



RESEARCH ARTICLE

Influence of Maternal Obesity on Reproductive Organ Weights and Sperm Quality in Male Offspring of Rats

Navya H¹. and Yajurvedi H N^{2*}

¹Research Scholar, Department of Zoology, University of Mysore, Manasagangotri, Mysore 570 006, India.

²Professor, Department of Zoology, University of Mysore, Manasagangotri, Mysore 570 006, India.

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*Address for correspondence

Yajurvedi H N

Professor, Department of Zoology,

University of Mysore,

Manasagangotri,

Mysore 570 006, India

Email:hnyajurvedi@rediffmail.com



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ABSTRACT

Adult female rats were divided into 2 groups and rats in one group were fed with normal diet (ND) whereas those in another group, with high calorie diet (HCD) for 8 weeks. After the confirmation of obesity, females of ND group and HCD groups were allowed to mate with normal males. The HCD rats continued to receive HCD during pregnancy and lactation periods. Male offspring of obese mothers were fed with HCD after weaning upto post-natal day 100. The pups of both groups were autopsied on post natal day (PND) 7, 13, 17, 24, 36, 100 and day of preputial separation. Offspring of high calorie diet fed mothers (OHCDM) showed a significant increase in weight of the testes at all age intervals over offspring of control mothers (OCM). There was a significant increase in the weight of the epididymis, vas deferens and seminal vesicle on PND 100 in OHCDM compared to OCM. In addition, OHCDM showed a significant decrease in total sperm count and increase in percentage of spermatozoa with abnormal morphology compared to OCM. The results indicate that maternal obesity and exposure to obesogenic diet in early life results in reduced sperm quality in rats.

Key words: offspring, high calorie diet, testis, sperm count.

INTRODUCTION

Obesity causes a variety of alterations in the reproductive system. Both over-nutrition and under-nutrition affect the reproductive system (Bray, 1997). In men testicular size remains normal, but serum concentration of testosterone





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decreases as obesity increases (Kley et al., 1980). Male obesity is associated with reductions in sperm concentration, counts of progressively motile sperm, and serum levels of total and free testosterone compared to normal individuals (Mokdad et al., 2001; Magnusdottir et al., 2005; Sallmen et al., 2006; Hammoud et al., 2008).

Similarly, adverse effect of obesity on reproduction has been observed in animal models. The obese rats had significantly smaller epididymis and seminal vesicles, larger prostates and underdeveloped testes compared with lean rats (Suh et al., 2011). High fat diet feeding for 15, 30 and 45 weeks in rats caused similar alterations in reproductive organ weights and sperm counts compared to standard diet group at all time points studied (Fernandez et al., 2011). Induction of high fat diet induced obesity in prepubertal rats showed increase in the body weight, BMI and Lee index and decrease in the relative testicular weight in mature rats (Hussain et al., 2015). However, in Zucker rats, the genetic model of obesity, the testis and epididymis weight of obese rats did not differ from lean rats (Edmonds et al., 1982). Likewise the testis and epididymis weight did not change in diet induced obese mice compared to normal mice (Ghanayem et al., 2010).

Despite number of studies on obesity and reproductive organ weights, effect of maternal obesity on offspring reproductive organ weights and sperm quality is not reported. There is a need to study this aspect as there is a high incidence of obesity in human populations. Mothers are exposed to high calorie diet during pregnancy, which indirectly exposes the fetus to obesogenic environment. Hence in the present study, effects of maternal obesity on male offspring, reproductive organs and sperm count has been investigated.

MATERIALS AND METHODS

Adult female rats were randomly divided into two groups, normal diet (ND) and high calorie diet (HCD) groups. The rats in normal diet group were fed with normal laboratory chow whereas those in HCD group were fed with high calorie diet (HCD), 10 gm/ day for two months to induce obesity prior to pregnancy. The HCD consisted of carbohydrate (33.63%), protein (12.78%) and fat (43.35 %) which was prepared by mixing casein, starch, egg yolk, raagi powder, rice powder, sugar, vanaspathi, soya powder and groundnut powder. Induction of obesity was assessed by biometric parameters (body weight and BMI). After confirmation of development of obesity, the female rats of both groups were allowed to mate with normal males. The dams of HCD group were fed with HCD throughout pregnancy and lactation. To maintain exposure to obesogenic environment, male offspring were also fed with HCD after weaning upto post-natal day 100. The pups of both groups were autopsied on post natal day (PND) 7, 13, 17, 24, 36, 100 and day of preputial separation. At each autopsy the body weight and body length were recorded and converted to BMI as per procedure of Novelli *et al* (2006). The weights of testis, epididymis, vas deferens, seminal vesicles were recorded at autopsy and later converted into relative organ weight (weight per/ 100 g body weight).

Total sperm count and sperm morphology

The cauda epididymis of one side was minced in 1 ml of PBS to release spermatozoa and sperm suspension was filtered in muslin cloth. Aqueous eosin(1%) was added to filtrate to stain the spermatozoa and stained filtrate was taken in a WBC pipette up to the 0.5 mark, diluted further up to the mark 11 with PBS, mixed well and charged into Neubauer's counting chamber. The number of spermatozoa present in eight outer squares of 1 mm² except the central erythrocyte counting area was counted. The aggregate of counts of eight squares was multiplied by 5×10⁴ factor to obtain the total sperm count/ epididymis.

A few drops of prepared suspension was spread on clean glass slide and sperm morphology defects, viz. pin shaped head, hammer shaped head, fork shaped head, double head, hook less and double tail were observed in the smear of sperm suspension according to the procedure of Narayana *et al.* (2002) and Vijayalaxmi and D'Souza (2004). A total of





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1000 spermatozoa were screened/cauda epididymis and number of spermatozoa with defective morphology was recorded in randomly selected areas of the smear and expressed as percentage of abnormal spermatozoa.

Statistical analyses

The mean value of each parameter was computed using data on at least 5 rats in each group and the mean values of control and HCD groups were compared using Student's t-test and judged significant if $P < 0.05$.

RESULTS

The body weight and BMI of adult female rats fed with HCD for 8 weeks were significantly higher than those fed with ND (controls) (Body weight: ND 169.5 ± 1.09 , HCD 208 ± 1.01 , $P < 0.05$; BMI: ND 0.61 ± 0.01 , HCD 0.80 ± 0.0 , $P < 0.05$). The male offspring of high calorie diet fed rats (OHCDM) showed a significantly higher body weight and BMI than controls at all age intervals studied (Table 1). The relative weight of the testes in OHCDM showed a significant increase over offspring of control mothers (OCM) at all age intervals studied (Table 2). Similarly, the weight of the epididymis of OHCDM on day of preputial separation and PND 100 and that of vas deferens and seminal vesicles on PND 100, showed a significant increase over OCM (Table 3). However the relative weights of vas deferens and seminal vesicle of OHCDM group did not significantly differ from OCM on post natal day of preputial separation.

Total sperm count and sperm morphology

The OHCDM showed a significant decrease in epididymal sperm count and increase in percentage of spermatozoa with abnormal morphology compared to OCM on PND 100 (Table 4).

DISCUSSION

In recent years in human populations, childhood obesity is growing at an alarming rate in developed and developing countries. The major cause is increase in consumption of foods with high levels of sugar and saturated fats combined with altered life style including decrease in physical activity (Teerds et al., 2011). Hence the present study was conducted to find out effect of exposure to obesogenic environment provided by maternal obesity during *in utero* development and lactation period and by HCD after weaning period up to PND 100, on reproductive organ weight and sperm quality. In contrast to earlier reports, wherein effect of obesity was studied following feeding with high fat diet either to young rats or adults, present study focused on reproductive effects of maternal obesity as well as high calorie diet during infancy, and reveal some interesting results.

Our present study showed that even maternal obesity can cause obese condition in new borns as male offspring of obese mothers showed a significantly higher body weight and BMI on PND 7, 13, 17 wherein they were completely dependent on nutritional support by mother. This trend continued with advancing age wherein these males were fed with HCD during pre-pubertal and pubertal period. Interestingly, the weight of the testis and accessory reproductive organs viz. epididymis, vas deferens and seminal vesicles of OHCDM showed significant increase over OCM.

It is reported that leptin treatment in ob/ob mice increases testis and seminal vesicle weight compared to controls (Barash et al., 1996). It is also known that in obese rats there is increased secretion of leptin (Ahima et al., 1997). Hence increase in weight of testis and accessory organs might be due to effect of leptin as reported in ob/ob mice (Barash et al., 1996). Increase in weight of reproductive organs is generally considered to be a sign of increased activity, as stimulation by gonadotropin increase the weight of gonads. However in the present study, interestingly increase in the weight of testis and accessory organs was accompanied by decrease in total sperm count and increase in percentage of morphologically defective spermatozoa, which suggest a decrease in quality of semen. Thus our study





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showed obesity induced increased weight of reproductive organs, results in decrease in sperm output as well decrease in quality of semen. Hence, increase in weight of reproductive organs of obese rats exposed to maternal obesity and obesogenic diet during prepubertal period, might be due to accumulation of fat rather than heightened activity of reproductive organs. However this aspect needs to be further investigation and our present study provides an insight into the deleterious effect of maternal obesity. Earlier, studies in humans (Jensen et al., 2004; Sallmen et al., 2006) and in rats (Vigueras-Villaseñor et al., 2011) showed decrease in sperm quality due to diet induced obesity. These studies were in adults. In contrast our study clearly demonstrates that even exposure to obesogenic environment *in utero* and early post-natal period also results in poor semen quality.

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Table-1: Body weight and body mass index of male offspring (F1) of high calorie diet fed female rats (F0)

	Groups	Age in post natal days						
		7	13	17	24	36	Day of preputial separation	100
Body weight (gm)	OCM	9.23 ± 0.59	17.28 ± 1.51	21.66 ± 0.54	37.70 ± 2.43	50.0 ± 1.67	140.5 ± 4.65	194.8 ± 5.40
	OHCDM	11.92 ± 0.71*	21.95 ± 0.71*	30.95 ± 1.01*	48.37 ± 2.40*	80.0 ± 2.7*	156.0 ± 3.87*	239.12 ± 6.15*
Body mass index (BMI) (gm/cm ²)	OCM	0.23 ± 0.0	0.28 ± 0.01	0.31 ± 0.0	0.34 ± 0.01	0.36 ± 0.02	0.42 ± 0.0	0.48 ± 0.0
	OHCDM	0.28 ± 0.0*	0.31 ± 0.0*	0.36 ± 0.0*	0.41 ± 0.01*	0.48 ± 0.01*	0.52 ± 0.01*	0.64 ± 0.01*

Note: OCM, offspring of control mothers; OHCDM, offspring of high calorie diet fed mothers; Mean values of control and OHCDM groups were compared using student's t test and judged significant (*) if P< 0.05.

Table-2: Relative weight of the testes of male offspring (F1) of control and high calorie diet fed female rats (F0)

Groups	Age in post-natal days						
	7	13	17	24	36	Day of preputial separation	100
OCM	174.45 ± 11.14	220.0 ± 3.46	261.90 ± 15.04	577.80 ± 17.89	698.37 ± 10.44	907.36 ± 37.11	1066.46 ± 30.94
OHCDM	209.10 ± 6.4*	359.93 ± 10.56*	424.34 ± 27.57*	670.69 ± 11.23*	889.25 ± 42.08*	1036.28 ± 27.94*	1174.36 ± 25.86*

Note: OCM, offspring of control mothers; OHCDM, offspring of high calorie diet fed mothers; Mean values of control and OHCDM groups were compared using student's t test and judged significant (*) if P< 0.05





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Table-3: Relative weight of accessory organs of male offspring (F1) of control and high calorie diet fed female rats (F0)

Age in Post Natal Days (PND)	Groups	Accessory organ weight (mg/100g body weight)		
		Epididymis	Vasdeferens	Seminal vessicle
PND of preputial separation	OCM	142.7 ± 6.08	50.24 ± 2.09	199.32 ± 15.22
	OHCDM	167.95 ± 5.43*	50.77 ± 2.27	203.81 ± 7.78
PND 100	OCM	338.20 ± 9.09	57.95 ± 1.22	357.0 ± 23.95
	OHCDM	368.18 ± 9.27*	64.80 ± 2.41*	445.8 ± 21.34*

Note: OCM, offspring of control mothers; OHCDM, offspring of high calorie diet fed mothers;

Mean values of control and OHCDM groups were compared using student's t test and judged significant (*) if P < 0.05.

Table-4: Total sperm count and percentage of sperm with abnormal morphology in male offspring (F1) of control and high calorie diet fed female rats (F0)

Groups	Total sperm count/cauda epididymis	Sperm abnormality
OCM	24.48 ± 0.47	3.0 ± 0.22
OHCDM	18.50 ± 1.24 *	10.02 ± 1.27*

Note: OCM, offspring of control mothers; OHCDM, offspring of high calorie diet fed mothers;

Mean values of control and OHCDM groups were compared using student's t test and judged significant (*) if P < 0.05.





The Relationship between Cultural Intelligence and Group Effectiveness of Faculty Members and Lecturers in Islamic Azad University, Zahedan Branch

Fatemeh Boshgazi^{1*}, Hassan Sharaki pour¹ and Mahnaz Shahraki pour²

¹Department of Training Management, Psychology Faculty, Islamic Azad University, Zahedan branch, Zahedan, Iran.

²Department of Statistics and Epidemiology, Faculty of Health, Medical University of Zahedan, Iran.

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*Address for correspondence

Fatemeh Boshgazi
Department of Training Management,
Psychology Faculty, Islamic Azad University,
Zahedan Branch, Zahedan, Iran.
Email: fboshgazi@gmial.com



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ABSTRACT

This research aims to study the relationship between cultural intelligence and group effectiveness .The research method is correlational .Statistical population of this research includes 300 faculty members and lecturers in Islamic Azad University of Zahedan in that 201 were selected by simple random method using Morgan table .Two questionnaires , Ang et. al., cultural intelligence questionnaire and Fridman and Yaro Berg effectiveness questionnaire have been used .Reliability coefficient of cultural questionnaire and group effectiveness were reported 0.874 and 0.925 ,respectively .Data analysis of obtained data was done through statistical indicators such as mean, deviations ,Pearson correlational coefficient ,and regression .

- a- A positive and significant relationship exists between group effectiveness and cultural intelligence.
- b- A positive and significant relationship exists between cognitive cultural intelligence, metacognitive cultural intelligence, behavioral cultural intelligence, and group effectiveness but a positive and significant relationship does not exist between motivational intelligence and group effectiveness.

Key words: cultural intelligence, (metacognitive, cognitive, motivational, and behavioral), group effectiveness.





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INTRODUCTION

In the third millennium, universities are considered as key elements in not only economic development but also industrial, cultural, and political development of developed and developing countries. This is clear because educational efficiency is beneficial in development of all countries. Faculty members are vital elements of universities. Undoubtedly, in educational systems, they are more important than syllabi and educational tools. Recognition of effective professional-motivational elements and group emotions are considered crucial for increased quality and successful planning. (Zia Nikpour and Shahraki, 2013). Groups can help organizations for successful implementation of tasks, in particular, groups provide synergy. Synergy is creation of a whole which is bigger than the ingredients. When synergy happens, groups work in excess ability each of their members. Organizations and managers obtain a considerable number of benefits through effective usage of groups as human resources.

Part of effectiveness in each group is determined by certain inputs which need to work with. Following general principles are true about groups as well. The better the inputs are, the higher the effectiveness of group will be. Inputs are considered as the first data in a group condition. Inputs provide the field for all group measures. If all inputs are satisfactory, it will enjoy strong scheme for effective follow up (Rezaeeian, 2012). The characteristics of each of group members are also important inputs which can be effective on group performance and what it does. Competencies as well as demographic and psychological features of group members are all important. (Rezaeeian, 2012, p273).

When groups are successful, they enjoy potential power to provide a noticeable number of advantages such as flexibility and rising creativity and they fail, they have lost a considerable number of resources. Thus, organizations need to pay attention to maximizing success probability of groups. Most experts believe that this fact needs an important ability which is cultural intelligence (David et. al, 1995). Cultural intelligence is the success key in the world of today. To have effective performance of work groups, groups must develop cultural intelligence themselves. Heterogeneous groups have bigger potential of success or failure in comparison with single-cultural groups. The trick is to maximize the positive effects of cultural diversity and to minimize its negative effects. (Thomas and Ixon, 2008). The concept of cultural intelligence was first introduced by Early & Ang, researcher of business school in London. These two have defined cultural intelligence as learning capability of new patterns in cultural-financial interactions as well as proposing correct behavioral responses to these patterns. (Early & Ang, 2003, p. 42)

Cultural intelligence center was introduced as one of four dimensional patterns to evaluate cultural intelligence considered as the most important conceptual frame of cultural intelligence. It has been used in this research as well as its dimensions include meta cognitive cultural intelligence (strategy), cognitive cultural intelligence (knowledge), motivational cultural intelligence, and behavioral cultural intelligence (Abbas Ali Zadeh and Naeji, 2011). In fact, four dimensional dimensions of cultural intelligence explain various processes during cross-cultural encounters. Meta cognitive intelligence focuses on higher-level of cognitive processes. Cognitive intelligence shows knowledge in comparison with norms and traditions in different cultures. (Ang et. al., 2007:337). It includes economic and legal (law) knowledge, social systems of various cultures and subcultures, knowledge, and awareness of major frames of cultural values. Motivational cultural intelligence reveals importance and the direction of energy and ability in accordance with learning and performance in cross-cultural situations and circumstances. This type of cultural intelligence is mainly introduced as a certain form of effectiveness, sense of being beneficial, or internal motivation in cross-cultural situations and circumstances. Finally, behavioral cultural intelligence is the ability of expressing appropriate verbal and non-verbal measures while dealing with people from different cultures. (Ang et. al., 2006:112). Francis and Yung stated the main features of effective groups as following: Combination of opposite force appearance they stated that effectiveness of groups must be evaluated by the same groups (Scott & Pollok, 2006:604). In addition to above mentioned topics, multicultural feature and multi-tribal texture of Iran, and in particular in Zahedan and scholar community, shows the importance of cultural difference-based discussions, solutions to manage them, and





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promotion of cross-cultural interactions in order to convert community diversity from threat status to opportunity . Considering the fact that cultural intelligence is a modern field of intelligence, it raises the possibility of mediation in diverse cultural spaces. Thus, studying the relationship between cultural intelligence and group effectiveness is highly important.

The Relationship between Cultural Intelligence and Group Effectiveness

Jafar Ghafari (2008,p70) ,studying the relationship between emotional and cultural intelligence and performance of managers of seminary schools ,concluded that enjoying these types of intelligence help managers obtain higher performance indicators .This research also showed that cultural intelligence plays a more important role on improvement and performance of mentioned managers in comparison with emotional intelligence .(Ghafari ,2008) . The results of Abzari research and others (2010) showed that a direct and significant relationship exists between cultural intelligence and group effectiveness in Mobarakeh steel company. (Abzari and others, 2010).

The results of Hadizadeh Moghadam and Hosseini researches conducted in Iran Administrative Modernization and Development Center entitled “the relationship between cultural intelligence and group effectiveness “ showed that a relationship exists between cultural intelligence and its components (knowledge (cognition), motivation, and behavior) and group effectiveness .(Hadizadeh Moghadam and Hosseini ,2008)

The results of another research entitled “the effect of emotional intelligence and cultural intelligence on achievement of leader in international level” revealed that a positive relationship exists between cultural intelligence of leaders and their success. (Moshabki and Tizrou, 2009).The research of Watson et. al., entitled “the effect of cultural diversity on process of communication and performance “showed that the difference between culturally homogeneous groups and diverse cultural groups vanished after 15 weeks .Inhomogeneous groups ,initially,showed weaker performance compared to homogenous ones but they acted better after a while .(Watson et. al., 1993) Thomas, Ravlin and Walals in their research entitled “the effect of cultural diversity among work groups” found out that cultural combination of groups affect their activities through three ways as following:

1. Cultural diversity or lack of cultural homogeneity in working groups
2. Social-cultural norms or cultural tendencies in working group in comparison with group structure and activity.
3. Cultural gap or the level of group members concerning culture (Thomas et. al., 1996)

Ang et. al., in his research, studied the effects and evaluation of cultural intelligence among foreign employees on cultural judgment and decision making ,cultural adaptability ,and performance .They found out that two components of behavior and knowledge influence performance .(Ang et.al., 2007)

Objectives

1. Describe demographic features of responders
2. Study the relationship between cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan branch.
3. Study the relationship between dimensions of cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan branch.
4. Determine the model of the relationship between cultural intelligence and the group effectiveness according to their factors.





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Questions

Main question

How is the relationship between cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch?

Secondary Hypotheses

1. How is the relationship between cognitive cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch?
2. How is the relationship between Meta cognitive cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch?
3. How is the relationship between motivational cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch?
4. How is the relationship between behavioral cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch?

RESEARCH METHODS

This research is analytic-descriptive with correlation outlook .Statistical population is all full time and part-time faculty members of Islamic Azad University, Zahedan Branch who were 300 in second semester of 2013-2014 .Random sampling method was used .

To determine sample volume,Krejcie and Morgan sample volume method (1976) was used .According to statistical population, sample volume (according to Morgan table), was calculated 168 which was considered 201 individuals. In this study, data collection tools are Ang et. al., cultural intelligence questionnaire and Fridman Yaro Berg group effectiveness questionnaire .Cultural intelligence questionnaire is a standard questionnaire with 19 questions .This questionnaire has been designed according to Likert spectrum (from completely disagree to completely agree) .Reliability of questions was reported 0.874 according to Alpha Cronbach coefficient.

Group effectiveness questionnaire is also standard with 21 questions .This questionnaire has been designed according to Likert spectrum (from completely disagree to completely agree).Reliability of questions was reported 0.925 according to Alpha Cronbach coefficient.Data analysis, according to nature of data and measuring scale in two statistical levels, includes determining frequency, percentage, and mean, standard deviation in descriptive level as well as factor analysis and Pearson correlation in inferential statistical level .All calculations were done by SPSS software version 18.

DATA DESCRIPTION

Table 1 explains frequency distribution and percentage of samples according to some variables including gender and level of education .As it can be seen from table 1, most responders are male with frequency of 142 and the highest number is for Master degree with frequency of 147.]

Statistical information related to age and teaching experience of statistical samples is in table2:

Table 3 shows general information of statistical indicators of research variables including Measures of Central Tendency and Index of dispersion.





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DATA ANALYSIS

The relationship between cultural intelligence and group effectiveness of faculty members and lecturers in Islamic Azad University, Zahedan Branch is analyzed using Amos software .The results are as following: (Figure1)

As it can be seen in table 5, the significance value is less than 0.05 for cultural intelligence and dimensions including Meta cognitive cultural, cognitive cultural intelligence, and behavioral intelligence .So it can be stated that, with confidence level of 95%, a significant relationship exists between above mentioned variables; however, the this value is 0.186 for motivational cultural intelligence which is more than 0.05. So it can be stated that,with confidence level of 95%, ,a significant relationship does not exist between motivational cultural intelligence and group effectiveness Pearson correlation coefficient was reported 0.094 for these two variables .This is a positive and close to zero value Thus, a direct and minor relationship exists between Motivational intelligence and group effectiveness ;however, a direct and medium relationship exists between cultural intelligence and other dimensions of cultural intelligence with group effectiveness. The highest relationship is reported for cognitive cultural intelligence and group effectiveness .To study more, the regression was done between cultural intelligence factors and group effectiveness.

As it can be seen in table 6 ,the significance levels are reported zero,0.007, for Meta cognitive and knowledge which are less than 0.05 and they have been removed from the model in another variable ,thus, Metacognitive and knowledge variables do have effect on group effectiveness .The effect of Metacognitive variable (0.191) and knowledge variable (0.292) are positive ,so their effect on group effectiveness are positive .Its equation is as following Group effectiveness=0.292 (cognitive cultural intelligence)+0.191 Meta cognitive intelligence

DISCUSSION AND CONCLUSION

This research aims to study the theoretical principles of cultural intelligence as a new and multi-dimensional structure in cultural studies as well as studying the relationship between cultural intelligence and its different dimensions with group effectiveness in university .Findings of this article indicates the existence of correlational relationship between cultural intelligence and group effectiveness .Among secondary indicators of cultural intelligence ,cognitive cultural intelligence had the highest positive relationship with group effectiveness and motivational cultural intelligence did not enjoy relationship with group effectiveness .Casual relationship between cultural intelligence and group effectiveness shows that faculty members usually experience high level of intercultural interactions and they can reach interlayers of culture by their cognitive cultural intelligence ,leading to better performance .New findings are in agreement with those of Z iaNikpour and Shahrakipour and Karim zadeh (2013) entitled "the relationship between cultural intelligence and effectiveness of faculty members in Roudhen university " .The result of the mentioned study showed that cultural intelligence and dimensions of cultural intelligence are related to effectiveness of faculty members .Also, effectiveness and dimensions of effectiveness are considerably related to cultural intelligence .These findings are compatible with findings of Abzari(2011) who concluded that a significant and direct relationship exists between cultural intelligence and group effectiveness in Mobarakeh Steel company ,Isfahan .

The results of this research are in agreement with those of Hadizadeh and Hosseini (2008) entitled "the relationship between cultural intelligence and group effectiveness" in Iran administrative modernization except for motivational cultural intelligence .Ang et. al., studied the effects and evaluation of cultural intelligence among foreign employees on cultural judgment and decision making, cultural adaptability, and performance. They found out that two components, behavior and strategy, affect performance (Ang et. al., 2007) which are in agreement with findings of this research.





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RECOMMENDATIONS

According to the results of this study and paying attention to the role of cultural intelligence and in particular two dimensions of Metacognitive and cognitive, a positive and direct relationship is reported with group effectiveness. Cultural intelligence needs to be considered as effective indicator in recruitment, performance evaluation, and promotion of faculty members especially in multicultural regions.

The ways of increasing cultural intelligence and group effectiveness need to be studied .Increasing the level of cultural awareness while interacting with others concerning various cultural fields.Increasing cultural knowledge from norms, values, rules, economic and legal contracts, cultural similarities and differences in different cultural environments

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Table 1 : Frequency distribution and statistical sample distribution according to gender and level of education

Variable		Frequency	Percentage
Gender	Female	58	29
	Male	142	71
Level of education	B.S.	6	3
	M.S.	147	72.1
	P.h.D.	48	23.9

Table 2: Statistical information according to variable and teaching experience

	Number	Minimum	Maximum	Mean	Standard deviation
Experience	189	1	30	9.80	6.864
Age	167	24	58	38.38	8.239

Table3: Statistical indicators of research variables

Variable	Measures of Central Tendency			Index of dispersion		
	Mode	Median	Mean	Extent of change	Variance	Standard deviation
Cultural	64	65	64.88	56	98.25	9.91
Strategic or meta cognitive	15	15	15.05	11	6.08	2.46
Cognitive	20	19	18.99	21	18.59	4.31
Motivational	18	19	18.48	17	11.93	3.45
Behavioral	16	12	12.34	16	15.38	3.92
Group effectiveness	66	66	67.37	79	153.59	12.39

Table 4: Results of significance for factor-analysis model

Model	Chi square statistics	Freedom degree	Significance level
Correlation	209.371	43	0.001





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Table 5: Results of Pearson correlation coefficient between cultural intelligence and group effectiveness

Variable	Group effectiveness	
	Correlation coefficient	Significance level
Cultural intelligence	0.347	<0.001
Meta cognitive cultural intelligence	0.303	<0.001
Cognitive cultural intelligence	0.365	<0.001
Motivational intelligence	0.094	<0.186
Behavioral intelligence	0.203	<0.004

Table 6: Regression coefficients

Independent variables		Non-standard coefficients		Beta	T statistics	Sig.level
		B	Standard error			
Model (1)	Intercept	47.471	3.696		12.845	0.00
	Knowledge	1.047	0.19	0.365	5.522	0.00
Model (2)	Intercept	37.049	5.294		6.999	0.00
	Knowledge	0.837	0.202	0.292	4.135	0.00
	Meta cognitive	0.958	0.354	0.191	2.71	0.007





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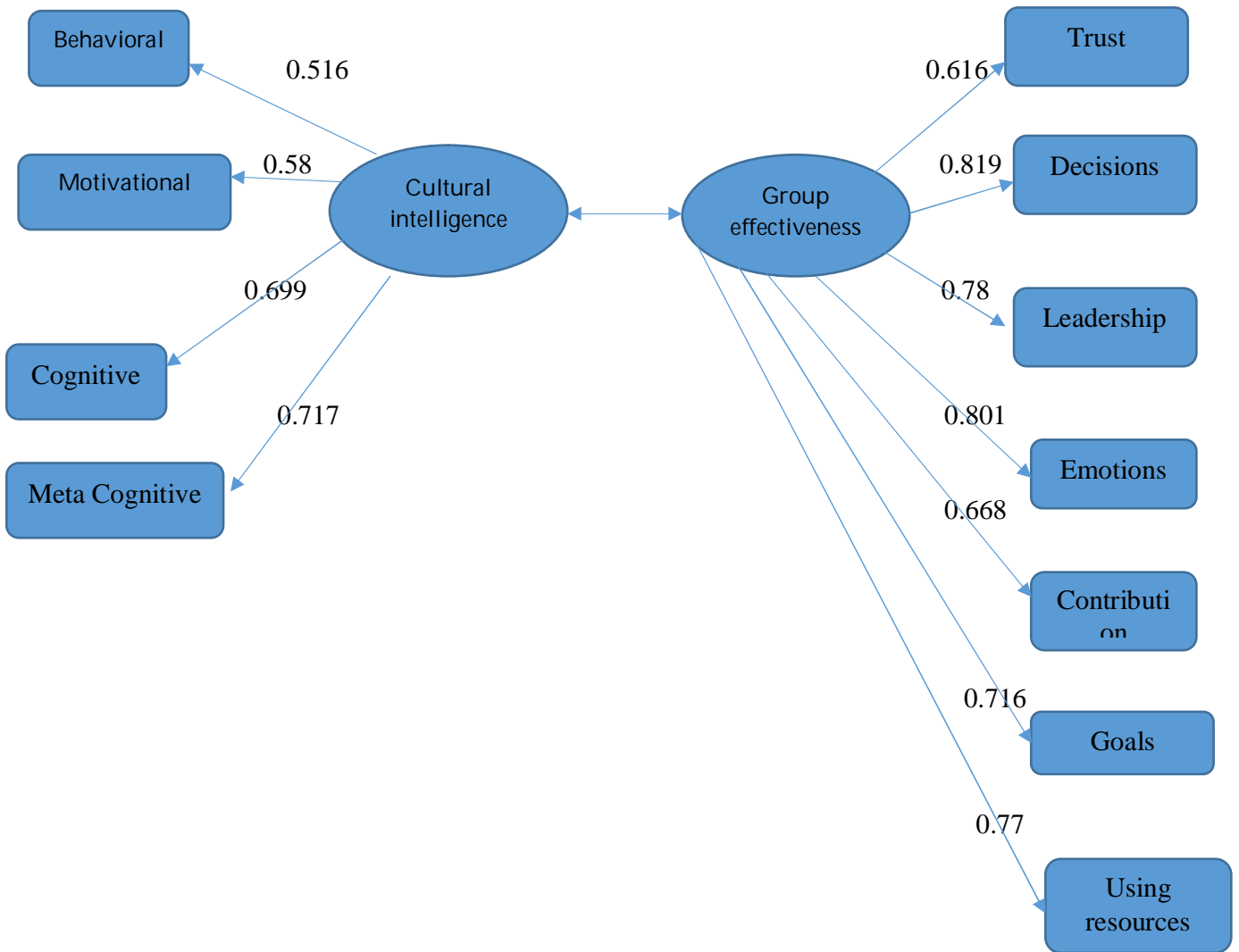


Figure 1: The relationship between cultural intelligence and group effectiveness according to their factors





RESEARCH ARTICLE

Positioning Crisis Management Support Bases using AHP Method and Integrating it with Fuzzy Logic (Case Study: Districts 5 and 22 of Metropolitan Tehran)

Siamak Mohammadi¹, Mohammad Fallah^{*2}, Mohsen Jafari²

¹MSc in Geographic and Urban Planning, Civil Engineering College, Maramd Branch, Islamic Azad University, Iran.

²MSc in Remote Sensing and Geospatial Information System, Civil Engineering College, Tehran Science Branch Azad University, Iran.

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*Address for correspondence

Mohammad Fallah

MSc in Remote Sensing and Geospatial Information System,

Civil Engineering College,

Tehran Science Branch Azad University, Iran

Email: Mohammadfallah2092@yahoo.com



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ABSTRACT

The establishment of each urban element in the spatial-physical position of the city subject to specific principles, rules, and mechanisms that in the case of observing, it would lead to success and efficiency for that element in that specific location. War crisis is the largest and most complex crisis that has cast a shadow on the history of human civilization. At the heart of this crisis, other major crises are appeared such as economic, security, and humanitarian crises like food and water shortages and prevalence of some diseases and other crises. Relief and rescue management in the crises related to war and invasion are a very necessary issue. Determining an appropriate location to establish support bases of crisis management is one of the most important duties and purposes of urban management which should be prepared in a systematic framework before implementation. In fact, the main purpose of positioning is to avoid wasting costs and ensure optimal performance of applications in the urban system. This research aimed at positioning support bases of crisis management in Districts 5 and 22 of Tehran city. The research method is a descriptive-analytic method, in which 12 base positioning indices were explained in two general forms by evaluating and studying the literature in the areas of land use and positioning. In the next stage, the coefficients of indices and criteria are determined using the Analytical Hierarchy Process (AHP) and ultimately, the most preferred locations in proportion to the objective are identified through overlaying information layers and applying these coefficients in ArcGIS software.





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The results showed that the support bases of crisis management in the studied area are not in a desirable situation in terms of distribution. Therefore, several locations have been proposed to create a new base for these regions after reviewing suitable locations for the construction of bases and matching with ground realities. It was also found that using multi-criteria decision techniques combined with GIS spatial analysis could be used as an efficient tool for positioning support bases. Locating bases in the vicinity of communication paths and its appropriate distance from fault areas have well proven the capability of the desired model in this research.

Keywords: war crisis, support bases of crisis management, spatial analysis, positioning, District 5 of Tehran, District 22 of Tehran

INTRODUCTION

Human threats like war have been raised a long time ago as one of the most destructive factors which is harmful to human. Hence, human efforts to deal with these events have led to open a new window of research activities and studies called "crisis management". In this regard, considering the situation of Iran and continuous exposure of this country with the phenomenon of war, it is worth to make efforts in order to practically achieve coherent methods and strategies for coping and logical behavior in order to minimize the tragic dimensions of such an event. It should be noted that what will make a disaster from this phenomenon is the lack of effective prevention and being unprepared to deal with its possible consequences. Since, Tehran is not only considered as the capital of the country, but also it is considered as one of the limited number of development poles and the most important of them, thus, its fate and end will leave extremely serious traces on the fate of the whole country after any unusual incident. One of the most important factors in reducing the waste of war is previous preparedness of a community to deal with the phenomenon of war. During occurring human disasters, several operations are done for injured people such as introducing shelters, medical supplies, primary rehabilitation, and determining temporary housing locations and emergency services and all these operations are accomplished in order to minimize damages and injuries. One of the basic measures to aid in the early hours of the crisis is crisis management support bases that the basic layout of constructing these bases goes back to the last decade. What is extremely important about aiding in positioning and establishment of these bases is the functional areas and positioning bases so that in addition to convenient access, positioning must be done in such a way that the structure be not threatened by any danger. In order to implement such actions, a comprehensive information system should be provided previously. Most disasters can be modeled and screened in the geographic information system (GIS). In fact, providing comprehensive services after the crisis such as earthquake will not be possible unless the geographic information system be a support for crisis management centers; because, the appropriate tool for crisis management is a comprehensive municipal information system with information layers and capabilities of decision-making, analyzing, and responding. Positioning process using GIS consists of performing certain stages that their implementations are inevitable in order to achieve reliable results. Generally, positioning process includes identifying stages, preparing the required data, creating and integrating maps and preparing output maps. Given that one of the main factors in crisis management is relief in the first hours and days of the crisis and also, the way of relief and its covered functional area are another criterion for its command and management and this ability is provided to create crisis management support service centers in critical situations and command capability in the North West of Tehran for Districts 5 and 22; the present research aims to measure and evaluate this capability and ability using GIS spatial analysis.

Research literature

Bahrampour and Bemanian (2012) in their paper entitled explaining the layout pattern of crisis management bases using GIS, (Case study: Tehran, District 3) have studied the requirements of positioning these bases by recognizing crisis management bases and their functions. For this purpose, some criteria have been developed for positioning





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these bases and expert opinions have been used in the section of analyzing for valuation and prioritization criteria. Then, the criteria's weights were calculated using EXPERT CHOICE software by matching the mentioned comments with the theoretical foundations of AHP method. Then, the collected information has been combined and analyzed using the spatial analyst of Geographic Information System and defining the desired criteria in the form of information layers and ultimately, the final value of each block has been calculated according to the mean value of the pixels of each block. Finally, the appropriate block has been provided for the establishment of these bases.

A research in America (2008) entitled a model based on GIS to determine the appropriate location of shelters for immediate evacuation by "Bandanakar" and "Michael A Hudson" in Florida can be mentioned as another research for positioning. The main purpose of this research was to identify the existing shelters and positioning with sheltering capability (schools, universities, churches, and community centers) based on their suitability and availability. This study was conducted in 17 areas of South Florida to obtain a final model by integrating two methods based on "weighted linear combination" and "success/failure showing technique". The results of this study indicate that 48 percent of shelters are located in poor areas and thus, 57 percent of locations with sheltering capability are located in inappropriate areas. Giovanizi 2008 concluded in a research that advances in information technology leads to strengthen many initiatives such as using simulation, damage scenario tools, Geographic Information System, and decision support systems to help rebuild after the crisis and also, its information and updating play a key role in post-crisis situations such as earthquakes and the analysis of human normal vulnerability increases the preparedness for facing with crisis.

Research Purposes

A- Main purposes

- Evaluating the effective spatial factors for optimal positioning of the desired application.
- Providing an appropriate model for optimal positioning of the crisis management support bases.
- Choosing the most appropriate location to establish the support bases of crisis management in the study area.
- Exploiting the achievements and results of this research for positioning crisis management support bases for other urban areas.

B- Secondary purposes

- Designing and implementation of a spatial information system for crisis management support bases and required modeling
- Taking advantage of the approach of passive defense in creating crisis management support bases
- Using fuzzy decision-making approach in relation to the positioning of bases

Geographical Information about the Study Areas

Geographic Area of District 5 in Tehran

5th District of the municipality with an area of 5287.1 hectares is located in the North West of Tehran which is limited to Karaj Special Road from the south, Alborz Mountains from the north, Kan watercourse and District 22 from the west, and Ashrafi Esfahani and Mohammad Ali Jinnah Highways from the east. This District is considered as one of the largest Districts of the 22 Districts of Tehran which is next to District 2 from the east, District 9 from the south, District 21 and 22 from the west. The population of this District according to the 1390's census is 793,750 (255,333 families), including 391,297 male and 402,453 female (Iran Statistical Center, 2011)

Deteriorated Areas

Deteriorated areas in the District 5 are classified to three types of short-live deteriorated areas (such as Shahre Ziba town and Moradabad village), fine deteriorated areas (such as Kan village), and impermeable deteriorated areas (such as Bagh e-Feiz village and Hesarak village).





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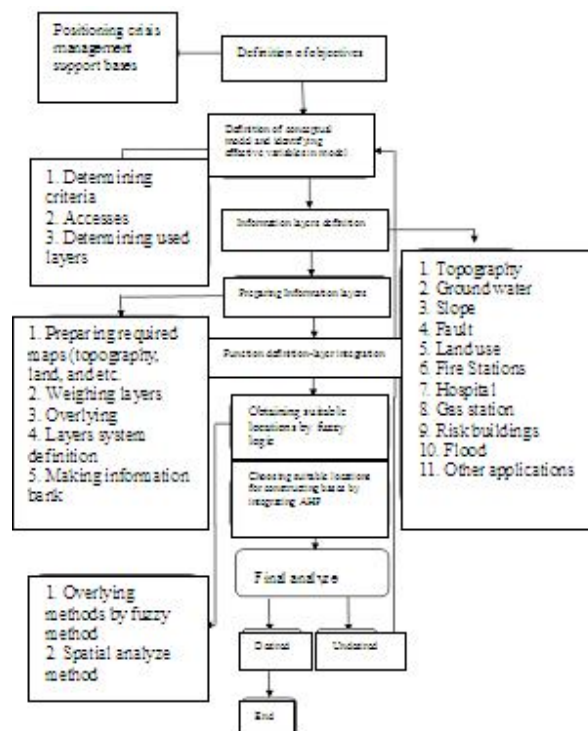
Geographic and Climatic Specifications of District 22 of Tehran

District 22 of Tehran Municipality is located between the East lengths of 51 5' 10" to 51 20' 40" and North latitudes of 35 32' 16" to 35 57' 19" in the north-west of Tehran and downstream of the Verdij and Kan rivers basin. The area is limited to the central Alborz Mountains from the north, Kan River from east, Tehran-Karaj highway from the south, and hand planted forests of Vardavard from the west and it is adjacent to Districts 5 and 21. The northern boundary of District 22 of Tehran Municipality has been developed until the end of the Alborz slopes up to an elevation of 1,800 meters. The area of this region is about 54000 hectares including the mountains that the maximum length and width approximately equal to 26 and 17 kilometers (Iran Statistical Center, 2011).

Analysis

Effective criteria in parking positioning

Various and different criteria are involved in positioning park lots. It was determined in Vent's researches that the current parking capacity, purpose and duration of parking and walking distance from the parking lot to the destination play an important role in determining the future of parking places. Due to the diversity of criteria in modeling, the criteria were divided into 6 main categories according to Table 1 and flowchart No. 1.



Flowchart (1). Research stages in the process of choosing a suitable location for the construction of crisis management support bases. A fundamental stage in this model is the indices determining process, in which the selected options are compared based on them. Criteria and indices of positioning for crisis management support bases. In this section, the most important criteria of positioning for crisis management support bases are evaluated.

A- physical criteria: respectively as follows:
Slope, height and fault





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B- Social and physical criteria:

Proximity to urban facilities and equipment, residential application, access to passages, green spaces, administrative centers, health centers, educational centers, military bases and distance from industrial application

Analytic Hierarchy Process (AHP).

AHP model which is first proposed by Professor Saaty (Saaty, 1980), shows that how the relative importance of some activities, options, and etc. can be determined in a multi-criteria decision problem. AHP process makes it possible to combine quantitative and non-palpable criteria with qualitative and palpable criteria at the same time. This process uses the comparison of binary alternatives and decision criteria. Pairwise comparison method (AHP) is one of the most prestigious and most widely used methods due to having a strong theoretical base, high precision, ease of use, reliability, having value and accuracy of results (Malczewski, 1999).

We use knowledge Driven method in this model.

Comparisons in this method are performed based on the theoretical judgments and their proportion are expressed qualitatively. Criteria are expressed according to Table (5) from 1 to 9 as a coefficient matrix.

Analytic Network Process (ANP)

Tomas Saaty has presented a method for multi-criteria decision in 1996 that this method is called network analysis process (Behboudi, Kiani, 2010, 9). Network analysis process is one of the decision-making techniques and it is placed in the series of compensatory models. This model has been designed based on the Analytic Hierarchy Process and it has replaced "network" instead of "hierarchy" (Faraji Sabokbar et al., 2010, 131). This feature makes it possible to systematically review the dependencies and feedbacks between criteria and sub-criteria. Generally, dependencies are linear (i.e., from top to bottom or vice versa) in the analytic hierarchy process (AHP). Now, if the dependency be bidirectional, i.e. the weight of indices depends on options and the weight of options depends on indices; the problem goes out of hierarchical type and it makes a network or non-linear system that the rules and formulas of AHP method cannot be used anymore. ANP provides a general framework, in which the dependencies between higher elements to lower elements and the dependencies of elements between themselves are emphasized. The success cause of this model is the high correlation of its results with the real world and its complexity. Considering that criteria in the real world usually are related to each other; traditional approaches in this regard cannot be used properly. For this reason, Saaty introduces network analysis process to obtain a set of suitable weights for criteria (Ghodsipour, 2005, 89). In general, this model has been created to fill the void of the lack of communication between the elements and criteria in the hierarchical model and its basis is forming a network of ties and links between elements and clusters. In fact, ANP link has two sections:

1. Section one: consists of a set of network control or hierarchical criteria and sub-criteria that controls the interactions and interrelationships;
2. Section two: it is a network of superiorities and effectiveness between elements and cluster.

ANP provides the conditions that the interaction between the levels of decision-making and decision criteria be considered and investigated more general (Saaty, 2005, 12-14).

RESULTS

Obtained Weights from AHP Model

As was mentioned: the first step in the analytic hierarchy process is creating a hierarchical structure from the investigated subject, in which the objectives, criteria, options, and relationships are shown between them. The next four steps in the analytic hierarchy process are calculating the importance coefficient of criteria and sub-criteria,



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calculating the importance coefficient of options, calculating the final score of options and evaluating the logical compatibility of judgments (Zebardast, 2001, 15). However, in this study, only criteria weighting is used in Expert Choice software environment and the extracted weights from Expert Choice software have been shown in Table 6.

The compatibility coefficient of criteria comparison is 0.05 which is less than the acceptable limit 0.1 in AHP and it is appropriate.

Results of fuzzy logic model

In order to implement fuzzy logic model in GIS, the following actions have been done:

First stage

Initially, the standard Euclidean distance of criteria was obtained using Distance Tool in the spatial analyst. Digital layers of distance for each criterion were extracted individually with the size of 20 pixels.

Second stage

At this stage, each layer was multiplied by the obtained weight from AHP and weighted layers are obtained. Then, the membership of an element is defined in a set with a value in the range of one (full membership) to zero (no membership) (Bonham-Carter, 1991). In fact, one of the most important steps in fuzzy logic is defining fuzzy membership value for each of criteria.

For this purpose, the operating instruction of Fuzzy Membership in Arc Toolbox is used. In fact, the definition of the fuzzy membership is the standardization of criteria that is one of the most important stages of Multiple Criteria Decision Making (MCDM).

Membership functions in fuzzy degrees include: S-shaped, J-shaped, linear, user-defined (Eastman, 1993, 112) and Gaussian (Gaussian). In this study, the linear method is used due to the linear nature (zero to one) of the criteria. Digital layers of Fuzzy Membership for criteria are shown as an example in the following figures.

Third stage: In this stage, the fuzzy overlay has been performed. For this purpose, digital layers which have become fuzzied in the last stage are overlaid in this stage that five operators exist for this purpose. In this research, gamma function has been used with a value of 0.9.

The above figure shows the final map obtained from fuzzy overlaying of criteria (desirability of spaces for the construction of support bases) (Source: Author). Digital layers obtained from overlaying suitable spaces are shown in the figure for positioning support bases. So that in this map, whatever the pixel size gets closer to red color, its desirability is reduced and conversely, pixels that have blue color the most appropriate locations for the construction of bases. In the final map, the most desirable points for the construction of support bases were spotted and they show the suitable spaces for construction.

CONCLUSION

1. According to the conducted surveys by the Hierarchy Analytic questionnaire, the most important effective criteria were prioritized in positioning the bases. So that each criterion has its score in the positioning process. Residential application criterion achieved the highest score.
2. Based on the research findings and also, the proposed methods in the first and third chapter of the research, hierarchical analysis models and fuzzy logic initially valued the criteria and then, the most suitable locations





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were shown in the GIS software. In fact, the results show that Multiple Criteria Decision Making system (MCDM) along with GIS can be used as an efficient tool for positioning the locations for bases. Locating bases in the vicinity of communication paths and its appropriate distance from fault areas have well proven the capability of the desired model in this research. (Figure 18)

3. The nearest neighbor technique was used in GIS software in order to analyze the distribution pattern of the support bases of Districts 5 and 22. The results showed that the value of R in District 5 is equal to 1.84 which indicates that the pattern is scattered. Since, the results of the applied model for analyzing the spatial distribution pattern show the irregularity of the distribution pattern of crisis management support bases in Districts 5 and 22; this means that there is still not a regular pattern in these spaces. Thus, spatial organization of the bases seemed necessary.
4. In fact, passive defense is a set of measures and actions which should be performed using tools and geo-environmental conditions and without the need for labor human resources. So that these measures can also increase the defense power of crisis management support bases and decrease the crisis consequences. While, the possibility to reconstruct the affected areas should be provided at the lowest cost. In this regard, it is emphasized that passive defense plans should be prepared and implemented before the enemy attack and in peace time. Thus, the use of passive defense measures and considerations will increase the efficiency of defense plans, objectives and projects at the time of the invasion of enemies in addition to the severe reduction of costs.

Recommendations

- Using the new logical models and efficient tools and systems, particularly by taking advantage of GIS to make decisions and solve urban problems, urban decision-makers and planners can follow their goals and missions with precision and faster speed.
- The proposed method in this study enables the crisis management and prevention organization to take actions more easily and accurately despite the number of parameters and different values in identifying and choosing desired and secure locations for the construction of crisis management support bases.
- According to the obtained results regarding optimizing the positioning process for future researches, the following cases are recommended:
- The role and impact of other factors such as soil type, gas pipelines and etc. can be evaluated in positioning the bases.
- If it is possible to access more detailed specifications of the used layers including the type and amount of faults' activity, surveying the seismic resistance of transport lines and etc., applying them will lead to more accurate results in the positioning process.

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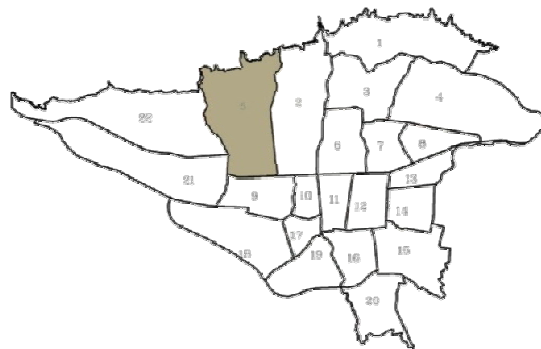


Figure 1: Location of the District in Tehran city





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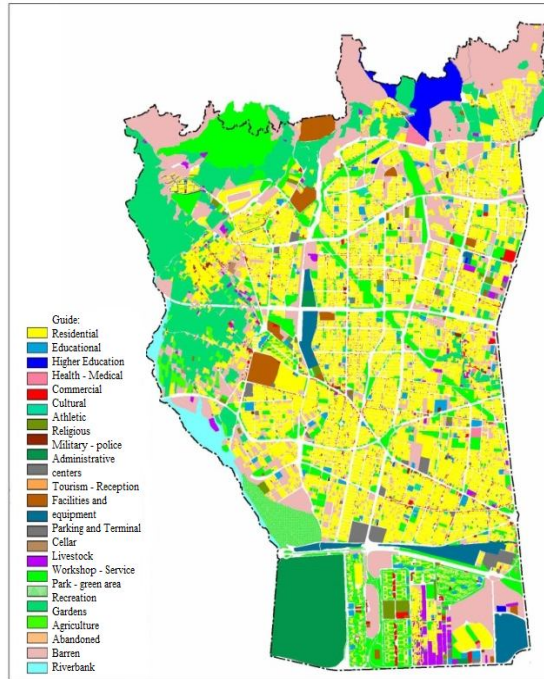


Figure 2: Land use of District 5 in Tehran

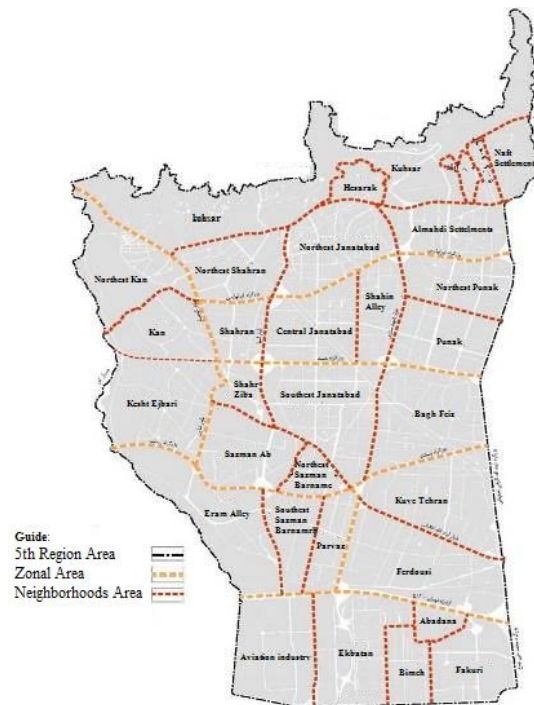


Figure 3. Geographic area of District 5 in Tehran





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Table 1. Prioritization of deteriorated areas and methods of intervention in them

Name of area	Type of deteriorated areas	Suggested strategies
Kan	Fine	Preserving physical structure as a Physical structure
Bagh e-Feiz	Fine and impermeable	Preserving and strengthening the body of urban garden in the area, increasing the permeability
Hesarak	impermeable	Strengthening the fields for construction through applying appropriate standards for increasing permeability and improving the quality of the environment
Moradabad	short-live	Strengthening the quality of quality of preventing constructions inconsistent with the rural context
Share ziba	short-live	Positioning for the establishment of the required services, urban block of the quality improvement

Table 2. Specifications of deteriorated areas

deteriorated areas		The extent of deteriorated area	Area (ha)	Current status					Suggested status			
Zones	Neighborhoods			Population (Person)	Average of parts (m ²)	Residential user surface (m ²)	Commercial services and activities user surface (m ²)	Permeability index	Population (Person)	Average of parts (m ²)	Residential user surface (m ²)	Commercial services and activities user surface (m ²)
2	Bagh e-Feiz	41.6	100.4	9208	300	160160.5	42859.4	Weak	41322	400	1599.3	36209
2	Share ziba	21.1	23	3920	1200*	97875.4	18134.5	Medium	21225	2000**	210945	-
6	Kan	61.3	148.7	17300	128	394083.7	56527.1	Weak	31327	500	20533.6	36594.4
7	Hesarak	18.1	50.6	2988	177	98165.3	8528.8	Weak	6853	250	112193.7	5896.8
7	Moradabad	2.3	24	800	177	13427.2	1333.5	Medium	1723	250	1488.2	6037.2

* The average of block sizes in Shahre ziba residential complex in the current status

** The average of block sizes in Shahre ziba residential complex in the current status in suggested status.





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Figure 4. Geographic area of District 22, Tehran

Table 3. Area and application percentages of District 22 in 2006

Application	Area	percentage
Commercial	8.98	0.18
Park - green area	1324.02	26.24
Public services	1778.62	35.25
Industrial-workshop	52.94	1.05
Parking and Terminal	72.74	1.44
Facilities and equipment	36.32	0.72
Barren and unconstructed lands	1431.38	25
Passages network	610	10.73
Gardens and Agriculture	80.48	1.59
Pure Residential	301.21	5.97
Coed Residential	16.37	0.32
Cultural and Religious	2.6	4
Health - Medical	3825	7
Administrative	16	3
Total area	5712.79	100.00





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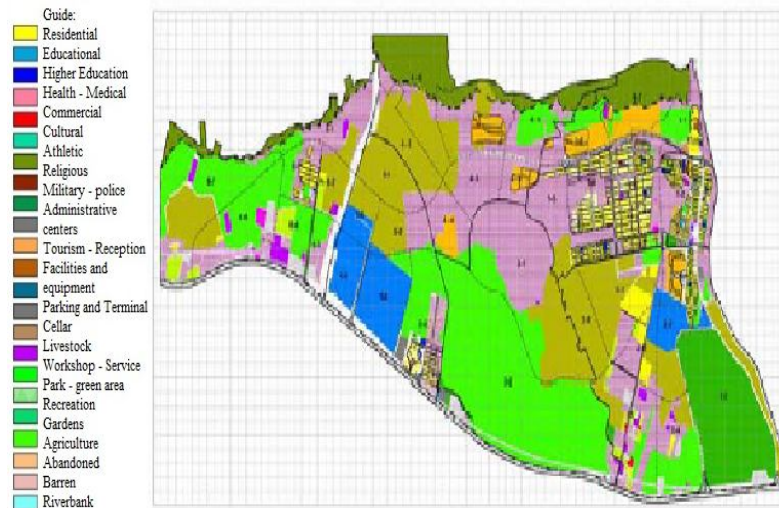


Figure 5. Land use map of the current status

Table4. The importance of proportions in paired comparisons

Degree of importance	Definition	Explanation
1	Equal importance	In the research purpose, two criteria have equal importance.
3	Slightly higher importance	Experience shows that the importance of i is a little more than j in the research purpose.
5	Higher importance	Experience and reflection shows that the importance of i is clearly more than j.
7	Much more importance	It was proved practically that that the importance of i is much more than j.
9	Absolute importance	The much more importance of I than j have definitely been proved
2-4-6-8	Intermediate values	When there is a middle position.

Source: (Aghababaei, 2009: 145)



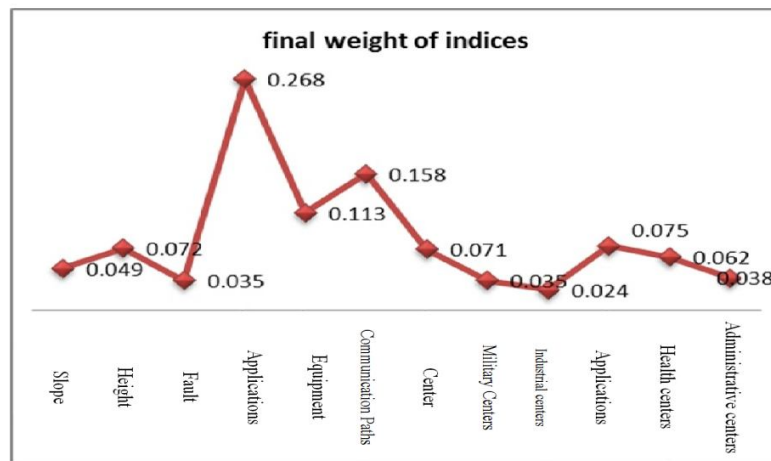


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Table 5. The final weight of effective indices in positioning crisis management support bases (Under Expert Choice Software)

Index	Final weight
Slope	0.049
Height	0.072
Fault	0.035
residential application	0.268
urban facilities and equipment	0.113
Communication paths	0.158
Educational Centers	0.071
Military Centers	0.035
Industrial centers	0.24
Green space application	0.075
Health centers	0.062
Administrative centers	0.038
Total weight	1

(Source: Author)



Graph 1: The final weight of criteria





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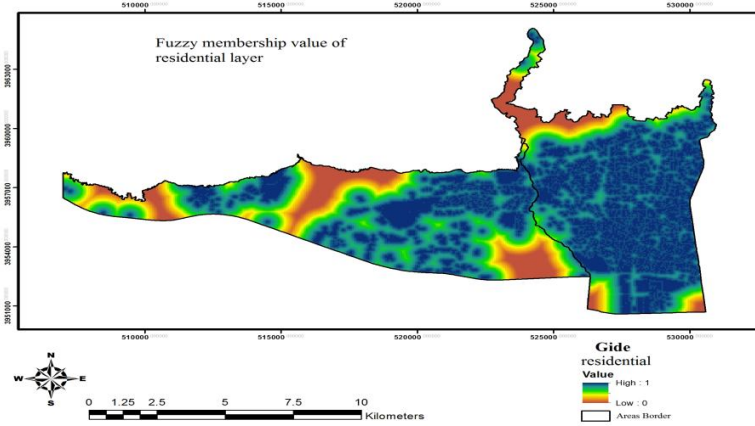


Figure 6. Euclidean distance of residential layer

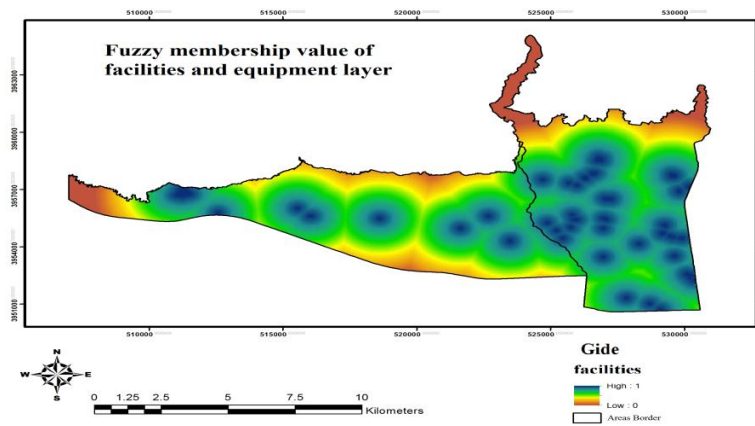


Figure 7. Euclidean distance of facilities and equipment layer

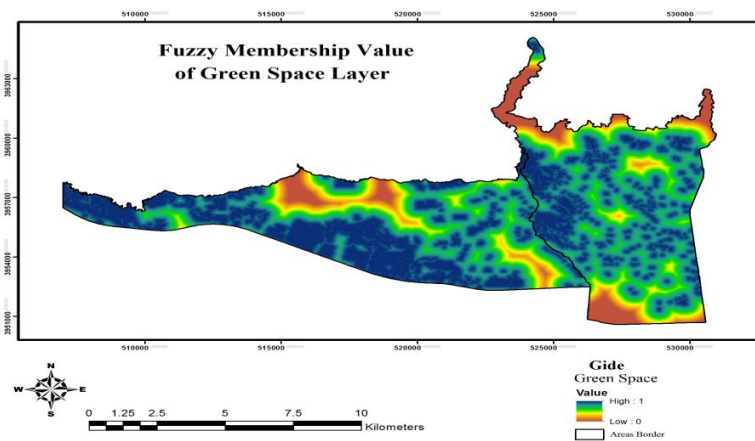


Figure 8. Euclidean distance of green space layer





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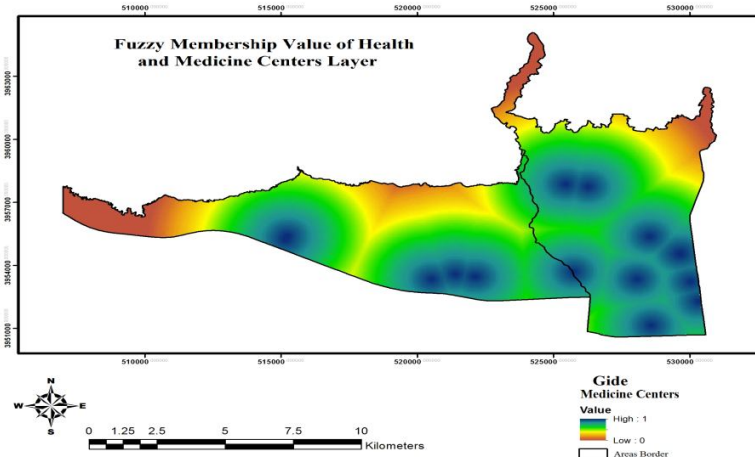


Figure 9. Euclidean distance of health and medicine centers layer

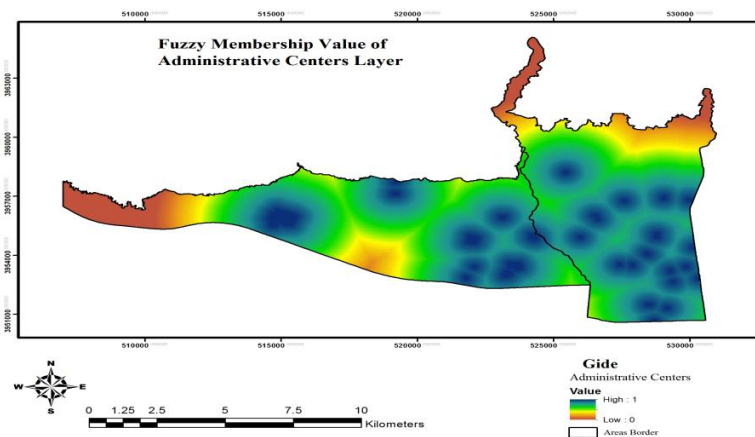


Figure 10. Euclidean distance of administrative centers layer

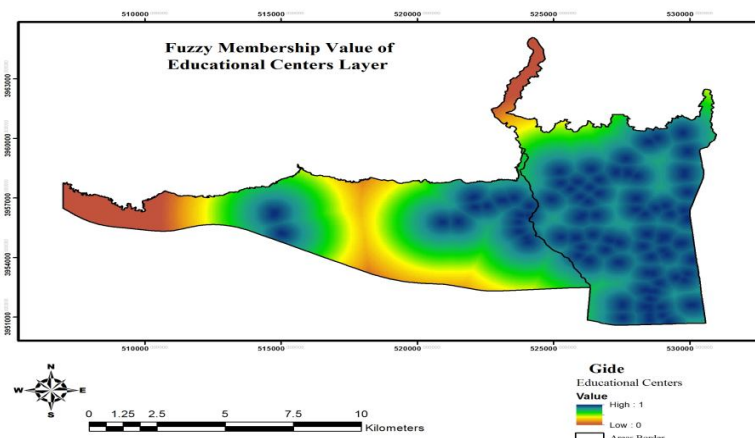


Figure 11. Euclidean distance of educational centers layer





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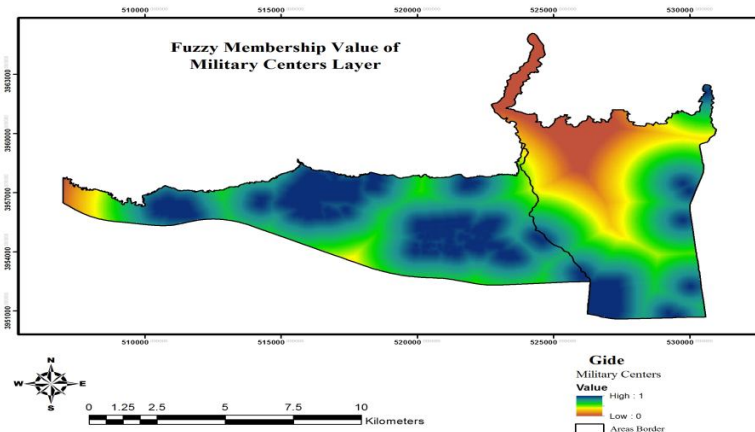


Figure 12. Euclidean distance of military centers layer

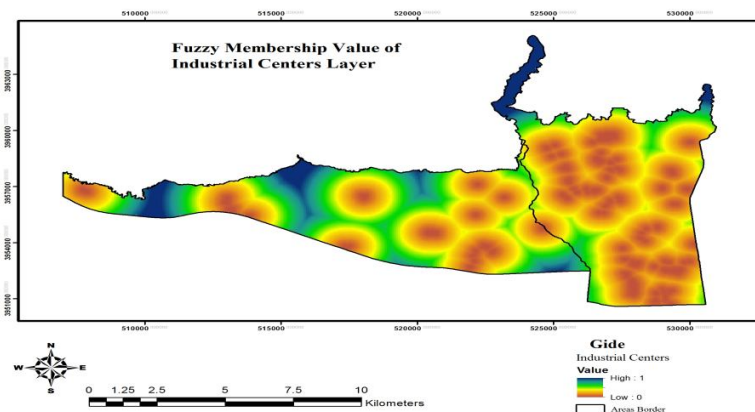


Figure 13. Euclidean distance of industrial centers layer

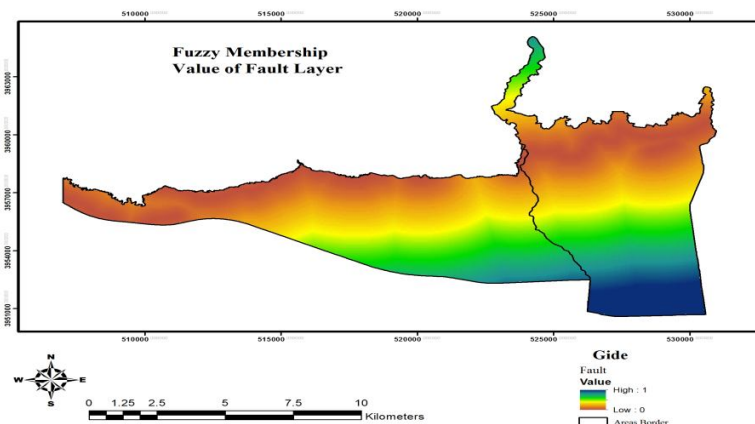


Figure 14. Euclidean distance of fault layer





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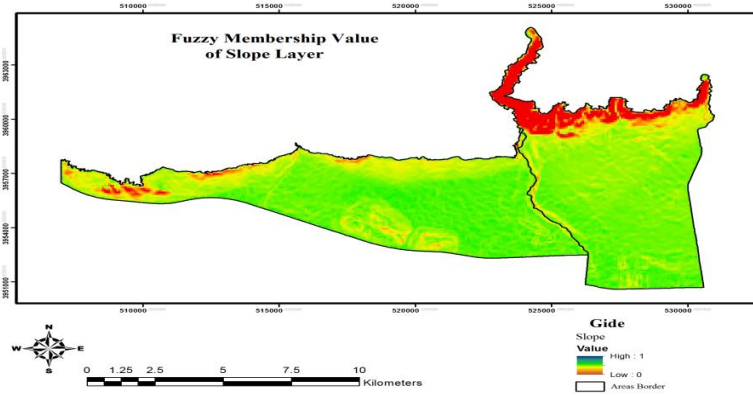


Figure 15. Euclidean distance of slope layer

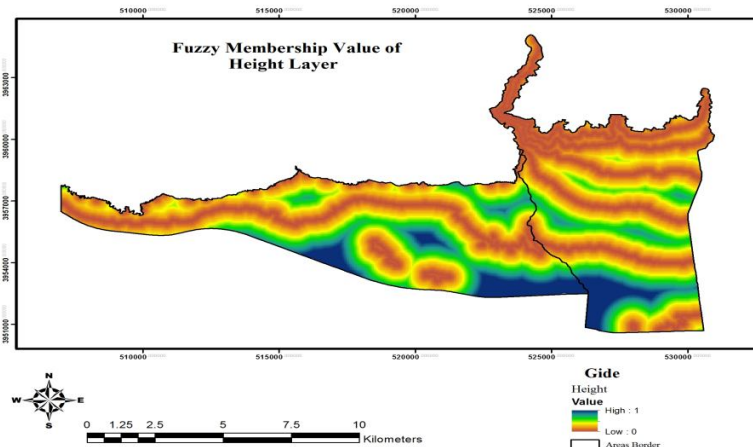


Figure 16. Euclidean distance of height layer

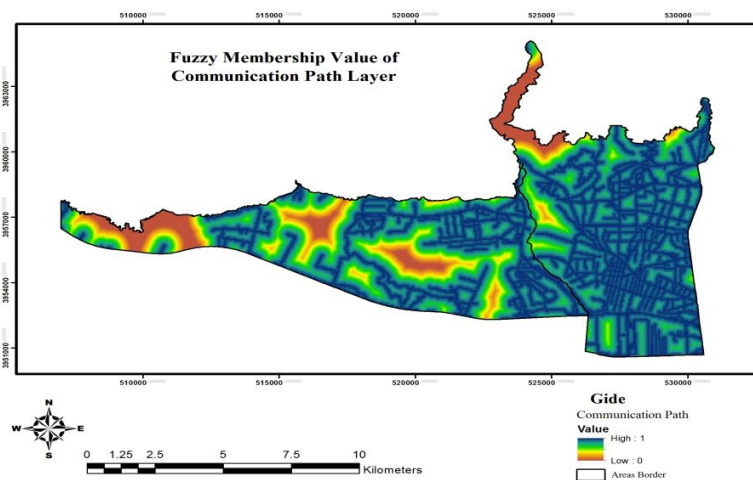


Figure 17. Euclidean distance of communication path layer





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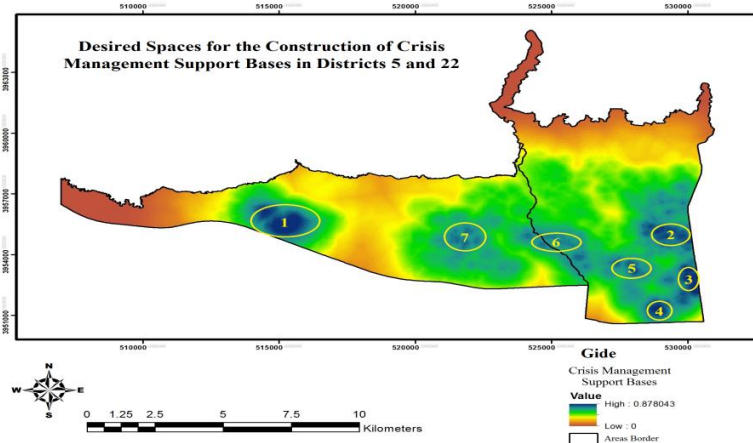


Figure 18. Desired spaces for the construction of crisis management support bases in Districts 5 and 22

Table 6. Summary of the nearest neighbor averages of District 5

The actual distance of the nearest support base	1215.44 m
The expected distance of the nearest support base	657.77m
R value	1.84
value Z	4.58

(Source: Author)

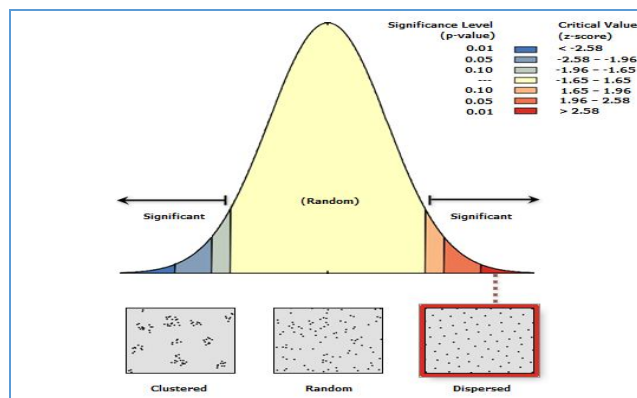


Figure 19. Summary of the nearest neighbor averages of crisis management support bases of District 5
(Source: Author)





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Table 7. Summary of the nearest neighbor averages of District 22

The actual distance of the nearest support base	1197.02m
The expected distance of the nearest support base	720.18m
R value	1.66
Z value	3.10

(Source: Author)

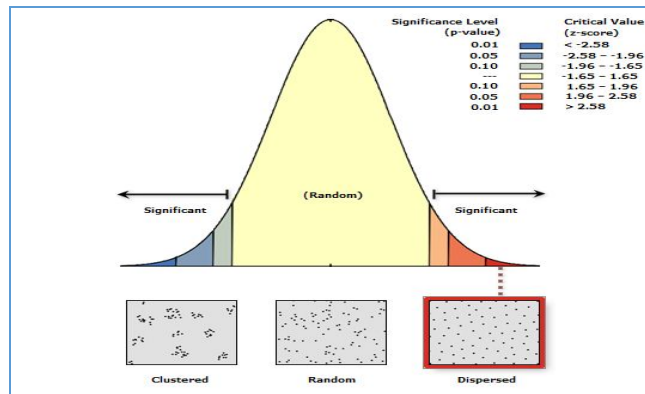


Figure 20. Summary of the nearest neighbor averages of crisis management support bases of District 22 (Source: Author)





RESEARCH ARTICLE

New LSB Method Base on Relative Complexity of the Pixels

Sara khosravi

Department of Computer, Payame Noor University, PO BOX 19395-3697, Tehran, Iran.

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*Address for correspondence

Sara khosravi
Department of Computer,
Payame Noor University,
PO. BOX 19395-3697 Tehran, Iran
Email: Khosravi_un@yahoo.com



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ABSTRACT

There are many ways to hide information or transmission of information secretly. In this sense steganography is the best part of sending information secretly. Steganography like watermarking and fingerprinting is branch of science to hide information but unlike watermarking and fingerprinting in steganography presence of a hidden text to be undetectable. There are many techniques to perform steganography on electronic media, most notably audio and image files. This paper intends to give an overview of image steganography, its uses and techniques. It also attempts to identify the requirements of a good algorithm steganography. The outcome of this paper is to generate a cross platform that can effectively hide a message inside a digital image file. An image is the combination of several pixels and each pixel has three color numbers and an image consist of millions of numbers. So the change in few color numbers resulting the picture which would probably look a lot likes the original image. In this paper we are presenting the technique which works by changing a few pixel color value at specific points in the image. The points selected with mathematical operations based on image and considering the criteria of color intensity. It is also trying not to degrade image quality and information stored will not lose their security and as far as possible does not change the image size.

Key words: steganography, watermarking, fingerprinting, pixels, color intensity, image quality, image size

INTRODUCTION

Since the rise of the Internet one of the most important factors of information technology and communication has been the security of information. Cryptography was created as a technique for securing the secrecy of communication and many different methods have been developed to encrypt and decrypt data in order to keep the message secret.





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Unfortunately it is sometimes not enough to keep the contents of a message secret, it may also be necessary to keep the existence of the message secret. The technique used to implement this, is called steganography. The word steganography is derived from the Greek words “stegos” meaning “cover” and “grafia” meaning “writing” [1] defining it as “covered writing”. The information communicated comes in numerous forms and is used in many applications. In a large number of these applications, it is desired that the communication to be done in secret. Such secret communication ranges from the obvious cases of bank transfers, corporate communications and credit card purchases, on down to a large percentage of everyday emails [2].

There has been a rapid growth of interest in this subject over the last ten years and for two main reasons [3].

1. The publishing and broadcasting industries have become interested in techniques for hiding encrypted, copyright marks and serial numbers in digital films, audio recordings, books and multimedia products; an appreciation of new market opportunities created by digital distribution is coupled with a fear that digital works could be too easy to copy.

2. Moves by various governments to restrict the availability of encryption services have motivated people to study methods by which private messages can be embedded in seemingly innocuous cover messages. The ease with which this can be done may be an argument against imposing restrictions. Capacity, security and robustness, are the three main aspects affecting steganography and its usefulness [4].

- Capacity refers to the amount of data bits that can be hidden in the cover medium.
 - Security relates to the ability of an eavesdropper to figure the hidden information easily.
 - Robustness is concerned about the resist possibility of modifying or destroying the unseen data steganography.
- This paper will focus on hiding information in images in the next sections.

There are lots of techniques available that implement steganography on a variety of different electronic mediums. We are using the technique depend on the digital image as digital images often have a large amount of redundant data and this is what steganography uses to hide the message. The data can hide within the image by changing the image content i.e. by changing the color of the pixels. By this technique we can hide a large volume of data inside the image. Once implemented, it is not necessarily perceptible to a human eye that the image has been changed, but to a computer simple statistical analysis can pinpoint a changed image from original one. It is so easy for a computer to notice these changes are.

Historical Instances of Steganography

1. In 440 BC, Herodotus mentions two examples of Steganography in The Histories of Herodotus. Demeratus sent a warning about a forthcoming attack to Greece by writing it on a wooden panel and covering it in wax. And other of Histiaeus, who shaved the head of his most trusted slave and tattooed a message on it. After his hair had grown the message was hidden [5].
2. During World War II, invisible inks were used to conceal information in seemingly standard, innocuous memos or letters. Common sources for invisible inks are milk, vinegar, fruit juices and urine. Each one of these substances darkens when heated and was especially effective during this time due to the fact that the sources were always readily available [6].
3. In the Second World War the Microdot technique was developed by the Germans. Information, especially photographs, was reduced in size, extremely difficult to detect [7].
4. Although steganography is an ancient subject, the modern formulation of it is often given in terms of the prisoner's problem proposed by Simmons [8], where two inmates wish to communicate in secret to hatch an escape plan. All of their communication passes through a warden who will throw them in solitary confinement should she suspect any covert communication [9].

The warden, who is free to examine all communication exchanged between the inmates, can either be passive or active. A passive warden simply examines the communication to try and determine if it potentially contains secret information. If she suspects a communication to contain hidden information, a passive warden takes note of the



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detected covert communication, reports this to some outside party and lets the message through without blocking it. An active warden, on the other hand, will try to alter the communication with the suspected hidden information deliberately, in order to remove the information [10]

Different kinds of steganography

For hiding secret information in images, there exists a large variety of steganographic techniques some are more complex than others and all of them have respective strong and weak points The.Figure 1 shows the four main categories of file formats that can be used for steganography.

Hiding information in text is historically the most important method of steganography. An obvious method was to hide a secret message in every nth letter of every word of a text message. It is only since the beginning of the Internet and all the different digital file formats that is has decreased in mportance [10].Given the proliferation of digital images, especially on the Internet, and given the large amount of redundant bits present in the digital representation of an image, images are the most popular cover objects for steganographyThis paper will focus on hiding information in images in the next sections.

To hide information in audio files similar techniques are used as for image files. One different technique unique to audio steganography is masking, which exploits the properties of the human ear to hide information unnoticeably. A faint, but audible, sound becomes inaudible in the presence of another louder audible sound [10]This property creates a channel in which to hide information. Although nearly equal to images in steganographic potential, the larger size of meaningful audio files makes them less popular to use than images[1].The term protocol steganography refers to the technique of embedding information within messages and network control protocols used in network transmission [11] In the layers of the OSI network model there exist covert channels where steganography can be used [12]. An example of where information can be hidden is in the header of a TCP/IP packet in some fields that are either optional or are never used. A paper by Ahsan and Kundur provides more information on this [13]

Difference Steganography whit other technologies

Steganography differs from cryptography in the sense that where cryptography focuses on keeping the contents of a message secret, steganography focuses on keeping the existence of a message secret [14]. Steganography and cryptography are both ways to protect information from unwanted parties but neither technology alone is perfect and can be compromised. Once the presence of hidden information is revealed or even suspected, the purpose of steganography is partly defeated [14]. The strength of steganography can thus be amplified by combining it with cryptography.Two other technologies that are closely related to steganography are watermarking and fingerprinting [10]. These technologies are mainly concerned with the protection of intellectual property, thus the algorithms have different requirements than steganography. These requirements of a good steganographic algorithm will be discussed below. In watermarking all of the instances of an object are “marked” in the same way. The kind of information hidden in objects when using watermarking is usually a signature to signify origin or ownership for the purpose of copyright protection [15]. With fingerprinting on the other hand, different, unique marks are embedded in distinct copies of the carrier object that are supplied to different customers. This enables the intellectual property owner to identify customers who break their licensing agreement by supplying the property to third parties [10]In watermarking and fingerprinting the fact that information is hidden inside the files may be public knowledge – sometimes it may even be visible – while in steganography the imperceptibility of the information is crucial [14].

Current Work

The image combination of pixels. Each pixel shows a color and specified whit a number. Thus the computer an image is a collection of numbers that constitute different light intensities in different areas of the image. This numeric





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representation forms a grid and the individual points are referred to as pixels[16].Each pixel set of multi-bit. The number of bits in a color scheme, called the bit depth, refers to the number of bits used for each pixel. The smallest bit depth in current color schemes is 8, meaning that there are 8 bits used to describe the color of each pixel. Monochrome and grey scale images use 8 bits for each pixel and are able to display 256 different colors or shades of grey. Digital color images are typically stored in 24-bit files and use the RGB color model, also known as true color. All color variations for the pixels of a 24-bit image are derived from three primary colors: red, green and blue.Mixture of this three color in any pixel is the 24 bit binary number 8 bit of it belong to red color, 8 bit belong to blue color, 8 bit belong to green color. Thus in one given pixel, there can be 256 different quantities of red, green and blue, adding up to more than 16-million combinations, resulting in more than 16-million colors. Not surprisingly the larger amount of colors that can be displayed, the larger the file size [17,18,19,20]. in image steganography it works by changing a few pixel color value

Convert text to byte

Data is converted into the bytes that are each character in message is converted into its ASCII equivalent. Moreover if message is password protected, then while retrieving message, the retriever has to enter the correct password for viewing the message for an example if we are taking the character "a" in the message then "a"=" 01100001 is stored in byte array. Because ASCII value for "a" is 97 and binary equivalent is 01100001.

Hide the text in the image

At 8 bit of the color that is processing, with alteration 2 least significant bit , Significant changes that we sighted system can detect changes in color is not in it. In this case leas significant bits have 4 state. Which is shown in Table 1. If we want to store information in 2 bit, at the worst situation 2 bit became symmetry, for example if the red number is a 10111011 pixel, and we want to store the information in 2 least significant bit, at the worst situation the red color number altered to 10111000, examinations shows that HVS can not distinguish this alteration.So our idea was it, we insert our information into color's least significant bits.it is obviously that each character is 8 bit, so with storing it's bits into 2 least LSB, we can store the information in the image.

Message Embedding In Digital Image

Hiding image involves embedding the message in to the digital image. Each pixel typically has three numbers associated with it, one each for red, green, and blue intensities, and these value often range from 0-255. In order to hide the message, and data is first converted into byte format and stored in a byte array. the message is then encrypted and then embeds each bit into the LSB position of each pixel position. It uses the first pixel to hide the length of message (number of character).Suppose we only change the last two bits are the bits that determine the "one place", and the "two place" . We can only alter the original pixel color value by 3. we use four colors in two pixel to store 8 bits character

The first color in first pixel: r7 r6 r5 r4 r3 r2 r1 r0

The second color in first pixel:g7 g6 g5 g4 g3 g2 g1g0

The third color in first pixel: b7 b6 b5 b4 b3 b2 b1b0

The first color in second pixel: r7 r6 r5 r4 r3 r2 r1 r0

My character have (c7 c6 c5 c4 c3 c2 c1 c0) bits. Then we can place two of these character bits in the lowest red pixel, tow more in the lowest green pixel, the two in the lowest blue pixel and the two in the lowest red other pixel as follows.

The first color in first pixel: r7 r6 r5 r4 r3 r2 c1 c0

The second color in first pixel:g7 g6 g5 g4 g3 g2 c3c2

The third color in first pixel: b7 b6 b5 b4 b3 b2 c5c4

The first color in second pixel: r7 r6 r5 r4 r3 r2 c7c6





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If we take an example of pixel (255, 64, 64) with character "a", then we can obtain:

Originl pixel=(11111111,01000000,01000000)

"a" = 01100001

New pixel = (11111101, 01000000,01000000)

New pixel =(253,64,64)

Here we can notice that the new pixel of (253,64,64) is almost the same value as the old pixel of (255, 64, 64). So there will not be noticeable color difference in the image. So, with least alteration in image's volume and using the Vision of human error and slight color's difference, we can store the information in the image. Figure 2 is a photo before saving the text in the image shows

for storing the text "save the text in the image" into the image, we should save 26 character in the 104 colore, so, at the image 24 bit BMP format we have 3 byte at any pixel, so, for storing the text, we procced our image and store it's information at 33 pixels. at figuer 3, after storing the text we see

Algorithm to find the pixel

The technique which suggested in this paper is HIOP (Higher Intensity Of Pixel) Algorithm. This algorithm is going measure the intensity of the pixel and then hides' data by random pixel selection with a goal to hide maximum data in each pixel without creating extra unnatural noise. For perform the operation and find pixels whit higher intensity, we obtains average color image pixels. The number is a boundary to determine the pixels whit higher intensity. These are elements that have greater average is more color intensity. Thus the intensity of pixels in the image are selected and scattering in a pixel selection is created. In order to perform this algorithm the career picture is shown figure 4.

In figure5, pixels higher than the average color images are marked with black color.

The total number of pixels in figure5 is 215232 that number of pixels marked is 58468 To determine pixel whit more Intensity, we can add factor k to mean and this number can be used as a key and discovery algorithm makes more difficult but whatever the number of K is greater than the selected pixels is reduced. For example in figure 5 if k=10 that number of pixels marked is 23405. For more efficient and find pixel of image that have a certain complexity, we divide image to bolck n*n. To pixels with more intensity than its neighboring areas to be compared and operation of the pixel intensity by more be done on each block.

To perform this operation and to find higher intensity pixel, we put n² color data element of block in matrix n *n. The average color of this block obtains the number is a boundary to determine the elements whit higher intensity in this block, these are elements that have greater average are more color intensity in this block. For example, if elements of a block is given figure 6.

Taking the mean of block and most elements of the average selection, elements that are selected is shown in figure 7. For example in [figure](#) , results specified whit different n in table2.

We use multiply matrices to create more scatter and implementing a security level. According figure8 we read row element of data block and other matrices, the presence read column.

Then multiply the two matrices, to do this we use rapid multiplication matrices astrasen with complexity (n^{2.81}). Matrix multiplied is processed that we get elements mean the number is a measure to select elements and we choose elements larger than the mean. For example, in the case before, matrix multiplied is shown in figure8.

After taking the mean of the block and selected elements of a larger average, element that are selected is shown in figure9.





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We choose common elements in these figure7 and figure10 is shown in figure11.

Elements Selected are higher intensity pixels and have more than scatter. So, we use this algorithm for embedding the message text

- 1) First, we chose the image and message text, that we should use them on the picture
- 2) We covert message text to binary code.
- 3) Image divided into n blocks
- 4) We determine pixel with Higher intensity in each block
- 5) We estimate the least significant bits in pixel marked.
- 6) Embed the text into the LSB
- 7) We save image with text embedded in it.

Message Extraction

In this section we will discuss the retrieving the message from the image independent of the file format. once a message has been retrieved it has to be converted in to the original message. This process can be done by reading the embedded data from the file. The read data will be in bytes format. This can be done by extract the pixels of output image in one array. Decoding in same manner as the reversal of encoding process i.e. first pixel value gives number of character in the message. After every pixel gives the message character's ASCII value, which then stored in byte array. to present the stored information in the image, we use this algorithm:

- 1) First, we chose the image that the text embedded into it.
- 2) we retrieve the LSB in pixels used to store information.
- 3) we combine 8 bit and convert them into one character

Decreasing rate of change

Three dimensions using a separate color

As has been said each pixel contains three color, Let's think about a color pixel of a 24 bit BMP image represented in figure 12. Each axis of the cube contain a color schema where first 8 bit represent R (Red) second 8 bit represent G (Green) and third 8 bit represent B (Blue). Images are the most popular cover objects for steganography. As it involves the conversion of message into the digital image. In order to hide the message, it is first converted into byte format and then stored in byte array. Then the message is encrypted and then embeds each bit into the LSB position of each pixel position. Proposed approach involves change in LSB of each pixel byte i.e. RGB instead of only in green byte. Hence reduces the distortion rate that is look of original image. First Data is placed in the green, if needed other colors to be used another color, As a result pixels scatter and security image is higher.

Reduce the number of bits LSB

Techniques LSB use in bmp image, so that the use of a bit LSB in a color picture element to hide information reduce the amount of change and noise but amount of data stored in the image reduces.

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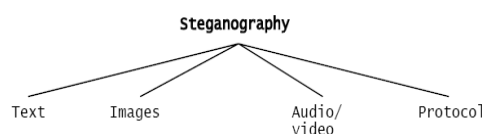


Figure 1: Category of steganography

Table 1

11	10	01	00
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Figure2



Figure3



Figure 4





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Figure 5

0	8	20	5	19	19	3	14
2	13	8	3	15	24	21	2
6	13	14	22	16	1	10	9
3	4	7	13	16	4	15	11
21	21	5	0	1	0	3	4
16	8	8	10	20	17	5	3
22	10	7	18	14	24	18	10
6	12	23	21	20	12	9	2

Figure 6

		20		19	19		14
	13			15	24	21	
	13	14	22	16			
			13	16		15	
21	21						
16				20	17		
22			18	14	24	18	
	12	23	21	20	12		

Figure 7

Table 2

n	Total Blocks	Total pixel selected
8	3363	45286
50	90	57573
100	25	66477





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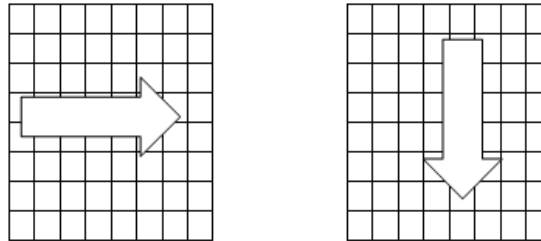


Figure 8

1416	1111	973	816	352	1034	1226	1324
1111	1492	851	826	441	1049	1468	1196
973	851	1323	963	551	946	1274	1416
816	826	963	861	287	762	1089	1025
352	441	551	287	933	591	815	548
1034	1049	946	762	591	1207	1476	1241
1226	1468	1274	1089	815	1476	2153	1541
1324	1196	1416	1025	548	1241	1541	1779

Figure9

	20	19	19	14	
13		15	24	21	
13	14	22	16		
		13	16	15	
21	21				
16			20	17	
22		18	14	24	18
12	23	21	20	12	

Figure10

				*		*
	*			*	*	
		*				
					*	
*				*		
*		*		*	*	
*	*	*	*	*		

Figure11





Sara khosravi

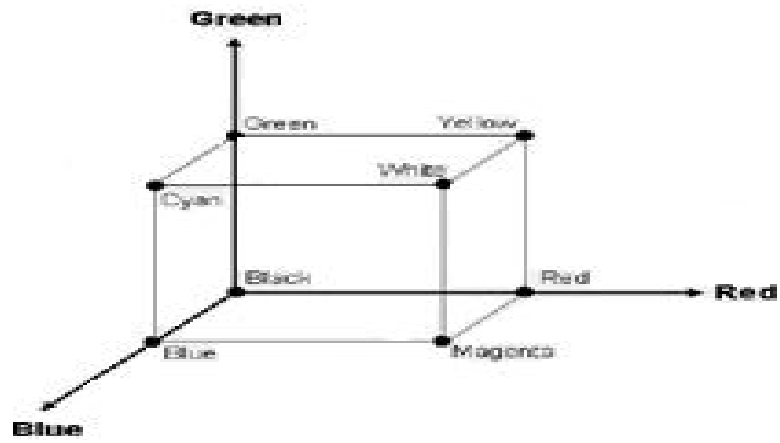


Figure12: 3D cube structure of a pixel





RESEARCH ARTICLE

Geogenic Radiological Impact Assessment of Soil Samples Collected from Parts of Sagamu Southwestern Nigeria

Oyeyemi K.D.*and Aizebeokhai A. P.

Department of Physics, Covenant University, Ota, Nigeria.

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*Address for correspondence

Oyeyemi K.D

Department of Physics,

Covenant University,

Ota, Nigeria.

Email: kdoyeyemi@yahoo.com



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ABSTRACT

This study is an assessment of the radionuclide concentration level and radiological hazards in soils from Sagamu, Ogun state Nigeria. Soil samples collected from 15 locations were analysed using a 76 x 76mm Sodium Iodide [NaI (TI)] detector crystal. The estimated average absorbed dose rates, annual effective dose, gamma radiation index and excess lifetime cancer risk of the soil samples were 42.07 nGy/h, 51.59 μ Sv \cdot y $^{-1}$, 0.66 and 0.181 μ Sv \cdot y $^{-1}$ respectively. Mean radium equivalent activity of 95.4 Bq/Kg was also obtained for the soil samples. The average soil radionuclides activity concentrations in the area of study were within the worldwide range; although at some locations higher values of ^{226}Ra and ^{232}Th activity concentration were observed. The results of the estimated radiological parameters in this study are lower than the International Commission on Radiological Protection (ICRP) maximum permitted limit. Hence, they have no significant radiological health impacts on the environment and the populace.

Keywords: Geology, Radionuclide, Spectroscopy, Activity concentration, Radiological parameters

INTRODUCTION

Radioactivity is a natural phenomenon, and the leading part of the external irradiation for humans comes from terrestrial radionuclides that are found within the earth crust. Benefits of radiation and radioactive substances span through their applications in power generation to medicine, industry and agriculture. The concentration activity of naturally occurring radionuclides (NOR) in soil can be influenced by human-made activities that are enhanced by industrial processes, such as oil and gas extraction, production of phosphate fertilizers, coal mining and combustion, and cement production. However, the risks of the exposure of these radiations and radioactive substances to health





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(and factory) workers, general public and the environment in its entirety may have to be assessed, monitored and ultimately controlled.

Human exposure to outdoor radiations from naturally occurring radioactive materials (NORM) usually emanate from the topmost few centimetre of the soil [1]. The concentration of these NORM depends mainly on geological and geographical conditions and may perhaps appear at different levels in soils of different geological regions [2]. Nonetheless, the humans' exposure dose rate depends on type, density and mineral constituents of the soil [3][4][5]. It is therefore of paramount importance to estimate radiation dose from the natural radionuclides in order to determine the health risks and radiological hazards they posed to the general populace. This study is an evaluation of the concentration activity of NORM contents which include ^{226}Ra , ^{232}Th and ^{40}K in soil samples obtained from Sagamu Southwestern Nigeria. Estimates of the corresponding radiological health risk associated with the soil in this area are presented.

Location, Physiography and Geology of Study Area

The study area is characterized by gently undulating topography with average elevation of 260 m above sea level (Fig. 1) within the tropical humid region. The climatic condition common to the sub-equatorial belt of Southwestern Nigeria is sub-divided into wet and dry seasons with mean annual temperature of 28°C . The rainy season starts from April to October with heavy downpours in June/July, while the remaining months are always dry with little or no rain [6]. Mean annual rainfall, which forms the major source of groundwater recharge within this area is about 1,270 mm. The vegetation within the study area is greatly influenced by climate and relief. Present day vegetation cover is sparse owing to commercial and residential activities within the town. The population of Sagamu is ~253, 412 (Wikipedia, 2013) and its proximity to Lagos has made it an industrial hub of Ogun state, Nigeria.

The geological setting of Sagamu, an area in the southwestern part of Nigeria is that of a sedimentary terrain located within the eastern Dahomey basin (Fig. 2) [7]. This basin extends into western Nigeria as far as the Okitipupa Ridge or Ilesha Spur and as far west as the Volta Delta complex in Ghana. The rocks within the Dahomey are extensive wedge of Cretaceous, Paleocene and Neocene sediments which thicken markedly from the onshore margin of the basin [8]. The Cretaceous sediments rest unconformably on the basement complex and west of the Okitipupa high consisting mainly coarse grained clastic sediments known as Abeokuta Formation in western Nigeria and "Maestrichtian Sableux" [9] in Benin (Dahomey).

Six lithostratigraphic formations were identified within the stratigraphy of eastern Dahomey basin, from oldest to youngest, Abeokuta, Ewekoro, Akinbo, Oshosun, Ilaro, and Benin Formations. Some workers have described the Cretaceous Abeokuta Formation as a group consisting of Ise, Afowo, and Araromi Formations [10][11]. The local geology of the study area is a sedimentary environment consisting predominantly sequence of shale and clayey lithology belonging to Akinbo Formation.

MATERIALS AND METHODS

Sample collection and preparation A total of 75 samples were collected from the study area, 5 soil samples from each sampling location. Table 1 shows the sampling points, area code and the number of samples collected. Soil samples weighing about 2 Kg each were collected in black nylon bags. The samples were then spread in trays and dried until there was no detectable change in the mass of the sample at 110°C in a temperature controlled oven. The dried samples were then crushed using mortar and pestle; the crushed samples were sieved using the 2 mm mesh size. The samples were later sealed in a radon tight container for about four weeks so as to reach secular equilibrium between radon ^{226}Ra and its daughter nuclides before radiometric counting.





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Radioactivity Measurement

The radioactivity measurement of the soil samples were carried out using a Gamma-ray spectroscopy. The spectrometer used was a 76 x 76mm NaI (TI) detector (Bircon model, serial number ff-669) enclosed in a graded 10cm thick Canberra Lead shield. The detector was coupled to a Canberra series 10 plus multichannel Analyser (MCA) (Model No. 1104) through a pre-amplifier using 5m connection co-axial cable. NaI (TI) detector was employed owing to its modest energy resolution which was measured by Full Width Half Maximum Height (FWHM) of approximately 8% at energy of 0.662 Mev (^{137}Cs peak). The standard International Atomic Energy Agency (IAEA) sources were used for calibration [12]. The soil samples were placed on top of the detector and the counting period was 10 hours and the net area under the corresponding γ -ray peaks in the energy spectrum was used to compute the activity concentrations in the soil samples using equation (1). The detection limit below which the measured values are regarded as below the detection limit (BDL) of the measuring system in this study are 4.2 BqKg⁻¹ for ^{226}Ra , 5.1 BqKg⁻¹ for ^{232}Th , and 17.3 BqKg⁻¹ for ^{40}K .

$$C_s = \frac{C_a}{P_\gamma (M_s/V_s) \epsilon_\gamma t_c} (\text{BqKg}^{-1}) \quad (1)$$

where C_s is the sample concentration, C_a is the net peak area of a peak energy, ϵ_γ is the efficiency of the detector for a γ - energy of interest, M_s/V_s is the sample mass/volume of soil, t_c is total counting time, while P_γ is abundance of the γ - line in a radionuclide.

RESULTS AND DISCUSSION

Activity concentrations

The radionuclides contents obtained within the study area is displayed in Table 2. The activity for ^{226}Ra , ^{232}Th and ^{40}K is found to vary from 17.35 ± 0.6 Bq/Kg to 46.16 ± 0.5 Bq/Kg, 20.72 ± 0.7 Bq/Kg to 58.31 ± 0.4 Bq/Kg and 37.18 ± 0.3 Bq/Kg to 82.20 ± 0.3 Bq/Kg respectively in the soil samples studied. These values, when compared to the worldwide average activity concentrations of 32, 45 and 420 Bq/Kg for ^{226}Ra , ^{232}Th and ^{40}K [2] showed that the measured activity concentration of ^{226}Ra is higher in some locations such as Isale-oko, Ita-Oba, Falowo, Awolowo and Sabo markets, Isokun and NNPC. Similarly, the activity of ^{232}Th is above the average worldwide values at Isale-oko, Falowo, Ijuku, Isokun, and Surulere areas. ^{40}K activity concentrations within the area of study however are below the worldwide average values. This low activity concentration of ^{40}K radionuclide within the top soil may be responsible for the low crop yield and higher demand for fertilizer by farmers in this part of the country.

Figure 3 shows the correlation of various radiological parameters using regression analysis technique. The correlation coefficients of both Radium equivalent activity and excess lifetime cancer risk with ^{232}Th radionuclide activity concentration of the soil samples within the study area (Fig.3 a and b) are quite high indicating strong connections between these radiological parameters and the natural radionuclide. The radiological maps of the radionuclides measurements in the area localising each sampling point using their geographical coordinates are presented in Fig. 4(a, b and c). Highest concentrations of the measured radionuclides (^{226}Ra , ^{232}Th and ^{40}K) are found to be localized towards the north-eastern part of the study area. The observed variations in the radionuclides concentration activities of the topsoil across all the sampling locations in Sagamu show the inhomogeneity in the near surface lithologies, which may not be unconnected to their clay contents and shaliness. This, as stated before, is based on the local geology of the study area with sediments from Akinbo formations forming the topsoil.





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Radiological assessment

Radium Equivalent Activity (Ra_{eq})

The radium equivalent activity (Ra_{eq}) is the most widely used radiation hazard index which is estimated to compare the activity concentration of samples containing different amounts of ^{226}Ra , ^{232}Th and ^{40}K natural radionuclides. It represents the weighted sum of the activities of the NORM based on the assumption that 370 Bq/Kg of ^{226}Ra , 259 Bq/Kg of ^{232}Th and 4810 Bq/Kg of ^{40}K produce the same gamma radiation dose rate. This parameter was calculated using the relation:

$$Ra_{eq} = C_{Ra} + 1.43C_{Th} + 0.077C_K \quad (2)$$

where C_{Ra} , C_{Th} and C_K are the soil samples activity concentrations (in Bq/Kg dry weight) of ^{226}Ra , ^{232}Th and ^{40}K respectively. Table 3 presents the range of radium equivalent in the soil samples from minimum to maximum as 48 Bq/Kg to 123 Bq/Kg at Ajegunle and Falawo respectively.

Radiation dose estimation

The external exposure to radiation arriving from the natural occurring radionuclides materials(NORM) can be determined considering the absorbed gamma dose rate in air at 1 m above the ground level. The mean activity concentration of ^{226}Ra , ^{232}Th , and ^{40}K (in Bq/Kg dry weight) radionuclides in soil samples from the 15 locations were used to estimate the absorbed dose rate in the air by applying the dose coefficients and the relation proposed [2]

$$D(nGyh^{-1}) = 0.462C_{Ra} + 0.604C_{Th} + 0.0417C_K \quad (3)$$

where C_{Ra} , C_{Th} , and C_K are the activity concentrations (in Bq/Kg dry weight) of ^{226}Ra , ^{232}Th and ^{40}K respectively in the soil samples. The absorbed dose rates were found to vary from 21.13 $nGy h^{-1}$ to 54.21 $nGy h^{-1}$ at Ajegunle and Falawo respectively. The annual effective dose $H_E (\mu\text{Svy}^{-1})$ received by member of the public was calculated using equation 4[2].

$$H_E (\mu\text{Svy}^{-1}) = D(nGyh^{-1}) \times O_c \times F_c \times 8760 \times 10^{-3} \quad (4)$$

where O_c is the outdoor occupancy factor taken as 0.2 [13] and F_c is the coefficient of conversion used in translating the absorbed dose rate to effective dose incurred by adult taken as 0.7[2]. The mean value for the annual effective dose from Table 3 is 51.9 μSvy^{-1} which is less than 1 mSvy^{-1} the recommended safety limit for the general public according to ICRP[14]. Hence, in terms of radiation dose estimation, the soil in the area studied does not pose any health hazard for the inhabitants. High correlation coefficient is however observed between the estimated radiation absorbed dose rates and excess lifetime cancer risk in the study area as shown in Fig. 3.

Gamma Index estimation

The gamma index (I_γ) is defined in order to examine the applicability of using materials in construction purposes. It is employed to estimate the radiation hazard associated with the naturally occurring radionuclides (NOR) in specific investigated samples. For a typical material, it is given by the following expression of ECRP[15]

$$I_\gamma = \sum_x \frac{C_x}{K_x} \leq 1 \quad (5)$$

where C_x (Bq/Kg) is the measured activity of each nuclide in the building material, K_x (Bq/Kg) is the activity concentration of each NOR in the material and it is assumed to produce the same gamma radiation dose rate, that is, 150, 100 and 1500 Bq/Kg for ^{226}Ra , ^{232}Th and ^{40}K , respectively [15][16]. Based on the dose criterion of 1 mSvy^{-1} [14] Table 3 shows that I_γ is less than unity in the soil samples investigated in this research.





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Excess Lifetime Cancer Risk

The Excess Lifetime cancer risk (E_L) was estimated using the following equation by Taskin, et al. [17]

$$E_L = H_E (\mu Svy^{-1}) \times D_L \times R_F (Sy^{-1}) \quad (6)$$

where D_L is the average duration of life (estimated to be 70 years) and R_F is the Risk Factor taken as 0.05 for the general public. The computed values for this radiological parameters range from 0.091 to 0.233 at Ajegunle and Falowo respectively in the study area.

CONCLUSION

Assessment of the radiological parameters in order to evaluate the corresponding health hazards is important. In this investigation a total of 75 soil samples collected from 15 locations within the study area were studied for assessment of radionuclides activity concentrations and selected radiological parameters. The average soil activity concentration of ^{40}K radionuclide in Sagamu were below the worldwide average values, whereas, higher concentration activity levels of ^{226}Ra and ^{232}Th were measured in some locations within the study area. The estimated Radium equivalent activity, annual effective dose, and the lifetime risk of cancer were lower than the world's average and are within the safe limits according to International Commission on Radiological Protection (ICRP). Therefore the use of the geomaterials in the study area for construction purposes poses no immediate health hazard to the populace. High correlation coefficients observed between both estimated radium activity equivalent and absorbed dose rates with excess lifetime cancer risk (≈ 1) show their strong interrelationships.

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Table 1: Sample collection plan

Area code	Sampling Area	Soil
L1	Isale Oko	5
L2	Ita Oba	5
L3	Falawo	5
L4	Makun	5
L5	Awolowo Market	5
L6	OOU Teaching Hospital	5
L7	Agura	5
L8	Sonariwo market	5
L9	Sabo Market	5
L10	Ajgunle	5
L11	Ijuku	5
L12	Isokun	5
L13	NNPC	5
L14	Temidire	5
L15	Surulere	5
Total		75

Table 2: Specific activity of ²²⁶Ra, ²³²Th and ⁴⁰K in soil samples

Location	No.	²²⁶ Ra (Bq kg ⁻¹)	²³² Th (Bq kg ⁻¹)	⁴⁰ K (Bq kg ⁻¹)
L1	5	37.54 ± 0.6	54.36 ± 1.1	82.20 ± 0.3
L2	5	43.31 ± 0.9	38.76 ± 0.8	67.64 ± 0.2
L3	5	41.64 ± 1.2	52.90 ± 1.3	72.41 ± 1.3
L4	5	22.81 ± 0.7	41.82 ± 1.2	68.33 ± 1.0
L5	5	39.06 ± 1.1	26.14 ± 0.6	54.32 ± 0.9
L6	5	27.42 ± 0.3	38.04 ± 0.9	46.64 ± 0.4
L7	5	17.35 ± 0.6	40.99 ± 1.2	43.06 ± 0.4





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L8	5	25.07 ± 1.0	38.96 ± 0.5	55.46 ± 0.2
L9	5	46.16 ± 0.5	32.31 ± 1.3	81.48 ± 1.3
L10	5	15.29 ± 0.7	20.72 ± 0.7	37.18 ± 0.3
L11	5	32.13 ± 0.8	54.14 ± 0.7	42.44 ± 1.6
L12	5	40.33 ± 1.2	48.23 ± 1.1	63.89 ± 0.8
L13	5	35.51 ± 0.9	38.11 ± 0.7	55.72 ± 1.4
L14	5	29.36 ± 0.6	32.23 ± 1.6	43.26 ± 0.6
L15	5	28.03 ± 1.3	58.31 ± 0.4	66.36 ± 0.6
Minimum		17.35 ± 0.6	20.72 ± 0.7	37.18 ± 0.3
Maximum		46.16 ± 0.5	58.31 ± 0.4	82.20 ± 0.3
Mean		32.07 ± 0.8	41.07 ± 0.94	58.69 ± 0.8
UNSCEAR (2000)		35	30	400

Table 3: Estimated Radiological parameters in the study area

Location	R _{eq} (Bq/Kg)	D (nGy h ⁻¹)	H _E (μSvy ⁻¹)	I _γ	E _L (μSv y ⁻¹)
L1	122	53.61	65.75	0.85	0.23
L2	104	46.24	56.71	0.72	0.198
L3	123	54.21	66.48	0.85	0.233
L4	88	38.65	47.4	0.61	0.166
L5	81	36.1	44.27	0.56	0.155
L6	86	37.59	46.1	0.59	0.161
L7	79	34.57	42.4	0.55	0.148
L8	85	37.43	45.9	0.59	0.161
L9	99	44.24	54.26	0.69	0.19
L10	48	21.13	25.91	0.33	0.091
L11	112	49.31	60.47	0.78	0.212
L12	114	50.43	61.85	0.79	0.216
L13	94	41.75	51.2	0.65	0.179
L14	79	34.84	42.73	0.55	0.15
L15	117	50.94	62.47	0.81	0.219
MEAN	95.4	42.07	51.59	0.66	0.181
UNSCEAR (2000)		54	66		0.29





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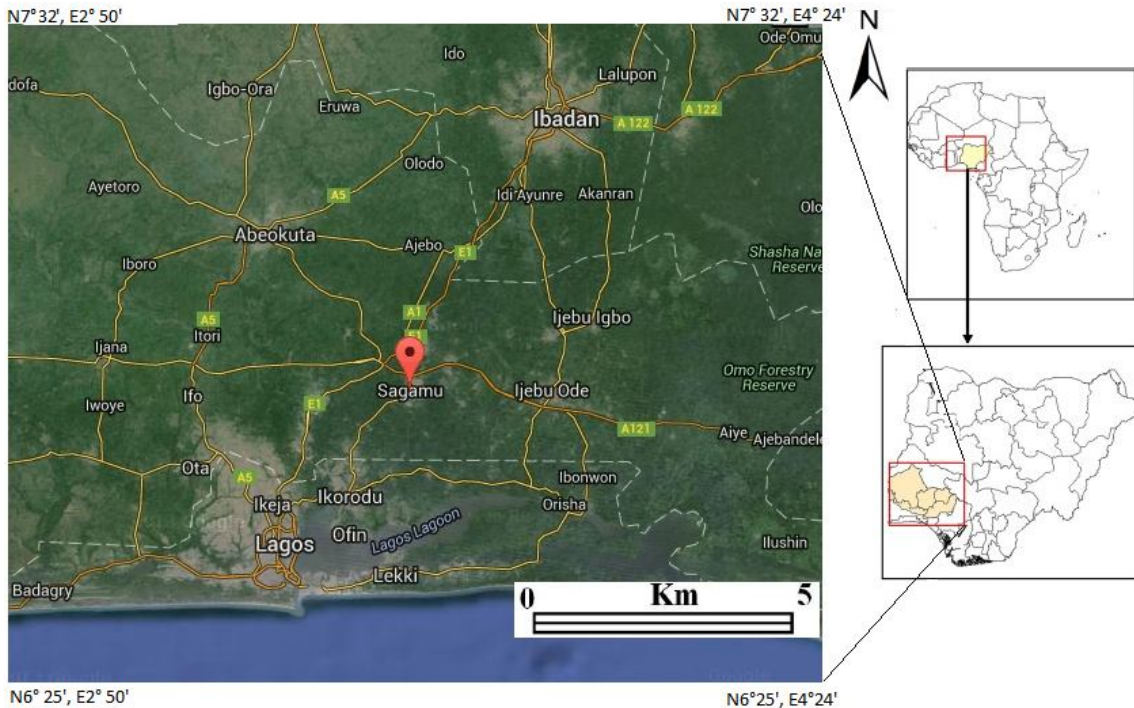


Fig. 1: Topographical map of the study area showing relief and accessibility. Inset: the position of the study area on the map of Nigeria and Africa. ©Google earth image downloaded 17.30 GMT 02.10.2015.

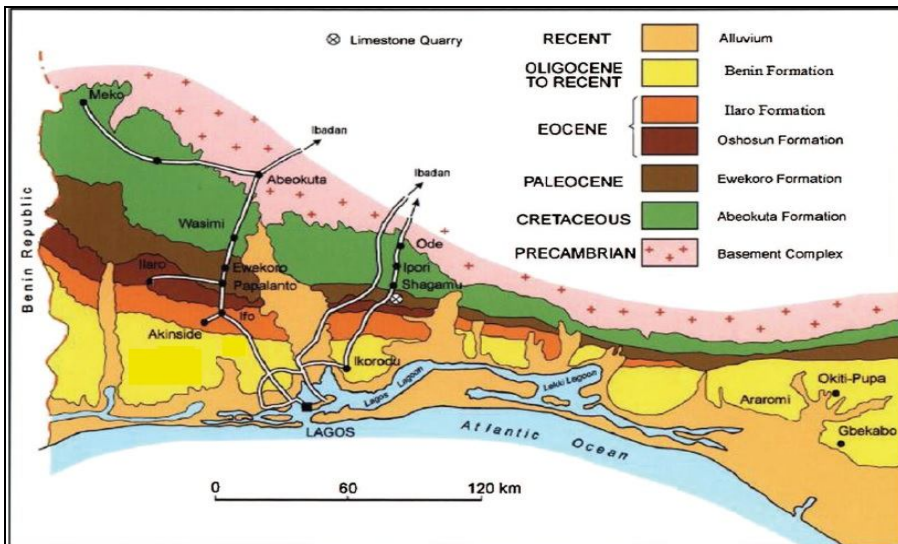


Fig. 2: Generalized geological map of Eastern Dahomey Basin (modified after^[7]).





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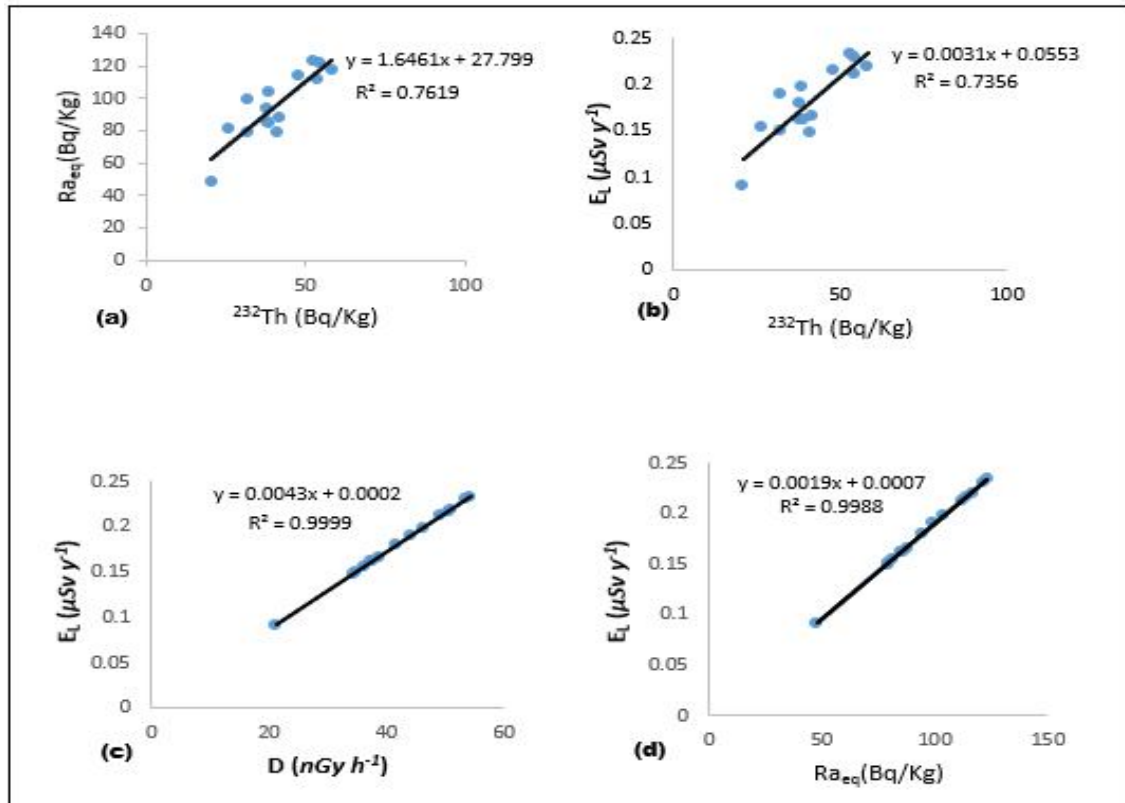


Fig.3. Correlation of various estimated radiological parameters (a) Ra_{eq} activity with ^{232}Th Concentration (b) Excess lifetime cancer risk with ^{232}Th Concentration (c) Excess Lifetime cancer risk with the absorbed dose rate (d) Excess lifetime cancer risk with Ra_{eq} activity





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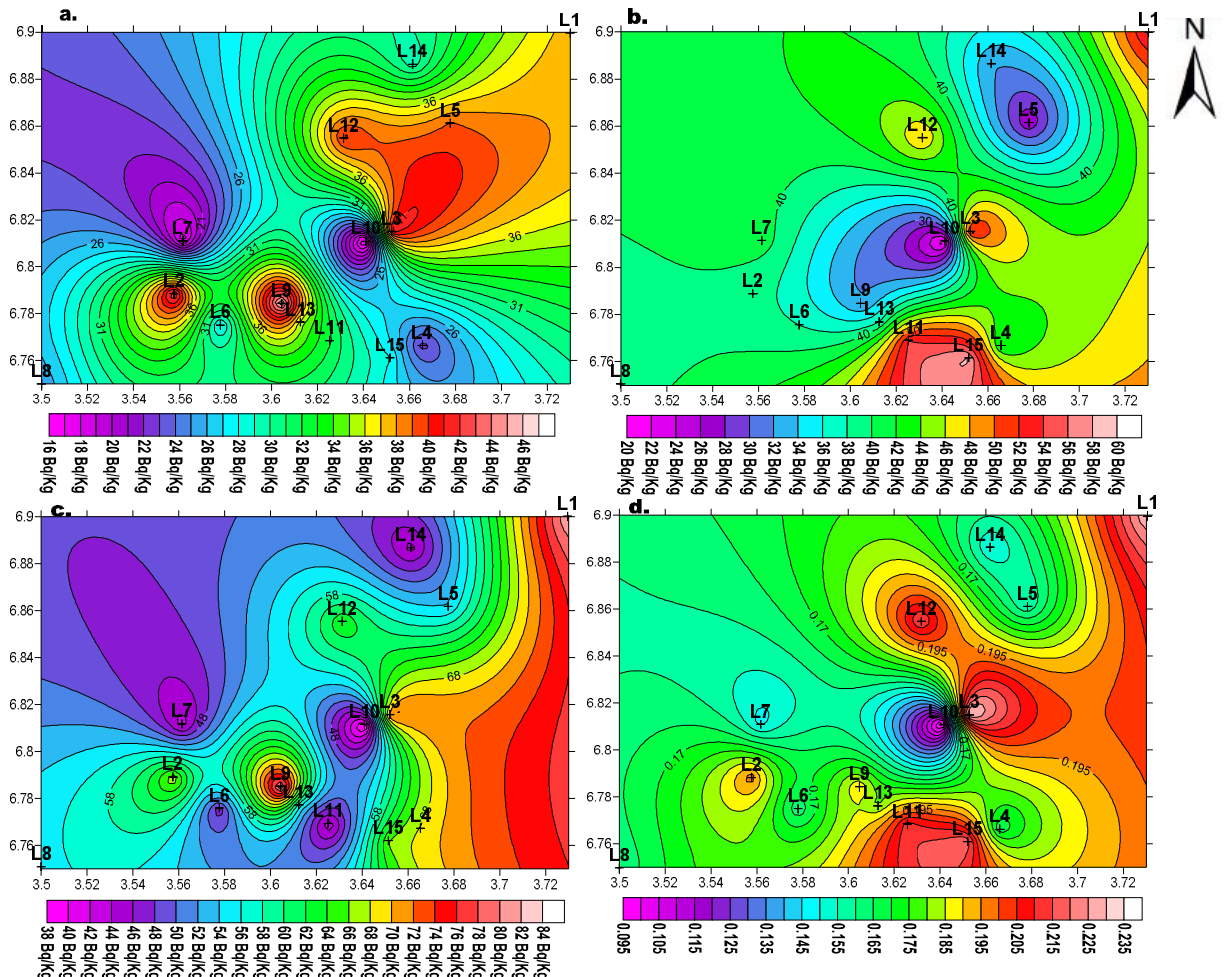


Fig. 4 Radiological maps of the study area showing (a) ²²⁶Ra Concentration activity (Bq/Kg) (b) ²³²Th Concentration activity (Bq/Kg) (c) ⁴⁰K concentration activity (Bq/Kg) and (d) Excess lifetime cancer risk





Analysis and Comparison of a Number of Cryptography Algorithms and Pseudo-Random Number Generators Based on a Comprehensive Evaluation Pattern

Ahmad Gaeini¹, AbdolrasoulMirghadri¹, Gholamreza Jandaghi^{2*} and Behbod Keshavarzi³

¹Imam Husein Comprehensive University, Iran.

²Faculty of Management and Accounting, Farabi College, University of Tehran, Iran,

³Shahed University, Iran.

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*Address for correspondence

Gholamreza Jandaghi
Faculty of Management and Accounting,
Farabi College,
University of Tehran, Iran,
Email: jandaghi@ut.ac.ir



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ABSTRACT

Since various pseudo-random algorithms and sequences are used for cryptography of data or as initial values for starting a secure communication, how these algorithms are analyzed and selected is very important. In fact, given the growingly extensive types of pseudo-random sequences and block and stream cipher algorithms, selection of an appropriate algorithm needs an accurate and thorough investigation. Also, in order to generate a pseudo-random sequence and generalize it to acryptographer algorithm, a comprehensive and regular framework is needed, so that we are enabled to evaluate the presented algorithm as quick as possible. The purpose of this study is to use a number of pseudo-random number generators as well as popular cryptography algorithms, analyze them in a standard framework and observe the results obtained in each stage. The investigations are like a match between different algorithms, such that in each stage, weak algorithms are eliminated using a standard method and successful algorithms enter the next stage so that the best algorithms are chosen in the final stage. The main purpose of this paper is to certify the approved algorithm.

Key Words: Pseudo-Random Sequences, BlockCiphers, Stream ciphers, NIST tests



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INTRODUCTION

Nowadays, pseudo-random sequences are used in a variety of areas like simulation, game design, modeling, communication channels, especially cryptography and are quite versatile. Given the generation of a good pseudo-random sequence as a requirement for acryptography algorithm, investigation method, evaluation and correct selection is very important in this step. Since nowadays many pseudo-random sequences and cryptography algorithms are being modeled and used, how a good algorithm is investigated is quite essential. Generally, this area can be divided into two parts of pseudo-random sequences whose goal is not cryptography and those whose goals is cryptography. In fact, in case of generation of a good pseudo-random sequence and demonstration of its security for the practical use in spite of its restrictions, it is introduced as a cryptography algorithm. The cryptography algorithms that are used for creation of privacy can be divided into two groups of symmetrical and asymmetrical. Symmetrical algorithms are themselves divided into two groups of block and stream type, all of which are able to generate pseudo-random sequences. It can be said that, all codes are good pseudo-random number generators but its reverse is not true. The goal is that each algorithm, having been designed, can receive a certificate for the approval of suitability for privacy applications. In order to certify an algorithm, actions should be based on a definite and standard framework. In this paper, using the model introduce in paper [1], various algorithms are investigated. In this model, at first the algorithm speed is compared and then in case of passing the stage, a thorough search space of the algorithm is investigated for its breaking. Then, in the next step, the first level of NIST tests are suggested for individual sequences and the algorithm is studied from sensitivity viewpoint. It means that with the smallest changes in input parameters, extensive changes should be observed in the output sequence and this feature is also called Strict Avalanche Criterion [2]. Having passed these stages, various attacks are done on the selected algorithm in accordance with the type of algorithm. In case of resistance against the attacks, the second level of NIST is tested on the algorithm output in which for a large number of sequences, the ratio of sequences that are successful in the tests are compared with the expected ratios. In case of success in this stage, the third level of tests is investigated. In the previous two levels, the comparison is made based on P-value, while in the third level, assessments is done based on uniformity of distribution of P-values. If the number generator passes this stage too, in the last step, the algorithm output is assessed using the repeated logarithm law test.

After the introduction, this paper deals with classification and concise introduction of types of algorithms in the second section. In the third section, the results obtained from implementation of 13 considered algorithms and execution of all steps of the comprehensive model of assessment on them are proposed. In the fourth section, the conclusion and summary is dealt with.

Various studied algorithms

Since all cryptographers are good pseudo-random sequences, a variety of cryptographers can be introduced as good pseudo-random sequences. However, it is worth mentioning that every pseudo-random number generator cannot be used as acryptography algorithm. In this paper, we have used three types of algorithm that are described briefly next.

Pseudo-random number generators

Pseudo-random number generator is a deterministic algorithm that receives an input called seed and generates a longer sequence that seems random, meaning that its output is composed of an unidentifiable uniform computational sequence. This group of algorithms is more used forthe design of a variety of cryptographers than being suggested ascryptographers themselves. In addition, they have many applications in other areas such as simulation. Among them, Mersenne Twister, various types of linear modular arithmetic number generators, chaotic maps based number generators like Skew tent, CCCBG and MT19937 can be mentioned.



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In paper [3], the way of investigating cryptography algorithms designed based on chaotic maps has been investigated and an appropriate model has been proposed to analyze this group of algorithms, which include various types of analyses and attacks.

In paper [4], the chaotic mapping based on Cross-Coupled Chaotic Tent Map Based Bit Number generator is introduced and presented, which in fact is the modified form of Skew tent, so that a better behavior in generation of a pseudo-random sequence can be achieved. In this paper, weakness of the Skew tent algorithm is shown using statistical tests of NIST and in order to improve it, the selected interval is changed using α value and also a combination of two Skew tents and definition of a non-linear relation is used to generate a pseudo-random sequence. In paper [5], the linear modular arithmetic number generator is introduced and how a pseudo-random sequence is generated by the algorithm is expressed. In paper [6], Mersenne Twister's pseudo-random number generator is introduced and how the pseudo-random sequence is generated by the number generator is accurately expressed.

Blockciphers

In this type of cipher, before performing the cryptography operation, the input data are arranged in blocks with constant lengths and then the cryptography operation is done on them. Length of input and output blocks is the same. The blockcipher system can be assumed as a big codebook dependent on a key, such that each input block corresponds to an output block according to the key. In execution, the cryptography operation normally consists of a number of displacements and replacements which depend on the key that is repeated periodically in several cycles. This group of algorithms encrypts the data according to the block length and its output can be considered as a good pseudo-random sequence. Given the limited length of blocks for blockciphers and very lower length of message than cryptographers block length, the cryptography mode was introduced. In standard condition, five standard modes namely Electronic Codebook (ECB), Cipher Block Chaining (CBC), Cipher Feedback (CFB), Output Feedback (OFB) and Counter (CTR) have been introduced for data privacy and using cryptography modes such as OFB and CTR block ciphers can be transformed to stream ciphers and then, the generated sequence can be XORed with a private message. In fact, in order to generate the pseudo-random sequence the two mentioned modes are used. AES, DES, SKIPJAC and CAST-256 can be mentioned as block ciphers.

In paper [7], the DES algorithm is introduced and its design method is accurately presented. The DES algorithm is among symmetrical cryptography block algorithms with the block length of 64 bits and the key length of 56 bits. In paper [8], the cryptography analysis of the DES algorithm is performed and the differential attack on the DES algorithm is expressed. For full procedure DES, 2^{47} main texts and its corresponding encrypted text are necessary to be broken completely, while in practice, having such number of messages is almost impossible. Thus, it can be said that the algorithm is operationally robust against the attack.

In paper [9], the AES algorithm is introduced as a symmetrical block cryptography algorithm. The algorithm has a block length of 128 bits and keys length of 128, 192 and 256 bits with procedures of respectively 10, 12 and 14 whose operation is of byte type. In addition, it should be mentioned that the algorithm is a versatile algorithm which is used for privacy.

In [10], the SKIPJAC algorithm has been introduced. This is considered as a block type of algorithm with the block length of 64 bit and key length of 80 bits. Low speed in cryptography and low key length is among the weaknesses of the algorithm.

In [11], the CAST-256 algorithm has been introduced. This is a block type of algorithm with the block length of 128 and a variable key length of respectively 128, 160, 192, 224 and 256. Low speed in cryptography is among the weaknesses of the algorithm.



**Gholamreza Jandaghi et al.****Stream ciphers**

Stream ciphers are such that a good pseudo-random sequence as well as secure from cryptography perspective is generated and then an output sequence with a private message is XORed bit by bit. Most of stream ciphers are designed based on good pseudo-random number generators or a part of them consists of these number generators. The most important feature of the algorithms is their high speed with regard to block ciphers. RC4, Frogbit, F-FCRS-8 and Triviumis among the stream ciphers. In [12], various types of stream ciphers is introduced and the studies conducted on the proposed algorithms are expressed and the best algorithms for operational use are introduced. In paper [13], the RC4 algorithm is introduced. The algorithm is a stream cipher algorithm with a variable key length, whose one of applications is Wireless Cryptography Protocol (WEP).

In paper [14], the Salsa20 algorithm has been introduced. This is an cryptography type of stream algorithm with the key length of 256 bits whose design structure is based ARX and has a good quality in terms of speed and security.

Implementation of the assessment model on algorithms

Diverse criteria have been proposed in valid references to assess the algorithms. In the comprehensive evaluation model reference that comprises various criteria such as statistical tests, implementation attacks and observations are suggested. In this model, eight steps have been considered as the priorities of the comprehensive assessment. In this section, besides implementing the 13 algorithms, we use the mentioned model for them.

The first step: speed

Speed is regarded as one of the most important parameters of a good algorithm. The higher the speed of an algorithm, the more is its applications in various areas. It should be mentioned that speed of algorithms is different on hardware and software. As an example, the DES algorithm has a higher speed on the hardware than the software.

A thorough search

In some algorithms like block and stream types of algorithms, since security is based on the key, the key space for a thorough search is very important. In addition, the algorithm structure should suffer no weaknesses so that the key space doesn't get limited. Furthermore, other initial condition or input parameters can be considered as the key for determination of the number generator space in pseudo-random number generators. In this stage, condition for the success of the algorithm is the search of a space of more than 2^{128} [15].

The first level of NIST

In this stage, given the statistical tests on the output sequence, some analyses are conducted to diagnose its randomness. At the first level, a simple test is in fact done on the output to make sure of its randomness. For example, at first, various types of NIST tests are done on 1000000 bits and in case of passing, its second and third level can be investigated. In fact, the other two levels are accomplished because of more randomness of the pseudo-random sequence.

Sensitivity analysis

Sensitivity analysis is different in different algorithms. However, the general goal is to see if for the smallest changes in the algorithm input there will be considerable changes in the output sequence. It means whether at least half of bits change with regard to the previous state [16]. The higher and more chaotic the changes, the more robust will be the algorithm against sensitivity analysis.





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In paper [17], a statistical analysis is performed on stream ciphers algorithms in the synchronous mode. Algorithms are compared in terms of correlation between the key and output sequence, initial value and output sequence, frames correlation and diffusion and it is shown that some algorithms suffer weaknesses in this type of sensitivity analysis. In paper [2], the SAC test is introduced so that the strict avalanche criterion in algorithms is analyzed. Design and investigation of output sequences using the test has also been introduced. As an example, in block and stream type of ciphers, changing the key and initial value as well as comparison of output sequences the analysis is carried out. However, in pseudo-random number generators, the analysis is conducted by changing input values as well as comparison of output sequences. The tests were performed on 1000 sequences with a length of 1000000 bits and for all algorithms, such that in each stage, a comparison is done for block and stream algorithms in terms of correlation between the key and output sequence, initial value and output sequence, frames correlation and diffusion. However, for pseudo-random number generators, the correlation between the seed and output sequence, correlation of different seeds, correlation of frames and also diffusion were compared. In addition, in other algorithms, the SAC test was investigated whose final results are shown in table 4.

Types of attacks

In this stage, taking into account the type of an algorithm, various types of attacks started to find weaknesses and reduce the search space or even separate output sequences from other pseudo-random sequences. Attacks include heuristic guess and determine attack which is mostly usable for stream ciphers [18]; differential and linear attack, which are mostly used for block ciphers and algorithms with the S_BOX structure and also the differentiation attack that is used to separate the output sequence of an algorithm from other algorithms and statistical tests investigations are among them. It should be mentioned that various attacks have been designed for cipher analysis such as Related-Key, Boomerang, Biclique etc.

In paper [19], the existing weakness of the algorithm RC4-like is mentioned and the attacks that are implementable on the algorithm are expressed. One of the most significant weaknesses of the algorithm is on the differentiation attack. It means the output of the algorithm can be separated from other good sequences in an acceptable volume. However, from cryptography analysis perspective, it has numerous weaknesses such as having many weak keys. In paper [20], the differentiation attack has been introduced. In fact, the very basic goal of this type of attack is to separate linear and non-linear outputs of various number generators. The most important attack investigated in this stage on other algorithms is the differentiation attack and the results of investigations are shown in table 5.

The second level of NIST

In this stage, the test NIST is performed on more output sequences of number generators. It means, for instance, NIST tests are investigated on 1000 sequences of 1000000 bits and based on a certainty level of $\alpha=0.01$, values $P - \text{value} \geq 0.01$ are passed. If m and n are respectively assumed as the number of sequences selected for each test and the number of passed sequences and we divide n by m and call the result as k and determine an interval according to equation (1), then if k value is less than the k value calculated in accordance with equation (1), the sequence is rejected for this test. In fact, it can be said that the second level of NIST has not been passed.

$$\hat{p} \pm 3 \sqrt{\frac{\hat{p}(1 - \hat{p})}{m}} \quad , \quad \hat{p} = \frac{n}{m} \quad (1)$$

The third level of NIST

In this stage, the distribution of quantities of P-value are observed and calculated for each test and in case of distribution uniformity of all P-value quantities of the existing tests of NIST, it can be said that the number generator



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has well passed the third level. In figures (1) and (2) for example, the process of passing or rejecting the stage can respectively be seen.

In fact, the point should be mentioned that the second and third levels are investigated in the attacks section. As a matter of fact, the investigations are normally conducted for the differentiation attack and in table 5, one of the reasons for penetrability in the algorithm RC4 is the weakness against the differentiation attack. Moreover, the results of the NIST test are given as an example for AES256 [21].

Iterative algorithm law test

This test was introduced by Wang in 2015, which is used for the accurate study of pseudo-random sequences as a new test known as the iterative algorithm law test [22]. The purpose of the test is to use the iterative logarithm law that is ignored in NIST test, in which various distances are used for comparison instead of calculation of P-value. The test has been calculated and compared for all the algorithms based on the paper standard.

CONCLUSION

As was seen, using the model it is possible to analyze different algorithms at an acceptable period of time. Furthermore, the selected path for investigation of algorithms is very important because if the stages are not arranged properly and in order, it will lead to in vain investigations and reduction of accuracy of algorithms analysis. It should be mentioned that if a stage is eliminated or ignored in this model, it may lead to errors in the diagnosis of a good algorithm. The weakness reveals itself clearly especially when the goal is to generate acryptography algorithm and causes many weaknesses to appear in the algorithm. Thus, it can be said that the most important application of the model is making a new algorithm. In contrast, it is also useful for analyzing different algorithms and it is worth mentioning that the model can be used to give the privacy certificate to an algorithm. In addition, we can imagine what features a good algorithm should have to observe privacy issues. In this paper, having investigated a number of pseudo-random number generators as well as block and stream ciphers, it was demonstrated what weaknesses each one has and in fact, avoiding any excess of analysis, the algorithm was eliminated from the list so that the best one is selected using the model. It should be pointed out that algorithms that pass all the stages well can receive the privacy certificate according to the model. Based on the conducted studies, algorithms AES256, MT19937 and Salsa respectively as a block cryptographer, a pseudo-random number generator and a stream cryptographer have passed all the stages and can be given the privacy certificate in accordance with the model.

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Table 1: Comparison of algorithms speed

TYPE of ALGORITHM	NAME of ALGORITHM	SPEED QUALITY	PASS or REJECT
Block Cipher	AES256	Good	PASS
Block Cipher	DES	Good	PASS
Block Cipher	CAST-256	Slow	REJECT
Block Cipher	SKIPJAC	Slow	REJECT
Stream Cipher	F-FCRS-8	Good	PASS
Stream Cipher	Frogbit	Good	PASS
Stream Cipher	RC4-like	Good	PASS
Stream Cipher	Salsa20	Good	PASS
Stream Cipher	Trivium	Good	PASS
PRNG	CCCBG	Good	PASS
PRNG	MT19937	Good	PASS
PRNG	PHP-MT	Good	PASS
PRNG	Standard C LCG	Good	PASS





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Table 2: Comparison of robustness against the thorough search attack

TYPE of ALGORITHM	NAME of ALGORITHM	Key Space	PASS or REJECT
Block Cipher	AES256	2^{256}	PASS
Block Cipher	DES	2^{56}	REJECT
Stream Cipher	F-FCRS-8	2^{128}	PASS
Stream Cipher	Frogbit	2^{128}	PASS
Stream Cipher	RC4-like	variable > 2^{128}	PASS
Stream Cipher	Salsa20	2^{256}	PASS
Stream Cipher	Trivium	2^{80}	PASS
PRNG	CCCBG	variable > 2^{128}	PASS
PRNG	MT19937	variable > 2^{128}	REJECT
PRNG	PHP-MT	variable > 2^{128}	PASS
PRNG	Standard C LCG	variable > 2^{128}	PASS

Table 3: Comparison of the final results of NIST tests

TYPE of ALGORITHM	NAME of ALGORITHM	NIST
Block Cipher	AES256	PASS
Stream Cipher	F-FCRS-8	PASS
Stream Cipher	Frogbit	PASS
Stream Cipher	RC4-like	PASS
Stream Cipher	Salsa20	PASS
PRNG	CCCBG	REJECT
PRNG	MT19937	PASS
PRNG	PHP-MT	PASS
PRNG	Standard C LCG	PASS

Table 4: Investigation of sensitivity analysis for the selected algorithms

TYPE of ALGORITHM	NAME of ALGORITHM	Quality Sensitivity	PASS or REJECT
Block Cipher	AES256	Good	PASS
Stream Cipher	F-FCRS-8	Bad	REJECT
Stream Cipher	Frogbit	Bad	REJECT
Stream Cipher	RC4-like	Good	PASS
PRNG	MT19937	Good	PASS





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PRNG	PHP-MT	Good	PASS
PRNG	Salsa20	Good	PASS
PRNG	Standard C LCG	Good	PASS

Table 5: Situation of the selected algorithms against various attacks

TYPE of ALGORITHM	NAME of ALGORITHM	Against Attack	PASS or REJECT
Block Cipher	AES256	Resistant	PASS
Stream Cipher	RC4-like	Weak	REJECT
Stream Cipher	Salsa20	Resistant	PASS
PRNG	MT19937	Resistant	PASS
PRNG	PHP-MT	Resistant	PASS
PRNG	Standard C LCG	Resistant	PASS

Table 6: Situation of the selected algorithms against the LIL test

TYPE of ALGORITHM	NAME of ALGORITHM	Against LIL	PASS or REJECT
Block Cipher	AES256	Resistant	PASS
Stream Cipher	Salsa20	Resistant	PASS
PRNG	MT19937	Resistant	PASS
PRNG	PHP-MT	Weak	REJEC
PRNG	Standard C LCG	Weak	REJEC

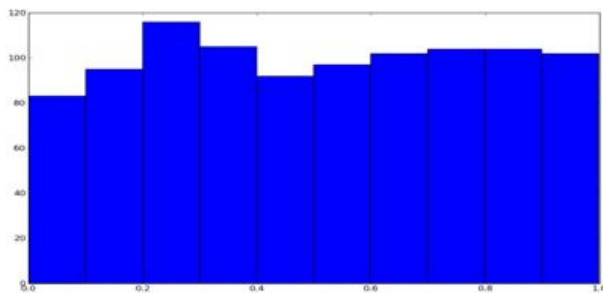


Figure 1: Uniform distribution of quantities of P-value

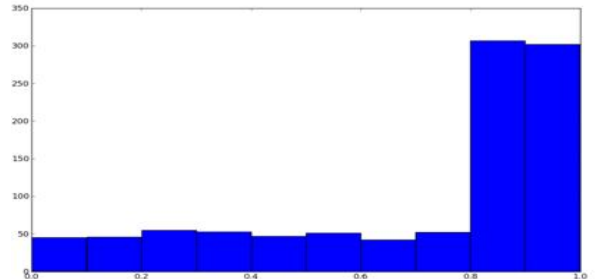


Figure 2: Non-uniform distribution of quantities of P-value





Coastal Morphological Changing View of Sagar Island, India

Subhanil Guha^{1*} and Anindita Dey²

¹Department of Geography, Dinabandhu Andrews College, Kolkata, West Bengal, India.

²Department of Geography, Nazrul Balika Vidyalaya, Guma, West Bengal, India.

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*Address for correspondence

Subhanil Guha

Department of Geography,
Dinabandhu Andrews College,
Kolkata, West Bengal, India.

Email: subhanilguha@gmail.com



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ABSTRACT

Sagar Island is one of the important coastal geomorphological features at the northern portion of the Bay of Bengal. It is a very small island and well known to the oceanographers, geologists and coastal geomorphologists because of its complex dynamic morphological nature. Being a part of geomorphologically very complex dynamic zone of Hugli Estuary and a land of mangrove ecosystem it is an important task to evaluate the recent scenario of landmass gain or loss of the tidal deltaic island. It is evident that the island was eroded from all direction during the early phase of the time period. After that deposition and erosion worked simultaneously throughout the decades. Remote sensing and GIS techniques are very much useful for the analytical study with exact computation. Constant sea waves with severe cyclones and mass scale tree felling are strongly responsible for the land loss. The present study has analyzed the erosional as well as the accretional changes in and around the Sagar Island using a series of multi-temporal satellite images namely IRS 1C 28/11/99, IRS 1C 27/03/2000, IRS 1D 19/02/2001, IRS P6 20/11/2005 and IRS P6 28/02/2008. The final output reveals that in very recent years, high rate of depositional activities taking place over the study area.

KEY-WORDS: Estuary, GIS, Remote sensing, Satellite image, Sea wave

INTRODUCTION

The Hugly estuary is a highly dynamic coastal zone. It faces remarkable tidal and cyclonic activities throughout the year. Hence, it requires continuous monitoring and updating of tidal information. Recently, the techniques of remote sensing with its synoptic, repetitive and multispectral coverage helps to monitor the dynamic environment. The



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study area is located in West Bengal covering parts of South 24 Parganas districts. The latitudinal extent of the study area is from 21°36' North to 21°56' North and longitudinal extent of the study area is from 88°02' East to 88°11' East. Several works have been done earlier on this context. An assessment has been made on land use dynamics and shoreline changes of Sagar Island using remote sensing techniques [1]. Estimation has been done on the erosional action of the Coast of Sagar Island [2]. A research has been performed on space and time related changes of land surface parameters in the Red River of the North basin [3]. Apart from these, an evaluation has been made on the coastal erosion due to wave dynamics operative in Sundarban delta [4]. Moreover, Landsat TM data has been used in order to design coastal morphological mapping around the Gulf of Khambhat [5].

MATERIALS AND METHODS

The main objective of the present study is to monitor the recent coastal morphological changes observed in and around the Sagar Island using satellite images of successive years [6]. The techniques of geoinformatics are used for the visual interpretation and understanding the recent morphological changes arising out for rapid disappearance of the Sagar Island from the every direction. The morphological condition of the estuary is overviewed from the satellite images covering the Sagar Island between the periods 1999 to 2008. The images considered for comparison are IRS 1C 28/11/99, IRS 1C 27/03/2000, IRS 1D 19/02/2001, IRS P6 20/11/2005 and IRS P6 28/02/2008. The following results have been derived through the analysis of the images-

- The overall health of the estuary was good in 1999.
- The Bedford group of Islands are remarkably reduced in size and some of them are totally disappeared.
- Advancement of Bedford channel with nearly complete erosion of Bedford Island is noticeable in 1999.
- From 2008 image, it is clear that heavy deposition has been taken place in the north and east of Sagar Island.

RESULTS AND DISCUSSION

From 1999 to 2001 the Sagar Island was gradually deposited but amount of deposition is quite negligible. But after 2005 some depositional land are also formed in the northern and western portion of the island. It shows a very dynamic and complex hydro-geomorphologic character of Hugli Estuary region [7]. It appears that during post dredging scenario, in absence of any river regulative measure, the area around Sagar have undergone fast changes due to the imbalance created by the stressed flow and the system as a reaction developed resistive forces enabling the morphological changes occurring in those areas. The above interpretations, analyses and inferences are drawn on the basis of satellite data interpretation. Apart from detailed Numerical and Hydraulic Model studies, hydrological analysis with detailed hydrographic survey will be required for the formulation of the comprehensive river training scheme [8].

Table-1 shows the change of the entire study area from 1999 to 2008. In 1999 the area of the Sagar Island was almost 241.15 sq km which become 242.51 sq km and 242.98 sq km in 2000 and 2001 respectively. During that time-period the rate of deposition was very low. From the 2005 data the area of Sagar island has been determined as 237.84 sq km which seems that 5.14 sq km area has been eroded in this four years. But it may be considered that this reduction in area is only due to disappearances of the coastal landmass because of high tides at that particular date (Table-2). The 249.87 sq km area of the Island from the 2008 image shows the gradual increase of landmass due to depositional activities.

Table-3 depicts the relative comparison between the common area and also the area under erosion and deposition during the different successive time-spans. It is very much clear from the table that the overall area under erosion is only 1.16 sq km in comparison to the 9.87 sq km of area under deposition. Almost 240 sq km area was common during this entire time period. Sagar Island is a very special island according to the coastal morphological point of view. Infact in the study area, accretion is stronger than erosion. It is a very significant evidence to determine the





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complex morphological and tidal nature of the area. In 1999-2008, the deposition has been taken place over erosion throughout the entire region and during the whole decade 3.49% land area has been gained.

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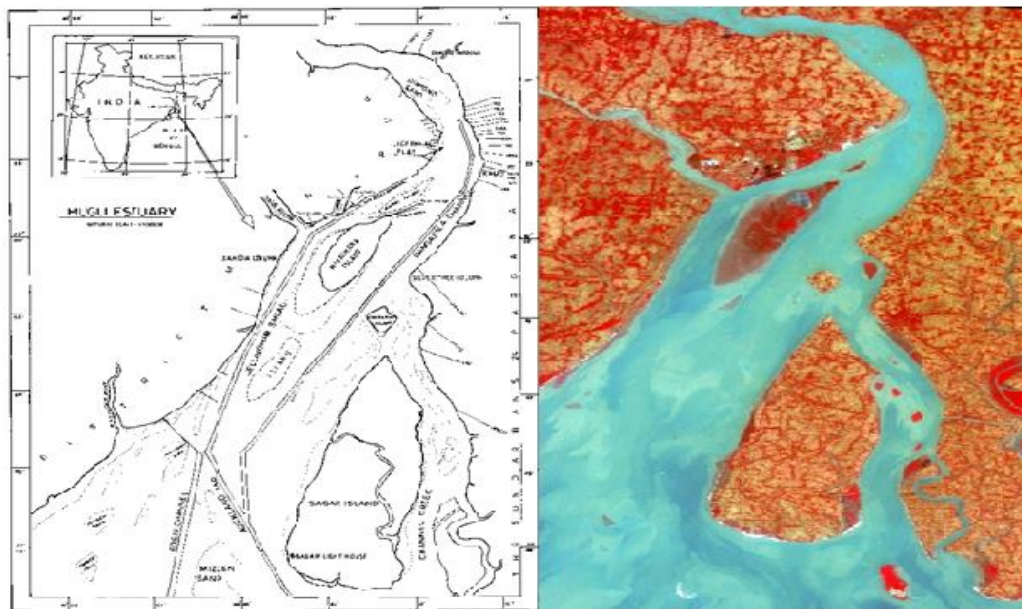


Figure 1: Location of the Study area





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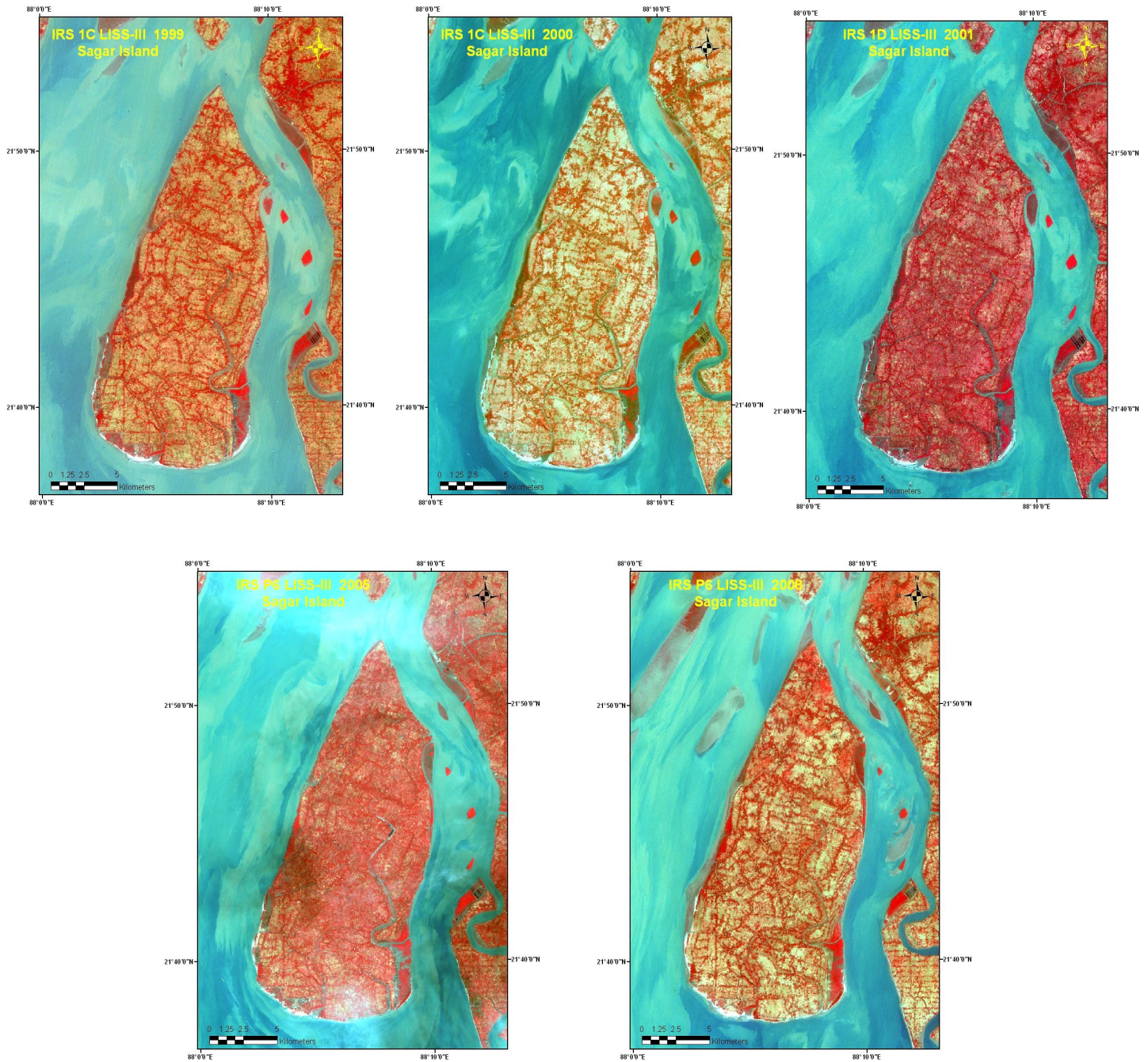


Figure 2: Multi-temporal Satellite Imageries of the Study Area





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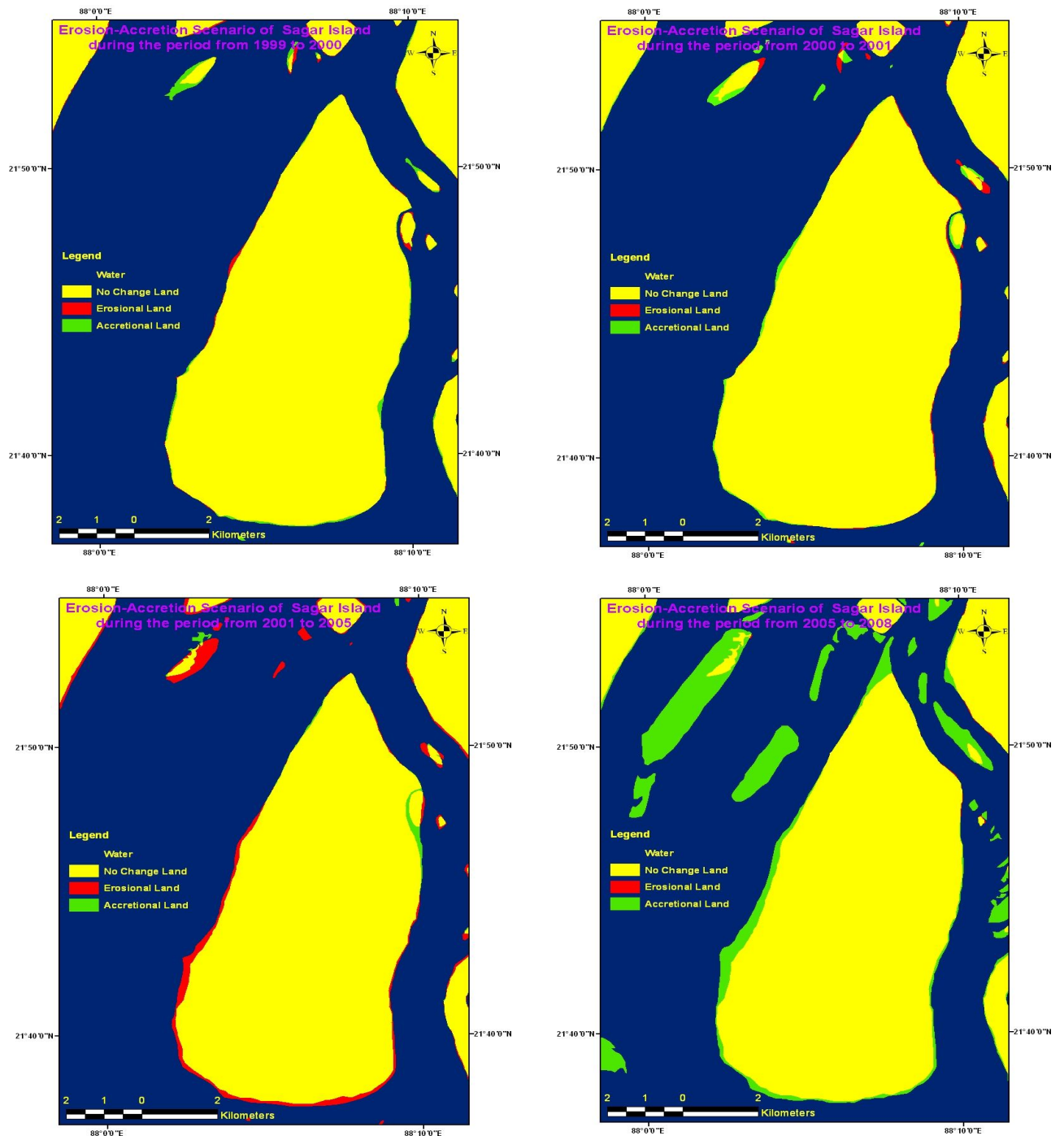


Figure 3: Erosion-Accretion scenario for the land area of Sagar Island during the different time-periods of the entire study





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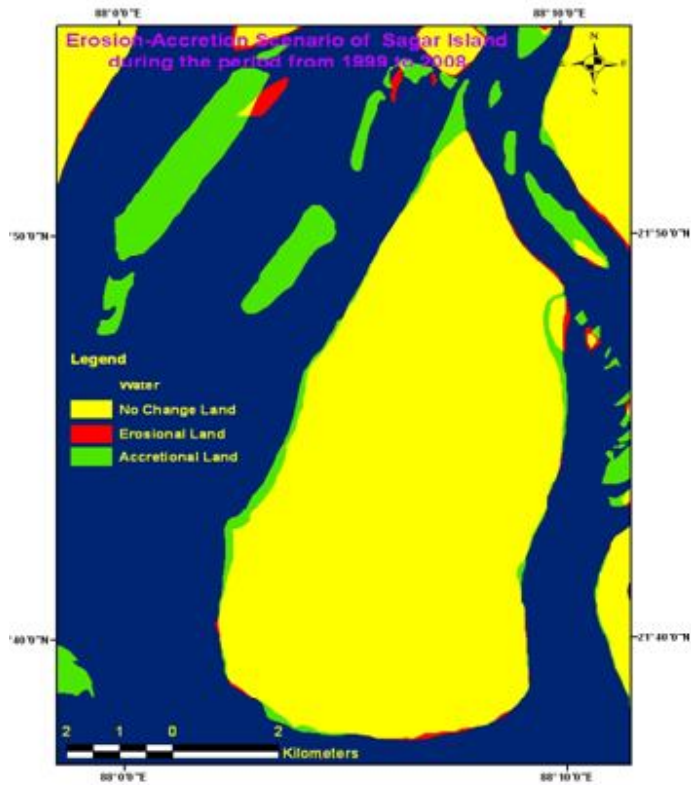


Figure 4: Overall erosion-accretion scenario of the study area during the full time-period

Table 1: Area of Sagar Island in Different Years

Year	Sagar Island Area(sq km)
1999	241.15
2000	242.51
2001	242.98
2005	237.84
2008	249.87





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Table 2: Tidal Information synchronous with Satellite passes

Serial Number	Date	Name of the satellite product with details	Time of pass	Tide in metre At Sagar Station
1.	28-Nov-1999	IRS 1C LISS-III	10.30 AM	N.A.
2.	27-Mar-2000	IRS 1C LISS-III	10.30 AM	N.A.
3.	19-Feb-2001	IRS 1D LISS-III	10.30 AM	3
4.	20-Nov-2005	IRS P6 LISS-III	10.30 AM	4.1
5.	28-Feb-2008	IRS P6 LISS-III	10.30 AM	1.93

Table 3: Erosion-Accretion area of Sagar Island during the different time-periods

Period	Sagar Island (Area in sq. km.)		
	Common Area	Area of Erosion	Area of Accretion
1999-2000	240.49	0.66	2.02
2000-2001	241.22	1.29	1.77
2001-2005	235.06	7.92	2.77
2005-2008	237.73	0.11	12.14
1999-2008	239.99	1.16	9.87





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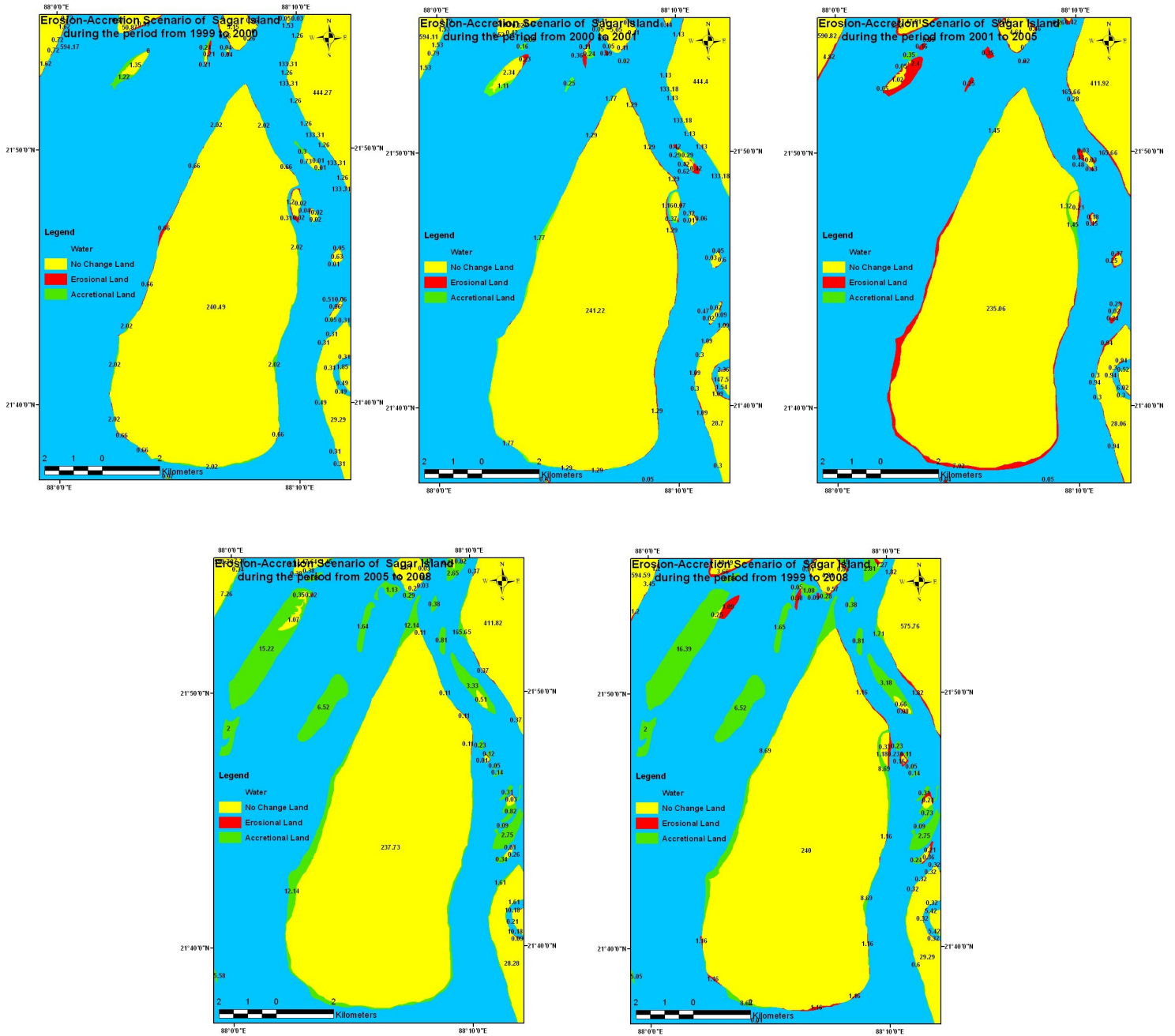


Figure 5: Absolute changes in the total area of Sagar Island (Number shown in the figure is area in sq km)





Reviewing and Acculturation of the Lifestyle of Shiite Innocent Imams as a Warranty of the Psychosocial Health of Community

Ali Fattahi Bafghi¹, Mohammad Reza Mozayan^{*2} and Kazem Barzegar²

¹Depart of Med Parasitology & Mycology, School of Medicine, Yazd Shahid Sadoughi University of Medical Sciences, Yazd, Iran

²PhD student. in TEFL, Head of the English Language Department, School of Medicine, Yazd Shahid Sadoughi University of Medical Sciences.

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*Address for correspondence

Mohammad Reza Mozayan,
The English language Department,
The school of medicine,
Yazd Shahid Sadoughi University of medical sciences,
Yazd, Iran,
Email: afbafghi@ssu.ac.ir



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ABSTRACT

Human beings should first know themselves to be able to know their Creator. Then, they may recognize the purpose of the creation of the universe and the method of how to live and to notice their own nature and essence. In this way, the mankind could perceive the divine messages and revelations and believe that they may reach their goals only and only in the light of extraordinary divine drives and motivations. This paper reviews the acculturation of the life style of the Shiite innocent Imams as a warranty for the psychosocial health of the community. This is a descriptive-comparative restatement of the divine guidelines of the powerfully and clearly expressed religion of Islam on the quality of human life conducted in 2013-2014. The data collection instruments included information sources as books, articles, journals, and the study of texts available in libraries, websites and search engines. By using websites, active websites on Islamic Lifestyle has been assessed. Gathered sources were categorized and evaluated with descriptive statistics and content analysis. In the Ahl-al-Bait School, all the divine prescriptions and remedies are linked to the origin of the existence, i.e., Allah, affecting the psychosomatic aspects of human existence and leading to the health and well-being of mankind and his wisdom. The divine sciences of Islam and Ahl-al-Bait possess comprehensive, multidimensional, interdisciplinary, and multidisciplinary attitude towards mankind and avoid a detailed individual-based outlook. The musts and mustn't of Islam are not excreted from the crude and incompatible mind of a weak human imposed on other members; rather, they are derived from the divine revelation and the holy book of





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Qur'an.Lifestyle consists of two components: instrumental and fundamental. The instrumental component is composed of issues as knowledge, innovation, constructions, and political empowerment observed in the governmental strategies contained in state documents; however, the main component of lifestyle consists of elaborating on the details of the context of life. The main focus of all the processes of this component is humanization. This should be considered from the establishment of the family structure and marriage and cover all the periods and fluctuations of life span events.

Key Words: Lifestyle, the Shiite innocent Imams' tradition, mental and moral health.

Implication for health policy/practice/research/medical education:

The aim of this research is to criticize and evaluate Islamic lifestyle in websites and identification of Iran position in that.

Context

Spirituality refers to the terminal or ultra materialistic fact that establishes the framework and rudiments of an individual contemplation and wisdom. It is a route but internal that makes a person able to explore the essence of existence or the deepest of values and concepts of people's life. On the other hand, spiritual health denotes enjoying a sense of acceptance, positive sentiments, and a sense of interactive relation with a dominant and superior Holy power. This is said to come into existence within an individual through a seeking and coordinated process with multiple facets, i.e., cognitive, sentimental, active, and consequential. Whereas spirituality is a type of being, spiritual health is a type of having. Amassing wealth, seeking God, love and worship, propensity to spirituality, and apprehending spiritual pleasures are all the features emanating from human nature. The biggest problem of human in preserving his identity, remaining in the pass of submission and obedience to God, and seeking pleasure out of spiritual reality dominated on his heart is the presence of the carnal desires instigated uncontrollably and gone to the extremes. An aspect of human soul is *Nafs* (self) which is in relation to his body and his nature and governs his carnal and natural life through two instigating forces: lust and anger. Acting out of moderation and not going to extremes, this aspect of human soul can assist in human spiritual excellence and spiritual health, hence directing his carnal and spiritual aspects of life coordinately. Should this phase, however, goes to extremes, it can get out of control of the human wisdom thereby making human soul unhealthy and orienting him towards dangerous arenas of impiety and corruption. To shun this, it is incumbent on him to follow the God-like and celestial comprehensive manners ascribed to *Ma'soum* (infallible) religious leaders. In *Elmo-ul-kalam* (knowledge of speech), *Ma'soum* (the infallible) are those who have been granted, from the almighty God and by his definite will, *Ismat* (infallibility), thereby being away--from birth to death--from any corruption both intrinsically and extrinsically in all aspects of life. This full-fledged concept of infallibility has a place only in *Shiism* and has been demonstrated therein via plain reasons. Allah's will is, of course, along the *Ma'soums* will and not across it in order to constrain the doubt of 'predestination' signifying that God's will has been destined so that *Ma'soum* would achieve excellence by his own will. The word *Syarah* has got varying meanings: method, tradition, style and manner of doing something, moving during the day, moving at night, and definite moving and walking. Hence any manner and behavior emanating from *Ma'soum* is regarded reverently as a beacon for those ordinary people of the society who seek advice. This is because *Ma'soum* is a character never stepping against what Allah the Almighty has enjoined. The Shiite emphasis on *Ma'soum* is to be seen not only in the central role accorded to Ta'wil (esoteric hermeneutics) but also in the central function of *Ma'soum* in daily religious life and his eschatological significance. *Shiite* Muslims must know their *Ma'soum* as a living existence in religious life, a link between the believer and Allah, the source of grace, and the fountain of knowledge. Endowed with a trans-historical reality, *Ma'soum* is not experienced simply as a personality belonging to religious history. *Ma'soum* is so comprehensible that is present in all aspects of people's life. His *Syarah* is of a divine source, so deep that it can interpret Quran and presents Islamic values contributing to appreciation of how the people must conduct either



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individually or socially. This study aims to recapitulate *Syarah* or the methods or patterns of living of the *Ma'soumin* the infallible Imams (AS) as the guarantee for mental and moral health.

Evidence Acquisition

This is a descriptive-comparative study recapitulating Islamic instructions on human quality of life. For obtaining data, the tools such as checklists, books, articles, journals, and electronic data bases were utilized.

RESULTS

Life-style has two important components: the instrumental and the major. It's instrumental component embraces elements such as knowledge, innovation, structures, and political potentials all existing in the 'Deeds for Government Orientation'. The major section, however, addresses the details of life context. Throughout all of its processes, attention should be exercised on improving humanity. This is to be commenced from family and from the wedding day or the so-called holy marriage day encompassing all ups and downs of life. In *Ahl-ul-Beyt* tradition, all the prescriptions are linked to the origin of existence or Allah, hence contributing to both body and mind health. The fact is that distancing ourselves from *Ahl-ul-Beyt* tradition can be regarded as the origin of all types of ethical misconduct either personal or familial/social. It is crucial to note that *Ahl-ul-Beyt* also took example(s) for themselves. The ever-present twelfth Imam, Imam Mohammad'al Mahdi (AS), for example, has selected Fatimah (SA) as his example and paragon of virtue and follows her manner and conduct. It is hence incumbent on Muslims all to praise the comprehensive feature of living learnt from *Ahl-ul-Beyt* so as not to be distracted from the straight path toward Allah. This is due to the fact that Islam has established its teachings and regulations on the basis of creation and has considered man's needs and has tried to settle them.

DISCUSSION

In an attempt to modify life-style, the most important effect can be attributed to obedience and subservience to Allah including praying to Allah. Even though worship is not restricted to praying, praying represents the appearance of subservience being effective in modifying soul and action. Fatimah (SA) is undoubtedly regarded as the paragon of virtue and of praying among all the *Ma'soums*. She prayed to Allah so beautifully that her praying place whispered with her the words of praying and *Mala'ek* (Allah's angels) came down in queues to watch her praying. She, Ali's wife and the prophet's (AS) beloved last daughter, has been glorified as the perfect woman, the symbol of purity and chastity whose example is to be emulated for all times. Referring to her as the lady of Paradise, generations of Muslims have reverently cherished her for her simplicity, piety, gentleness and silent suffering in diversity. One of the very important lessons one can take from the conjugal life of Ali (AS) and Fatimah (SA) is the modification in life-style. Their marriage, for example, was regarded a symbol in traditional Iranian wedding ceremonies. With a simple dowry and free from formalities the families and some relatives participated in providing what the couple often needed for their life. Life was associated with passion and the symbol of "take precedence over each other only in virtue and piety." Spending money, millions and millions, just for renting halls and various types of dishes more often than not intended to show off will formulate a life that is unlikely to endure for long. This, usually institutionalized in the existing status of our society, was never present in the life of our Imams (AS) but was crystallized in the life of the tyrants, despots, and oppressing leaders and enemies of *Ahl-ul-Beyt* (Mohammad's [SA] household). Mo'avieh was one of those who held such ceremonies for the wedding of his son Yazid thus disobeying to follow the simplicity of life recommended by *Ahl-ul-Beyt*. In Iranian traditional life-style, the young following *Syarahof Ahl-ul-Beyt* started their conjugal life mostly with simplicity, free of formalities, and at an early possible age hence much less suffering from immoralities. Features of *Syarahof Ahl-ul-Beyt*: Enjoying divinity: Their manner and behavior is structured on the basis Allah's will so that every bit of their action is ascribed to divine revelation. Enjoying profundity: Their manner is so comprehensive that it can be expressive of a world of content via simple speech or behavior. As Shahid Motahari contends, having good appreciation of their manner, being so deep, needs to





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be hesitated and contemplated on. In this way it can act as a beacon to illuminate the pass for those who seek divinity and the logic of living. At times it is possible to extract the most significant Islamic laws out of their simplest conduct. Enjoying capacity for *Qur'an* interpretation: *Syarahof Ahl-ul-Beyt* has emerged out of Allah's will and in line with *Qur'an*. Hence proper understanding of *Masoumin'sSyarah* will help a good appreciation of *Qur'an*. When, for example, the Qur'anic verse "Hold praying to remember Me." was descended from Allah, the people were unaware of how to hold it. Hence, the prophet Mohammad (SA) declared: "Hold praying as I do." Also *Syarah* of Imam Ali (AS) can signify interpretation of the status of some *Qur'anic* verses. For example, the verse, " Say: My lord has only prohibited indecencies, those of them that of apparent as well as those that are concealed, and sin and rebellion without justice, and that you associate with Allah that for which he has not sent down any authority, and that you say against Allah what you do not know." is interpretive of Imam Ali's (AS) *Syarahin Laylat-ul-Mobit* () that he reposed in the prophet's bed so as to save the prophet's life. The religion interpreters believe that some of the verses of 'Ensan' *Surah* (the chapter of *Qur'an*) is about Imam Ali (AS) and Fatimah's *Nazr* (vow solemnized to Allah), those who donated their *Eftari* (food for breaking fast) to the needy, the captive, and the oppressed for three consequent days. It follows that *Syarah* and the manner of *Ma'soumin* is representative and interpretive of *Qur'an*, the awareness and knowledge of which can contribute to the fact of *Qur'anic* concepts and better appreciation of Allah's words. Representative of Islamic values: The *Syarahof Ahl-ul-Beyt* is the practical crystallization of Islamic values its application of which in daily individual and social conduct has been enjoined. Comprehensiveness: As it was mentioned before, the *Syarahof Ahl-ul-Beyt* is so perfect and comprehensive that it can capture all aspects of human life. Comprehensiveness is different from profundity as the former is considered a hidden extensive feature whereas the latter represents some vertical characteristics. Comprehensiveness comprises all aspects of human life such as religious, ethical, training, social, economic and the like.

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Authors' Contribution

Ali Fattahi Bafghi developed the original idea and the protocol, abstracted and analyzed data, wrote the manuscript, and is guarantor. Mohammad RezaMozay and Kazem Barzegar contributed to the development of the protocol, abstracted data, and prepared the manuscript.

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RESEARCH ARTICLE

Examining the Influence of Organizational Leadership on Work Ethics

Mohamad Reza Jaber Ansari* and Rezwan Azadmanesh

Department of Management, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Mohamad Reza Jaber Ansari
Department of Management,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran
Email: M_ansari1353@yahoo.com



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ABSTRACT

The main objective of this study was to examine the influence of leadership in organizations is the work ethics. In this study the leadership style was the independent variable and the dependent variable was work ethic. This research is a descriptive – correlation type and its goal is to be applied in real world context. This study is based on data collected from field and library research. The population of the study included the official staff of Lorestan province's Telecom Company (420people) and its sample size was determined to be 201 people by Kurgesi and Morgan's table. The sampling method of this study was random sampling and data collection was done through a standard questionnaire (Leadership Questionnaire of Bass and Olive (1995)) and the work ethic questionnaire of Gavin (2005)). The Cronbach's alpha in the leadership style questionnaire was equal to 0.882 and in work ethics questionnaire equal to 0.769. The collected data was analyzed by SPSS software. The results showed that there exists a relationship between leadership and work ethics. There is a relationship between transformational leadership (change management) and work ethics in an organization. There is a relationship between transactional leadership and work ethics of the organization.

Keywords: leadership, transformational leadership, transactional leadership, work ethicS

INTRODUCTION

Today, organizations are increasingly involved with what they call an ethical dilemma. Ethical dilemma is about conditions that ethical and right conduct must be redefined again. This renovation is definition of ethics is the result of blurring of boundaries of right and ethical conduct. In general, the human have specific ethical features in their individual and personality dimensions which form their ethical thoughts, speech and behavior. It is possible that





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when these individuals are in an organizational setting with a specific position and place, their thoughts, speech and behavior influence the efficiency and effectively of the organization. Moreover the morality and immorality of their behavior and performance can have positive and negative outcomes for the organization. Manager must create a healthy environment for employees so they can work with all of their power and productivity. This requires a leader with high moral intelligence .

The managers of organizations have found out that without an integrated regime of ethics which fulfills the ethical needs of individual, organization including different aspects of economical, social, cultural, political and religious ethics in a coordinated manner, the organization will not survive. An integrated regime of ethics with a holistic and systematic point of view will take care of different aspects of ethics and by creating balance between these aspects, will be an obstacle of going to extremes and would not sacrifice one aspect of values for another one. This integrated regime of ethics would make it possible for everyone to come to an agreement about an ethical culture. For the sake of keeping and sustaining such a regime, the management would have to devise different structural and behavioral measures in a way that this integrated regime of ethics improves and expands in a daily manner and comes to an optimum state (Alvani, 2005,10).

Organizations use visions in their mission to perfection and the behaviors of their leaders is under a close surveillance to determine how efficiently these leaders achieve organizational goals. The leaders in an organization should accept their interdependence and influence their employees in a way that motivates them to get involved in responsibilities and get familiar with performance expectations (Chen & Bliese, 2002). As a part of interaction between the leader and followers, the method with which a leader impacts the ideas of his/her employees' and establish mutual trust, may have an effect on the overall performance (Hyatt et al., 2003).Moral standards represent the norms and beliefs of an organization. These norms and beliefs are generally provided, proposed, evaluated and defined and then broadcasted by senior managers, and then made available to other members of organization. These norms are standards of behavior that the senior staff of the organization expect others to adhere to them in a particular situation .The beliefs in a moral standard, are in fact, the correct way of thinking: they are the criterions that senior people expect others to think according to them. (Hessmer , 1995, 179).

Leadership

Leadership styles are strongly influenced by the cultural environment of their society. So much that we can say leadership and management practices of every civilization, is a cultural manifestation of that civilization. It is obvious that the cultural structure of each society is influenced by the social, economical, religious environment of that community. Therefore the behaviors of managers are partly influenced by the cultural structure of their environment. Therefore while using the leadership theories it must be taken care that these theories are product of which cultural climate and devising them will require what peculiarities (Rezayian, 2002, 423). Today the role of manager as a leader has gained so much importance that a lot of effort is made in all fields to employ the people who have the required characteristics for leading people.

Leader ship is the ability to influence the group and pushing it toward the desired goals. The source of this power or influence is formal. Since the position of management is formal and his/her authorities are given to him/her formally, a person may get to become a leader as a product of getting a position in an organization. However it must be said that not all of the managers are leader and not all of the leaders are managers. Since an organization gives special rights to a manager, this does not guaranty that the manager will guide the organization in an effective manner. The unofficial or informal leadership (The influence power a person gets via sources other than official structure of an organization) can gain more importance than official influence power. In other words a person can emerge from a group as a leader as well as a person who is formally appointed as a group leader (Robins, 2005, 218).





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According to the above discussion management and leadership is not the same thing. Management is influence on others based on formal authority and position. However leadership is the result of a social influence process. Therefore a person can be manager, leader or both of them. A person can have formal position, such as a person who is in charge of a group or an informal position such as a person who arises among ordinary members of a group is considered a group leader with the contest of all group members. Therefore leadership means using influence for directing and coordinating the activities of members of a group in order of achieving goals. As an attribute leadership is a set of characteristic features which is attributed to someone who uses influence in a successful manner. Therefore a manager or a supervisor can be a leader or not (Morehead and Griffin, 1997, 275).

In some cases, it is said that the type of the organization is irrelevant to its leadership. This means that in any organization or in any situation where a person is able to influence others, in fact she/he has exercised leadership. The method by which leaders devise their power and influence is called leadership style. Now the question arises that how it is possible to influence the behavior of others?The answer is that influence is devised through creating an illusion of the power. Creating illusion of power requires access to power sources. The power sources can be divided into two categories based on their sources:

- 1.Power sources based on the position and authority of the manager.
2. Power sources based on the personal abilities of the manager (Rezaeaiian , 2002, 423 - 424).

The situation for a leader is when he/she hasboth personal power and authority, in some cases it is not possible to build a relationship between these two.

New theories of leadership

In recent years, new theories or models of leadership has emerged by researchers which include the models of, interactional and transformational leadership. Interactional model: "Edward Hollander" considers the process of leadership as an event that interactions between leaders and followers occur in particular situation content. In his view the leadership core happens when three forces of leaders, followers and their situation have common interface. Hollander believes that only by identifying the main characteristics of the three forces and the ways, in which they interact, leadership can be identified Transformational model: There are some leaders that create change and transformation in the organizational system and its followers. These leaders have extraordinary power and influence the hearts of their followers. "Marx, Weber," speaks of the leader as charismatic leaders. Transformational leaders are characterized by some features which are mentioned bellow:Insight - symbolization – delegate authority to others - intellectual stimulation - Honesty (Moghimi, 1999, 286)

Work Ethics

History of ethical issues is perhaps as old as human beings existence, but documents show that until the fifth century BC, the ethics has not done anything much more than advice, order to follow, preaching and guidance and encouragement to follow the examples. The basics of ethics were introduced by Socrates in the fifth century BC who always tried to teach other people to weight their actions, behavior and beliefs against a benchmark and determine the right and wrong by their common since. After Socrates, Plato, by taking into consideration the duality of mind and body, established his ethical system based on the teachings of Socrates and ethical issues. He noted the need to understand the basis for morality and believed that as sun is essential for light, nutrition and growth of nature, understanding the good in the behavior of man, institutions, and society is a necessity. In fact, Platonism is the source of moral, religious, mythical and idealistic thought (Ahangari, 2008, 2).

In the evolution of society and the development of human thought, little by little, the concepts of right and wrong, and should and should not, required or not required became the conceptual tools to examine the social customs. These knowledge and experiences about the dos and don'ts of social conduct, were the cause of wisdom and guidance of personal and social life as well as the creation of civilization and legal institutions, and with it came the





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ethics and moral philosophy (Ahangari, 2008, 2). Alex De Tocqueville has claimed in his classic nineteenth-century attitudes that Americans explain every act of life based on their individual interests. In principle, this is the true individualistic belief in which a person sacrifices some of his/her personal interests for the sake of other interests. Over the two hundred years, the same ambitious men and women insisted on gaining power and playing their roles in life based on personal gain. The problem multiplies when the personal interests of a person is against the public interest, although not all of the personal interests are like this.

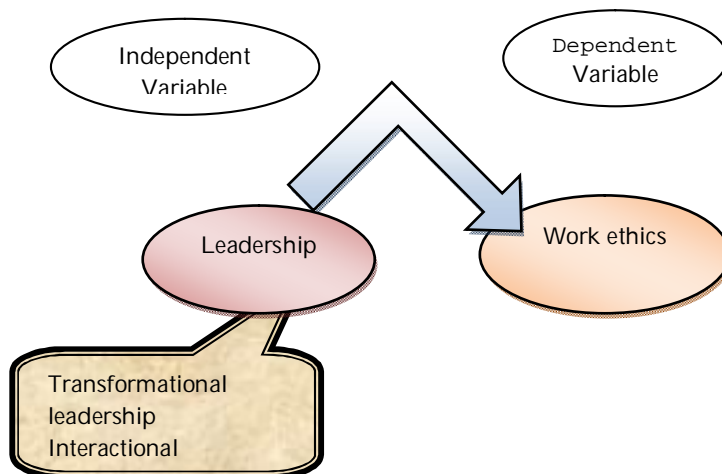
One of the ways by which it can be assured that the public interest is not sacrificed for the sake of personal interests is passing numerous laws and regulations and limiting authority of the state and government men. However, the passage of adequate laws and regulations which limit the authority of government and stops it from abusing its power is a vague or somehow impossible work (Manzel, 2010, 2). The ethical issues in Iran were raised by "The teachings of Pahlavi "which was written in Islamic age. In these kinds of writings usually the behavioral ethics of a person is the main subject and the basics of ethics and ethical habits are never discussed. It is interesting to note that after translation of Iranian books from Pahlavi to Arabic language, the teachings of Iranian entered Arabic books and sometimes were quoted by Imams. In Ibne Nadim List the name of forty-four Pahlavi texts were mentioned which were adapted and translated into Arabic. These books were mainly in the field of practical wisdom. Of course in the structure of Islamic philosophy and in the field of moral issues, the translation of Greek texts for example the works of Galen, Aristotle and Plato also had a big impact. In ancient Iran, the necessity of paying attention to ethical issues and under the shadow of creating a ethical society was only satisfied by creating law books which were preserved in the corner of libraries and were never employed in a practical manner (Ahangari, 2008, 2).

Definitions of Ethics

The word "ethics" is the plural of "ethic ", and it fact is the science of studying and evaluation of behaviors and temperament (Ahangari, 2008, 1).

The conceptual model of the study

This model shows the effect of leadership on work ethics (Buckly, 2001)





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METHODOLOGY

This research is a descriptive –survey type and its goal is to be applied in real world context. The population of the study included the official staff of Lorestan province's Telecom Company and its sample size was determined to be 201 people by Kurgesi and Morgan's table. The members of the sample worked in different branches of Lorestan Province Telecom Company based in different cities. The population size of the study was 420, which was reduced to a 201 sized sample using Kurgesi and Morgan's table. The sample was divided based on the labor force of each branch.

Data collection tool

Data collection method in this study was field research. Data collection was done by distributing questionnaires among sample members in the organization, while the researcher was present the whole time. The scale used for data interpretation was Lickert scale with five rating points. The respondent rated their answer on the scale depending on their agreement to the statement. The answers included totally agree, agree, no opinion, disagree, totally disagree (with points of 5, 4, 3, 2 and 1.) The questionnaire was developed as follows: Leadership Style Questionnaire: a questionnaire for measuring the leadership variable based on Bass and Avolio (1995) questionnaire, which consists of two dimensions of "transformational leadership and interactional leader" and consists of 32 items. Work Ethics Questionnaire: a questionnaire for measuring the work ethics variable based on standard questionnaire of Gavin (2005) which consists of 6 items.

Validity and reliability of the questionnaire

The data collection tools of the study (questionnaires) were standard, however for assuring of its validity of time and place, the guidance of experts of the field was sought and also content analysis was performed on it, The reliability of the questionnaire was checked in the initial phase of the study, by distributing 30 questionnaires and after collecting them, their Cronbach Alpha was calculated by Spss software and the results showed that, the questionnaires were reliable enough. The Cronbach Alpha of the Leadership Style Questionnaire amounted to 0.882 and the Cronbach Alpha of Work Ethics Questionnaire amounted to 0.769.

The assessment of normal distribution in the data and hypothesis test

The assessment of normal distribution in the data and hypothesis test was conducted by SPSS software.

The tested hypotheses were as following:

H0: The distributions of the study are variables normal

H1: The distributions of the study are variables are not normal

Based on the results of presented in the above table, the significant level in all of the variables is the above 0.05 (sig>0.05), therefore the null hypothesis is accepted and we can conclude that the distributions of all variables are normal and using parametric tests is permitted. However for using regression tests it must be established that the data is linear. The linearity of the data is established by the figure presented below:

In order of regressing the data, the linearity condition of the data must be met, therefore the following figure was used for checking the validity of using regression test. The linearity of the data is established by the line and data distributed around it, therefore using regression analysis is permitted.

Regression test of hypothesis

The main hypothesis- Leadership style affects the work ethics in the organization.

H0: Leadership style has no effect on the work ethics in the organization.





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H1: Leadership style effects work ethics in the organization

The results of regression in the above table shows that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199)=60.994$, $p=0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 23 % of changes in work ethics in an organization are due its leadership style, the 78% of it explained by other factors. The amount of Durbin-Watson statistic is 2.220 in the above table, which shows that the errors are independent of each other and there is no correlation between the errors, therefore the assumption of correlation between the errors is rejected and regression analysis will be allowed.

As it can be seen from the above table, the amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.48) and ($P<0.000$). Therefore H1 will be confirmed by 95% confidence level and the resulted equation will be **work ethics=2.528+0.163 leadership style**. The sub hypothesis 1- Transformational Leadership style affects the work ethics in the organization.

H0: Transformational leadership style has no effect on the work ethics in the organization.

H1: Transformational leadership style effects work ethics in the organization

The results of regression in the above table shows that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199)=53.235$, $p=0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 45 % of changes in work ethics in an organization are due its transformational leadership style, the 55% of it explained by other factors. The amount of Durbin-Watson statistic is 2.295 in the above table, which shows that the errors are independent of each other and there is no correlation between the errors, therefore the assumption of correlation between the errors is rejected and regression analysis will be allowed.

As it can be seen from the above table, the amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.459) and ($P<0.000$). Therefore H1 will be confirmed by 95% confidence level and the resulted equation will be **work ethics=6.032+0.201 transformational leadership style**.

The sub hypothesis 2- Interactional Leadership style affects the work ethics in the organization.

H0: Interactional Leadership style has no effect on the work ethics in the organization.

H1: Interactional Leadership style effects work ethics in the organization

The results of regression in the above table shows that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199)=24.688$, $p=0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 33 % of changes in work ethics in an organization are due its interactional leadership style, the 67% of it explained by other factors. The amount of Durbin-Watson statistic is 2.039 in the above table, which shows that the errors are independent of each other and there is no correlation between the errors, therefore the assumption of correlation between the errors is rejected and regression analysis will be allowed.

As it can be seen from the above table, the amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.332) and ($P<0.000$). Therefore H1 will be confirmed by 95% confidence level and the resulted equation will be **work ethics=7.947+0.288 Interactional leadership style**.

RESULTS AND DISCUSSION

Discussion about the main hypothesis- Leadership style affects the work ethics in the organization. The results of regression analysis show that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199)=53.235$, $p=0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 23 % of changes in work ethics in an organization are due its leadership style, the 78% of it explained by other factors. The amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.48)





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and ($P < 0.000$). Therefore the main hypothesis is confirmed by 95% confidence level. Discussion about sub hypothesis 1- Transformational Leadership style affects the work ethics in the organization. The results of regression analysis show that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199) = 60.994$, $p = 0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 45 % of changes in work ethics in an organization are due its transformational leadership style, the 55% of it explained by other factors. The amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.459) and ($P < 0.000$). Therefore the sub hypothesis 1 is confirmed by 95% confidence level. Discussion about sub hypothesis 2- Interactional Leadership style affects the work ethics in the organization. The results of regression analysis show that the significance level of 0.000 with df of 1 and 158 is lower than 0.05 ($F(1,199) = 24.688$, $p = 0.000$). Therefore the resulted model of regression is statistically significant. Moreover since the amount of R^2 shows that 33 % of changes in work ethics in an organization are due its transformational leadership style, the 67% of it explained by other factors. The amount of Beta shows the variable has a positive and significant effect on work ethics (Beta=0.332) and ($P < 0.000$). Therefore the sub hypothesis 2 is confirmed by 95% confidence level.

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Table1: Definitions of ethics

Author	Definitions of ethics
Adel Azar, Masoud Rebiyeh, Fatemeh Gheytsi	Ethics: the valued rules and norms of a society that is reflected in the behavior of people. (Azar et al., 2009, 61)
Jamal Khani Jazani	Ethics can be defined as measures and good moral standards and patterns that govern human behavior and leads to cooperation, peace and provides collective survival. (Khani Jazani, 2009, 92)
Verdinejad	Ethics is a knowledge that takes shape from the voluntary human actions based on a rational process. (Verdinejad, 2009,2)

Table2: Normal distribution test for the study variables

Variables	Quantity	Mean	Standard deviation	Kolmogorov-Smirnov	Significance level
Leadership style	201	94.55	16.15	1.209	0.107
Transformational leadership	201	59.59	12.47	1.432	0.133
Interactional Leadership	201	34.96	6.29	1.214	0.105
Ethical behavior	201	18.02	5.46	2.182	0.075

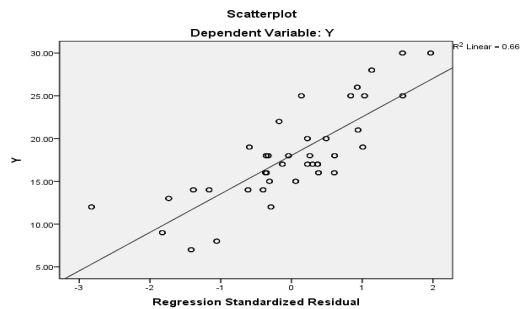


Figure 1: Checking the linearity of data

Table3: The multi variable regression analysis step by step for the main hypothesis

Variance Source	Sum of Squares	The degree of Freedom	Square Means	F	Significance level	R	R ²	Durbin - Watson
Regression	1402.84	1	1402.84	60.994	0.000	0.484	0.235	2.220
Residual	4576.9	199	23	-	-	-	-	-
Total sum	5979.8	200	-	-	-	-	-	-





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Table4: Beta coefficients in order of identifying the amount and direction of variable effect in the main hypothesis

The predictor variable	B	Standard Error	Beta	t	Significance level
The constant amount	2.528	2.016	-	1.256	0.211
Leadership style	0.164	0.021	0.484	7.810	0.000

Table5: The multi variable regression analysis step by step for sub hypothesis 1

Variance Source	Sum of Squares	The degree of Freedom	Square Means	F	Significance level	R	R ²	Durbin-Watson
Regression	05.2362	1	05.2362	235.53	000.0	211.0	459.0	295.2
Residual	7.4717	199	7.23	-	-	-	-	-
Total sum	8.5979	200	-	-	-	-	-	-

Table6: Beta coefficients in order of identifying the amount and direction of variable effect in the sub hypothesis 1

The predictor variable	B	Standard Error	Beta	t	Significance level
The constant amount	6.032	1.680	-	3.591	0.000
Transformational Leadership Style	0.201	0.028	0.459	7.296	0.000

Table7: The multi variable regression analysis step by step for sub hypothesis 2

Variance Source	Sum of Squares	The degree of Freedom	Square Means	F	Significance level	R	R ²	Durbin-Watson
Regression	9.659	1	9.659	688.24	000.0	110.0	332.0	039.2
Residual	8.5319	199	7.26	-	-	-	-	-
Total sum	8.5979	200	-	-	-	-	-	-





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Table8: Beta coefficients in order of identifying the amount and direction of variable effect in the sub hypothesis 2

The predictor variable	B	Standard Error	Beta	t	Significance level
The constant amount	7.947	2.062	-	3.854	0.000
Interactional Leadership Style	0.288	0.058	0.332	4.969	0.000





RESEARCH ARTICLE

Examining the Influence of Ethical Factors on Strategic Initiatives in Market Orientation Context

Mohamad Reza Jaber Ansari* and Zahra Valipouri

Department of Management, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran

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*Address for correspondence

Mohamad Reza Jaber Ansari
Department of Management,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran
Email: M_ansari1353@yahoo.com



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ABSTRACT

The main objective of this study was to investigate the influence of ethical factors on the strategic initiatives in market orientation context. Ethical factors as predictor variables, and strategic initiatives in market orientation context as criterion variables were examined. This research is a descriptive –survey type and its goal are to be applied in real world context. Its statistical population included employees of Zamzam Company in Tehran (387) and its sample using the Cochran formula as calculated to include 130 employees of this company and its sampling method was random. Data collection was conducted using questionnaires, and then analyzed by Spas software. Regression analysis was conducted on the data. Results show that ethical factors directly influence strategic initiatives in market orientation context and all aspects of this variable (final customer, the initiatives of distributors, competitors and macro environment).

Keywords: distributors, competitors, final customer, moral factors, market orientation

INTRODUCTION

Ethics is one of the subjects that have existed since birth of humanity and its importance not only has not faded over time but also in this day and age its importance and necessity has increased. This importance and necessity has gone so far that, today topics of social responsibility and international standards of human ethics are the latest challenge for all organizations. Today ethical factors as set of principles and values which determine the correctness or incorrectness (good or evil) of behaviors or decisions of people or organizations, has entered the realm of the theoretical literature of management as one of the main axes of Customer satisfaction from organizational and has





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drawn the attention and affirmation of many experts (academics, policy makers and managers of public and private organizations). In today's dynamic environment, a correct understanding of market and its transformations and endeavoring in satisfying the needs of customers, emphasis activities that develop a kind of sensitivity and efforts on answering the needs of the market (Hou, 2008: 1251). Studying the effectiveness of ethical factors on market trends by an organization can result in increase of its value-added products and thus customer satisfaction.

Continuously, in business management literature, the role of market orientation on industry performance improvement in a dynamic environment has been emphasized. Since the beginning of 1990 till now market orientation has been one of the main concepts that have been introduced in the marketing literature. It is believed that market orientation has been the focus of marketing efforts of those organizations focus that have multiple responsibilities and meeting the needs of customers is considered as top priority for these organization (Narver et al., 1990: 25-31). Market orientation has a fundamental role in a dynamic business environment. Firms that are able to efficiently collect market information are considered as market oriented firms (Menon et al., 1992: 53-71). Strategic initiatives in market orientation context tend to promote the capabilities within the organization, development of new products and technologies, and generally increase the efficiency of firms (Oczkowski et al., 1998: 3-10).

Today work ethics and customer orientation which stems from the strategic initiatives plans in market orientation context, has gained tremendous importance and a lot of scientific studies has been conducted in this regard. Although the words market and marketing has been considered as competitive advantage for some decades, but articles regarding the relationship between business ethics and strategic initiatives in market context are but a few. Zamzam Company was the first producer of soft drinks of cola type and has the franchise of this Canadian soft drink. The orange flavored these drinks was the cause of its rapid growth and soon this drink became very popular. It took years for soft drinks to become a part of families' purchase basket, but today they are considered as high consumption goods. In year 1978 the production of soft drinks was 1.7 billion bottles, this figure became 2.6 billion bottles in 1984 and this increasing trend has continued till this day. Zamzam company with annual production capacity of 165 million liters of soft drinks (cola, orange, lemon and diet drinks in different flavors) is the largest producer of all kinds of soft drinks in the beverage industry and has the greatest diversity of production in the country. This company is a multinational company that exports many of its products.

Theoretical bases of the study

Definitions of Ethics

The word "ethics" is the plural of "ethic " which means "a complex of moral percepts held or rules of conduct followed by an individual " and includes both good nature and tradition, such as honesty and probity, and obscene or individualities, such as lying and unchastity. Books of literally considers this word synonym of moral. Good ethics means having a beautiful and good nature and ethical culture is a culture that emphasizes ethical behavior independent of religious beliefs. Some of the definitions of ethics are provided in the below table:

Work and organizational ethics

Work ethic means knowing right from wrong at work and then doing the right and abandoning the wrong. Work ethic, as a branch of management knowledge, emerged during the emergence of social responsibility movement in the 1960s. In this decade, awareness of social movements, rouse people's expectations of the organizations, and they came to the conclusion that organizations should devise their large financial facilities and social influence in resolving social problems, such as: poverty, violence, protection of the environment , equity, public health and improving education conditions. People believed that because firms use state resources in their way of gaining profit, they are debtor and liable toward the country and should strive to improve the social situation (McNamara, 1999: 6).





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Work ethic fans are of two categories. People like Chapel believe that the ethics of work, will add value to shareholders, and is a means to achieve the goal of maximizing profits (an instrumental ethical point of view). In contrast, people like Barnard (1938), Quinn and Jones (1995) and Milton - Smith, have a non-instrument approach and believe that in addition to financial considerations, organizations should engage in work ethic, because the nature of its virtuous nature (Poesche, 2002: 311). Organizational ethics is defined as a system of values, beliefs, principles, basics, and norms, which are recognizable, based on goodness and badness of organization and distinct the good and the bad conduct (Alvani, 2002).

If there exists ethics in work life of a person, then working would become sweet and Sense of satisfaction and self-actualization on the one hand and public satisfaction with the progress and prosperity of the work on the other would follow it. The most dangerous humanistic pheromone would be the breach of human morals and degeneration of moral boundaries in which case nothing will be spared and human foundation would be destroyed. This puts ethics in a special and strategic position in human society. Because when a human gets comes out f his/her individuality and is placed in conjunction with other humans, this conjunction gets the form of an organization. If there exists no ethics in human relationships, then the disaster would catastrophic, therefore the highest criterion of humanity in an organization would be its adherence to humanity ethics. Discipline at workplace, love, equity, good interaction, consulting, humility, meeting commitments, serving the people, respecting customers, restraint and tolerance for hardships of time and a lot of good qualities and good practices, include accepted work ethics in managing organizations, which have to be implemented by being mentioned in organizational code of conduct and practiced organizational wise (Ansari Rannani, 2010).

Strategy and Strategic Management

The meaning of the word strategy can be expressed as "pushing", sending, taking and monitoring. It is thought that this word was used when knowledge and art collided and for the first time was used by a Greek general named stratēgos. In some Latin sources, it is expressed that the roots of the word strategy is stratagem which means road or river bed. Although the roots of this word has changed, but with a general look we can say that both of these words have similar meanings and this shows the integrity of them. Strategy can be defined as the "analysis of the relationship between the institution or its environment, determining the direction and goals of the institution, establishing activities that should be done and re-adjusting organization by the allocation of needed resources" (Amir Kabiri, 2003: 26-30). Strategic management is the art and science of formulating, implementing and evaluating multi-functional decisions that enable the organization to achieve its objectives (Fardar, 2013: 45).

Market orientation (market trends)

Unlike many definitions of marketing that is highly influenced by cultural issues and there are many definitions of them around, market orientation is not defined to their extent and cultural issues have had less affect on it. Initial Efforts of people like felten and McKitrick (1957) and after them Cotler (1994) had a great influence on the development of the concept of market orientation. Some of the definitions of market orientation are as follows:

Strategic initiatives toward customers

Achieving competitive advantage for companies is possible by creating value for customers through providing differentiated products with greater benefits than competitors based on their core competencies. The main focus of marketing strategy is allocating resources and coordinating marketing activities and resources in a way that supplies the operational objectives of the company in a specific market - product. Market strategic planning is a tool that companies benefiting from it devise a suitable plan for marketing mix elements according to the demand and needs of customers in the target market, and are looking for competitive advantage and creating synergy. One aspect of achieving customer satisfaction is providing goods and services according to the needs and values of customers, or





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even beyond. In this regard, management and marketing many models and approaches have been proposed by management and marketing literature that increase the value offered to the customer. Many of these models are based on one-dimensional structures; which means that increase in the quality of the product which is offered to the customer, would increase his/her satisfaction as much, but it does not pay attention to this reality that perfecting the attributes of a service or a product, does not necessarily mean increase in customer satisfaction. One the other hand the customer is not able to evaluate the type and the extent of these needs based on the quality he/she received from the company (Nora et al, 1998:36). One of the inputs of strategic planning is the demand of customers. Dr Noriaki.Kano as one of the most celebrated voices in quality management field, in his model has divided the customer requirements and quality of products into three categories: (1) basic requirements, (2) functional requirements and (3) motivational requirements.

Strategic initiatives toward distributors

Strategic initiatives toward distributors are implemented in these four stages

1. Map the role of distribution channel in marketing mix: distribution channel strategy must be designed within the marketing mix framework. First of all marketing targets should be revised, and then the role of marketing product, price, promotion and distribution are plotted and studied. The company must also decide on the defensive or aggressive distribution. If the distribution is defensive, the company should attempt to distribution as good as its competitors, but if the goal is to try to distribute in an aggressive way, the company must act superior to its competitors.
2. Select the type of distribution channel: at this stage it must become clear that whether or not the distribution channels require intermediaries, and if necessary these intermediaries should be of what kind.
3. Determine the number of intermediaries: Determining the number of intermediaries in wholesale and retail levels of distribution channel in a particular region or area. Purchase behaviors in the market and the nature of product market have direct effect on this decision.
4. Select the members of channel: specify the companies as a part of the channel, in this phase the factors related to the markets, products, companies and intermediaries must be assessed. Two other important factors includes: making sure that the distributors sell their products in the intended markets which are assessable to the producer and the mix of product, price structure, promotion and customer services are compatible with companies standards(Amir Kabiri, 2003: 152-162).

Strategic initiatives toward competitors

Due to changing market dynamics and technology in today's market, the possibility of finding a permanent strategic position that once formed the basis of the strategy, is non-existent. Competitors can quickly copy any position in the market. In such circumstances, the results of the competition will be temporary at best. But such beliefs are dangerous half truths that are causing the companies to take on more destructive competition. It is true that simplified rules and global markets are breaking some of the competition barriers and companies are still attempting downsizing, but what is called "hyper competition" in many industries, is in fact a kind of self-immolation and has no relation to the changing patterns of competition. Companies can have better performance than competitors when become able to create sustainable differentiation points. For example, companies should provide more value (in a product) to their customers, or they should provide the same quality of the product in comparison with competitors however with lower prices, or they should apply both simultaneously. In this case they can make tremendous profit. Having more options to the company's product allows then to receive higher prices per unit of goods on average. Also, higher efficiency reduces the average cost per unit of production. Companies' differences in cost or price, is the result of their activities in the field of manufacturing, sale and delivery of goods or services, such as contact with customers, staff training and the integration of the final products. Costs are the result of company activities and advantage in cost occurs when a company does a specific activity e better than other competitors. In similar situations, the difference of companies' performance lies in the type of activities that are selected and their method of





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engaging in them. Therefore activities are the principle units of competitive advantage. Overall, the advantages or disadvantages in a company are the result of all of its activities, not just a few of them (Porter, 1391: 19).

Strategic initiatives in the macro environment

In order of strategic planning at upper levels of organization/firm, the vision and mission of the organization and its external and internal factors must be considered and proportional to them long-term goals must be set and strategies have to be evaluated and selected, which will bring about the success of the organization. At business level by considering the vision, mission and strategies set for the upper levels of organization and also according to internal and external factors of the indented unit, strategies must be developed in the framework of organization's overall strategies, which will assure the success of organization in competition arena. Similarly, taking into account the items which are determined above, at operational level by considering the factors that level, strategies are developed which will cause the success of the operational level at one hand and the related strategic business units and mother company/organization on the other. The similarities between the upper and the business level (strategic business unit), most categories of strategy apply at both levels (Rezaie, 2010: 21).

Conceptual research model

Research Questions

The main question:

What is the influence of ethical factors on Strategic initiatives in market orientation context?

Sub-questions:

1. What is the influence of ethical factors on Strategic initiatives in final customer context?
2. What is the influence of ethical factors on Strategic initiatives in distribution context?
3. What is the influence of ethical factors on Strategic initiatives in competition context?
4. What is the influence of ethical factors on Strategic initiatives in macro environment context?

RESEARCH METHODOLOGY

This research is a descriptive –survey type and its goal is to be applied in real world context. Its statistical population included employees of Zamzam Company in Tehran, which amounted to 387 personnel. Considering the population of the study, the sample size was 130 and its members were selected by random sampling method. The sample size was calculated by Cochran formula.

$$N = \frac{t^2 pq}{d^2} = \frac{(1/96)^2 0/25}{(0/07)^2} = \frac{196}{1/50388} = 130/32 \approx 130$$

$$1 + \frac{1}{N} \left(\frac{t^2 pq}{d^2} - 1 \right) = 1 + \frac{1}{387} \left(\frac{(1/96)^2 0/25}{(0/07)^2} - 1 \right)$$

Data collection tool

Data collection method in this study was field research. Data collection was done by distributing questionnaires among sample members in the organization, while the researcher was present the whole time. The scale used for data interpretation was Lickert scale with five rating points. The respondent rated their answer on the scale depending on their agreement to the statement. Ethical factors questionnaire of Brian et al (2002: 468-490) and strategic initiatives in macro environment questionnaire of Nora et al (1998: 23-39) were used for the purpose of this study.





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Validity and reliability of the questionnaire

The questionnaire of the study is standard, however for assuring of its validity of time and place, the guidance of experts of the field was sought and also content analysis was performed on it. The reliability of the questionnaire was checked in the initial phase of the study, by distributing 30 questionnaires and after collecting them, their Cronbach Alpha was calculated (Table 3) and the results showed that, the questionnaires were reliable enough.

Data analysis and hypothesis testing

In order of statistical data analysis in this study, the data gathered from questionnaire was analyzed by statistical analysis softwares such as SPSS. Statistical tests appropriate to the type of data and variables were performed on the data. These tests included linear regression and normality test for study questions.

Kolmogorov-Smirnov test to assess the normality of the data

Kolmogorov-Smirnov test was performed to assess the normality of the data. The tested hypotheses were as following:

H0: The distributions of the study are variables normal (there is no significant difference between the distribution of the study variables and normal distribution).

H1: The distributions of the study are variables are not normal (there is a significant difference between the distribution of the study variables and normal distribution).

Interpretation: Because the significant level in all of the variables is above 0.05 error, then null hypothesis is accepted and we conclude that the distributions of all variables are normal and using parametric tests is permitted. However for using regression tests it must be established that the data is linear.

Checking the linearity of data

In order of regressing the data, the linearity condition of the data must be met, therefore the following figure was used for checking the validity of using regression test. The line and the data around it in figure 1 is a proof of linearity of data, Therefore regression can be performed on it.

Examining the study questions

Main Question: How ethical factors influence the strategic initiatives in market orientation context?

H0: Ethical factors influence the strategic initiatives in market orientation context.

H1: Ethical factors do not influence the strategic initiatives in market orientation context.

Interpretation: The results of regression in the above table show that the significance level in df of 1 and 127 is 0.000 which is lower than α . Therefore the regression model is significant in statistical terms. The amount of R^2 (0.674) = 0.674 (127) = 60.1 F (0.05) shows that 32% of changes in strategic initiatives in market orientation context is because of ethical factors and 68% of it is because of other factors. If Durbin-Watson statistic remains between 1.5 to 2.5 we can say that there is no dependency between errors, therefore regression test can be performed on the data. The amount of Durbin-Watson statistic in the above table is 1.63 which shows the independency of errors. Therefore we can say that there is no dependency between errors, so regression test can be performed on the data. And the positive amount of B (2.637) shows that ethical factors have a positive and significant influence on strategic initiatives in market orientation context.





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Sub Question1: How ethical factors influence the strategic initiatives toward customers?

H0: Ethical factors influence the strategic initiatives toward customers.

H1: Ethical factors do not influence the strategic initiatives toward customers.

Interpretation: The results of regression in the above table show that the significance level in df of 1 and 126 is 0,000 which is lower than . Therefore the regression model is significant in statistical terms. The amount of $R^2=0/000$ $p = 0$. $F(1, 126) = 45,675$ Shows that 26% of changes in strategic initiatives toward customers is because of ethical factors and 74% of it is because of other factors. If Durbin-Watson statistic remains between 1.5 to 2.5 we can say that there is no dependency between errors, therefore regression test can be performed on the dada. The amount of Durbin-Watson statistic in the above table is 1.75 which shows the independency of errors. Therefore we can say that there is no dependency between errors, so regression test can be performed on the dada. And the positive amount of B (0.335) shows that ethical factors have a positive and significant influence on strategic initiatives toward customers.

Sub Question2: How ethical factors influence the strategic initiatives toward distributors?

H0: Ethical factors influence the strategic initiatives toward distributors.

H1: Ethical factors do not influence the strategic initiatives toward distributors.

Interpretation: The results of regression in the above table show that the significance level in df of 1 and 126 is 0,000 which is lower than . Therefore the regression model is significant in statistical terms. The amount of $R^2=0/000$ $p = 0$. $F(1, 126) = 57,379$ Shows that 31% of changes in strategic initiatives toward distributors is because of ethical factors and 69% of it is because of other factors. If Durbin-Watson statistic remains between 1.5 to 2.5 we can say that there is no dependency between errors, therefore regression test can be performed on the dada. The amount of Durbin-Watson statistic in the above table is 1.773 which shows the independency of errors. Therefore we can say that there is no dependency between errors, so regression test can be performed on the dada. And the positive amount of B (6.675) shows that ethical factors have a positive and significant influence on strategic initiatives toward distributors.

Sub Question3: How ethical factors influence the strategic initiatives toward competitors?

H0: Ethical factors influence the strategic initiatives toward competitors.

H1: Ethical factors do not influence the strategic initiatives toward competitors.

Interpretation: The results of regression in the above table show that the significance level in df of 1 and 126 is 0,000 which is lower than . Therefore the regression model is significant in statistical terms. The amount of $R^2=0/000$ $p = 0$. $F(1, 126) = 52,333$ Shows that 29% of changes in strategic initiatives toward competitors is because of ethical factors and 71% of it is because of other factors. If Durbin-Watson statistic remains between 1.5 to 2.5 we can say that there is no dependency between errors, therefore regression test can be performed on the dada. The amount of Durbin-Watson statistic in the above table is 1.571 which shows the independency of errors. Therefore we can say that there is no dependency between errors, so regression test can be performed on the dada. And the positive amount of B (2.382) shows that ethical factors have a positive and significant influence on strategic initiatives toward competitors.

Sub Question4: How ethical factors influence the strategic initiatives in the macro environment?

H0: Ethical factors influence the strategic initiatives in the macro environment.

H1: Ethical factors do not influence the strategic initiatives in the macro environment.

Interpretation: The results of regression in the above table show that the significance level in df of 1 and 126 is 0,000 which is lower than . Therefore the regression model is significant in statistical terms. The amount of $R^2=0/000$ $p = 0$. $F(1, 126) = 26,968$ Shows that 17% of changes in strategic initiatives in the macro environment is because of ethical factors and 83% of it is because of other factors. If Durbin-Watson statistic remains between 1.5 to 2.5 we can say that there is no dependency between errors, therefore regression test can be performed on the dada. The amount of Durbin-Watson statistic in the above table is 1.804 which shows the independency of errors. Therefore we can say that there is no dependency between errors, so regression test can be performed on the dada. And the positive



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amount of B (3.178) shows that ethical factors have a positive and significant influence on strategic initiatives in the macro environment.

CONCLUSION AND RECOMMENDATION

The conclusion of the main question: How ethical factors influence the strategic initiatives in market orientation context? The results of tests performed on this question shows that the obtained level of significance is lower than 0.05, therefore the model of ethical factors influences strategic initiatives in market orientation context. And also the amount of R^2 shows that, ethical factors explains 32% of changes on strategic initiatives in market orientation context and 68% of the changes are explained by other factors, by accounting the positivity of B, the two variables have appositive and significant influence on each other. The Research results obtained from Fréhel et al (2008) and Hunt and Whittle (2006), are in line with the results obtained for this question.

The conclusion of the Sub question1: How ethical factors influence the strategic initiatives toward customers? The results of tests performed on this question shows that the obtained level of significance is lower than 0.05, therefore the model of ethical factors influences strategic initiatives toward customers. And also the amount of R^2 shows that, ethical factors explains 26% of changes on strategic initiatives toward customers and 74% of the changes are explained by other factors, by accounting the positivity of B, the two variables have appositive and significant influence on each other.

The conclusion of the Sub question2: How ethical factors influence the strategic initiatives toward distributors? The results of tests performed on this question shows that the obtained level of significance is lower than 0.05, therefore the model of ethical factors influences strategic initiatives toward distributors. And also the amount of R^2 shows that, ethical factors explains 31% of changes on strategic initiatives toward distributors and 69% of the changes are explained by other factors, by accounting the positivity of B, the two variables have appositive and significant influence on each other.

The conclusion of the Sub question3: How ethical factors influence the strategic initiatives toward competitors? The results of tests performed on this question shows that the obtained level of significance is lower than 0.05, therefore the model of ethical factors influences strategic initiatives toward competitors. And also the amount of R^2 shows that, ethical factors explains 29% of changes on strategic initiatives toward competitors and 71% of the changes are explained by other factors, by accounting the positivity of B, the two variables have appositive and significant influence on each other.

The conclusion of the Sub question4: How ethical factors influence the strategic initiatives in macro environment? The results of tests performed on this question shows that the obtained level of significance is lower than 0.05, therefore the model of ethical factors influences strategic initiatives in macro environment. And also the amount of R^2 shows that, ethical factors explains 17% of changes on strategic initiatives in macro environment and 83% of the changes are explained by other factors, by accounting the positivity of B, the two variables have appositive and significant influence on each other. The Research results obtained from Fréhel et al (2009) are in line with the results obtained for this question.

Suggestions

Considering the results obtained for the main question (The positive influence of ethical factors on strategic initiatives of an organization in market orientation context.) the following suggestions can be made;

- If an organization manufactured a low quality product, its distributors and customers should be informed and the product must be replaced with a high quality one.





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- A small label can be adhered on the product and a summary of its benefits and harmful features should be written on it. Considering the results obtained for the sub question1 (The positive influence of ethical factors on strategic initiatives of an organization toward customers.) the following suggestions can be made;
- Creating an innovation department in order of examining the ideas of employees and departments.
- Shortening the interval between idea evaluation and converting it to a product.
- Lowering the costs of manufacturing without lowering the quality of product.
- Increasing the motivation of organization employees by increasing their down time, increasing their benefits for innovation, promoting them, giving them the chance of group travel for analyzing customers in local and international markets.
- Providing them with little and free samples as an experiment. Considering the results obtained for the sub question2 (The positive influence of ethical factors on strategic initiatives of an organization toward distributors.) the following suggestions can be made;
- Creating commitment among product distributors and showing this commitment to them by providing them with advantages such as gifts in special occasions, inviting them to celebrations and religious events in organization.
- Quick reaction in resolving the complaints of distributors.
- Holding round tables with distributors for examining the customers from their point of view. Considering the results obtained for the sub question3 (The positive influence of ethical factors on strategic initiatives of an organization toward competitors.) the following suggestions can be made;
- Providing acceptable quality and price for preventing the competitions from robbing the current customers of the organization.
- Providing quality services to distributors for preventing the competitions from robbing the current distributors of the organization. Considering the results obtained for the sub question4 (The positive influence of ethical factors on strategic initiatives of an organization in macro environment.) the following suggestions can be made;
- Providing products for every for all segments and associations of society, such as the producing beverages for various meetings
- Engaging in Humanitarian work for the community.
- Providing the same level of services to customers regardless of their social and financial status.

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Table1: Definitions of Ethics

Author	Definition
Tabatabai	Ethics is a technical discussion about the human properties. Properties, which are related to his/her vegetable, animalistic and humanistic power. Ethics work toward separating virtues from vices and determine which one of human properties are good and a virtue and ends up in complementing him/her and which one of them are vices and disfigure him/her. So he/she can use this knowledge in going toward virtues and staying away from vices. The result is virtuous conduct, which are in line with his/her inner virtues. This way he will attract human community and public praise and bring in to perfection his practical and theoretical prosperity (Tabatabai, 1379: 13).
Adel Azar et al	Ethics:is the norms and valued rules of a society that that is reflected in the behavior of its people(Azar eal., 1387: 61).
Menzel Donalds	Ethics refers to the values and principles that guide the detection of correctness or wrongness of behavior (Menzel, 1388: 7
Larby	Ethics is defined as a set of moral standards for guiding human conduct (Larby, 2001: 67)





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Table2: Definitions of market orientation

Author	Definition
Deshpande et al	Market orientation is of a set of beliefs that puts customers at the center of attention to make grounds for the long-term profitability of the company provide. Of course this does not mean a lack of attention to other stakeholders such as owners, managers and staff (Deshpande et al., 1993: 23-27).
Slater et al	Market orientation means efforts to understand and pay attention to customers and provide solutions, products and services tailored to their interests and needs (Slater et al., 1995: 74).
Kohili and Chaversky	Market orientation means creating information about market in organization including the current and future needs of customers, development and transfer of the knowledge and the talent across the organization and creating accountability for that at all levels of the organization (Kohili and Chaversky, 1990).
Naver et al	Market orientation consists of three behavioral components: customer orientation, competition orientation and coordination and information exchange between units along with two types of decision-making, focusing on long-term and profitability (Narver and Slater, 1998: 233).
Dey	Market orientation includes excellent and outstanding skills in understanding and satisfying customer needs and desires (Dey, et al., 1998).
Frishamer and Anderson	The objective of market orientation is aligning the company with its environment, i.e. the market (Frishamer et al., 2009: 60) In this study the four dimentions of atrategic initiatives were selected from studies conducted by Nora et al (1998: 23-39).

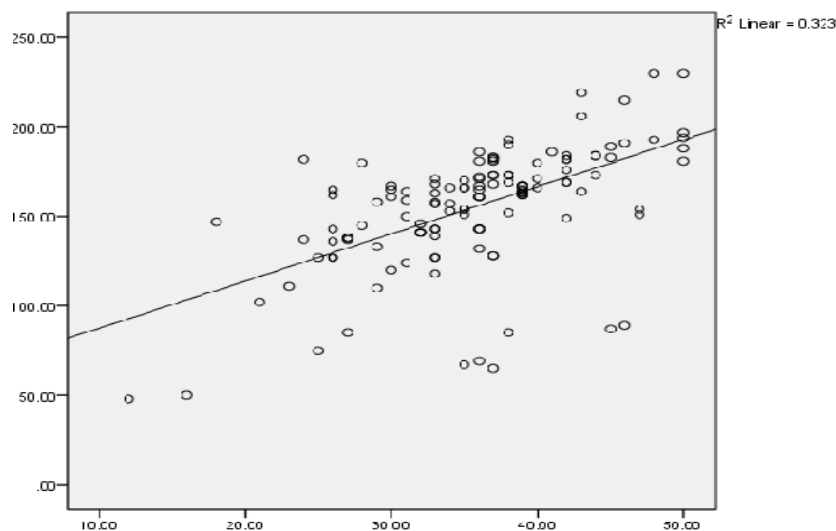


Figure 1: Checking the linearity of data





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Figure2: Conceptual research model (Nora et al, 1998; Brian et al, 2002: 468)

Table 3 Chronbach alpha calculated for examining reliability of study questionnaires

Variables	Cronbach Alpha	Variables	Cronbach Alpha
Ethical factors	0.816	Strategic initiatives toward competitors	0.822
Strategic initiatives toward customers	0.734	Strategic initiatives in the macro environment	0.914
Strategic initiatives toward distributors	0.978	Strategic initiatives in market orientation context	0.854

Table4: The results of Kolmogorov-Smirnov test on study variables

Variables	Z statistic	Significance level	The result of the hypothesis
Ethical Factors	0.925	0.359	Normal
strategic initiatives in market orientation context	1.453	0.069	Normal





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Table5: Regression analysis of the main question

The source of variance	Degree of freedom	F	Significance level	R	R ²	Durbin-Watson	Predicator variable	B	Beta
Regression	1	60.674	0.000	0.569	0.32	1.63	Fixed amount	61.160	-
Residual	127						Ethical Factors	2.637	0.569
Total Sum	128								
Predicator variable: Ethical factors Criterion variable: strategic initiatives in market orientation context			Regression equation		strategic initiatives in market orientation context $= -61.160 + 2.637 \text{ Ethical factors}$				

Table6: Regression analysis of Sub Question1

The source of variance	Degree of freedom	F	Significance level	R	R ²	Durbin-Watson	Predicator variable	B	Beta
Regression	1	45.675	0.000	0.516	0.266	1.754	Fixed amount	8.796	-
Residual	126						Ethical Factors	0.335	0.516
Total Sum	127								
Predicator variable: Ethical factors Criterion variable: strategic initiatives toward customers			Regression equation		strategic initiatives toward customers $= 8.796 + 0.335 \text{ Ethical factors}$				

Table7: Regression analysis of Sub Question2

The source of variance	Degree of freedom	F	Significance level	R	R ²	Durbin-Watson	Predicator variable	B	Beta
Regression	1	57.379	0.000	0.559	0.313	0.733	Fixed amount	6.675	-
Residual	126						Ethical Factors	2.297	0.559
Total Sum	127								
Predicator variable: Ethical factors Criterion variable: strategic initiatives toward distributors			Regression equation		strategic initiatives toward distributors $= 6.675 + 2.297 \text{ Ethical factors}$				





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Table8: Regression analysis of Sub Question3

The source of variance	Degree of freedom	F	Significance level	R	R ²	Durbin-Watson	Predicator variable	B	Beta
Regression	1	52.333	0.000	0.542	0.293	1.571	Fixed amount	2.382	-
Residual	126						Ethical Factors	0.133	0.542
Total Sum	127								
Predicator variable: Ethical factors Criterion variable: strategic initiatives toward competitors			Regression equation		strategic initiatives toward competitors =2.382+0.133 Ethical factors				

Table9: Regression analysis of Sub Question3

The source of variance	Degree of freedom	F	Significance level	R	R ²	Durbin-Watson	Predicator variable	B	Beta
Regression	1	26.968	0.000	0.420	0.176	1.804	Fixed amount	3.178	-
Residual	126						Ethical Factors	0.109	0.420
Total Sum	127								
Predicator variable: Ethical factors Criterion variable: strategic initiatives in the macro environment			Regression equation		strategic initiatives in the macro environment =3.178+0.109 Ethical factors				





RESEARCH ARTICLE

Comparison of the Impact of Tow Short term Exercise with Dumbbell and Plyometrics Exercise on the Vertical Jumping Performance of Minor Female Basketball Players

Leila Khazaei* and Mohammad Nikravan

Department of Physical Education, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Leila Khazaei
Department of Physical Education,
Boroujerd Branch,
Islamic Azad University,
Boroujerd, Iran.
Email: kleyla43@yahoo.com



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ABSTRACT

Theme and aim: several exercise methods have been used in recent years to improve power and potency, including exercises with dumbbell and plyometrics exercises. The aim of this study is to compare to short term exercises, one with dumbbell and another plyometrics and their impact on vertical jumping of minor female basketball players. The methodology of this study is semi experimental, the sample included of 24 minor female basketball player, which had voluntary and purposeful participated in this research study, and were randomly divided into 3 groups each contains 8 participants, including: control group (tall: 158.4 cm+ 4.4, weight: 48.5 kg+ 28%, and age: 11.38 year+ 28%), dumbbell exercise group (tall: 158.8 cm+ 5.7, weight: 50.3 kg+ 3.9, and age: 11.38 year+ 22%) and plyometrics exercise group (tall: 156.7 cm+ 3.4, weight: 46 kg+ 3.1, and age 11.51 year+ 18%). Independent variable of 2 sport exercises was selected exercises with dumbbell and plyometrics, and dependent variable was vertical jumping of the players. Independent variable was 2 exercise types and selected exercises with dumbbell and plyometrics exercise and dependent variable was vertical jumping of the students. Methodology of data analyzing was descriptive and deductive method using ANOVA test and Tookie following test. Findings: a short term plyometrics exercise had significant impact on vertical jumping of the students ($t = -7/67$; $sig = 0.0001$). A short term exercise with dumbbell had significant impact on vertical jumping of the students ($t = 7/82$; $sig = 0.0001$). There was no significant difference between tow plyometrics and dumbbell exercises impact ($sig = 0/99$). Plyometrics and dumbbell exercises with near maximum power growth, can apply significant impact on vertical jumping of basketball players. Treatment and sport plan (with needs power and

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potency) of each dumbbell and plyometrics exercises could be used in the place of other exercise and in combination with each other.

Key words: dumbbell exercises, plyometrics exercises, vertical jumping, female basketball player.

INTRODUCTION

The improving growth of sports sciences has been significant in recent years and physical (body) preparation, as an important part of these sciences, has benefited of variety, revolution and development. Studying different sports exactly, we find out that practices could be observed in most of them, which have absolute requirement to physical preparation, and combination of power and speed (explosive potency). For example double shooting in basketball, cutting spak in volleyball, head shoot in football, drive shoots in table tennis and jumping movements in four jumps of running, require to reinforcing of mentioned factors [11]. Basically, the sport exercises cause to increase in human movement capabilities, but what should be done if we want to maximize and make continuous this capability? This case is regarded as an important principle in exercise science and principal exercises which are suited according to movement and physiologic requirements of target sport branch. Speed and jumping power, are certainly of important and effective factors of many sport exercise skills. Athletes are encountered continuously to such situations in the sport games that should compete and fight with stronger, faster and more experienced competitors, therefore using special exercise methods which athletes using those, could be prepare themselves for international games and competitions against other adversaries is essential and necessary [12].

Today, plyometrics and dumbbell exercises are of exercise methods that are recommended by researchers to increase people capabilities and skills. Kampo et.al (2009), concluded in a study that plyometrics exercises lead to significant increase in jumping capability after 6 weeks [26]. Brenda et.al (2003) studied 7 weeks influence of plyometrics exercises on jumping and vertical jumping power of rhythmic practice performers. Results showed significant improvement in vertical jumping performance and maximum torque power of the feet. Aromin et.al (adopting from Behm, Kibele) concluded in their study that 7 weeks persistence exercise has positive impacts on balance power and performance [35].Lander et.al (1989), studied the impact of dumbbell exercises on power and potency variables.Results showed that dumbbell exercise programs could significantly increase explosive power and potency [36]. Hashemi (2002), studied the impact of plyometrics and dumbbell exercises on college students feet explosive power, results showed that dynamic and dumbbell exercises have significant impact on feet explosive power, but there was no significant difference observed between impacts of tow methods on the above factors [25]. Pirani (1993), found that the impact of plyometrics exercises was more positive than dumbbell exercises [6]. Tiwan (1983), showed in comparison of 3 athletes groups that plyometrics exercises has more impact on improvement of power and speed capacity than dumbbell exercises. Regarding above mentioned cases, researcher decided to evaluate and compare the impact of dumbbell and plyometrics exercises on vertical jumping, using internal and external researchers.

METHODOLOGY

The impact of independent variables including a period of dumbbell and plyometrics exercises on dependant variable (vertical jumping) was studied in this study. The study type was semi experimental with pretest, posttest proposition, and the statistical sample includes 24 minor female amateur basketball players aged, between 11-12 years. To required data gathering different tests were done in 2 stages: 1- pretest in the beginning of exercises, 2- posttest in the end of exercises. Then circumstance of conducting different stages of study consisting performing of initial test (pre-test), participating in exercises and final test (post-test) was explained to participants. After that, testimonial was signed with all participants. The participants weight and tall was measured (using tape meter and scale), and Sarjent jumping test (using scaled wall to register maximum jumping tall) was conducted for participants. Then, participants were divided into 3 equal groups, tow experimental groups with plyometrics and dumbbell





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exercises respectively ($n_1=8$, $n_2=8$) and a control group ($n_3=8$). The participants' characteristics have been presented in table 1. Finally, participants exercised four weeks, 3 sessions per week and each session 1.5 hour. After 4 weeks of selected exercises, Sargent jumping test was performed for participants.

In plyometrics exercise group, participants after 25 minutes warm up (light running, extension, and plasticity), they performed exercises in 3 stations (front deep jumping, rear deep jumping, and jumping over the cord). According to plyometrics exercise principals, number of iterations in each station for elementary learners was: participants could start their exercises with 40 times foot contact with the earth and increase it to 100 times foot contact with earth. Number of iteration in each station was 10 times and extra load principle was observed in each session. Plyometrics exercises were controlled using height and iteration enhancement. Dumbbell exercises included prostrate foot press, scot and leg pressing, which was performed using Delorem method, and work volume was increased using dumbbell addition principle. Participants should repeat third set of each last session of week, as far as they could.

Statistical methods

Descriptive statistics was used to analyze information. Average values and standard deviation and table and chart drawing were used in descriptive statistics section. In the analyzing statistics Kolmogrov-Smirnov test for examining data distribution, Levin test for variances contingency, and variance analyzing test were used for determining the difference between groups average in different test variables. In the case of observing difference between groups average, Tookie follow up test for determining the exercises impact and for comparing pretest and posttest in both groups the T coherent test were used. To accept or reject the hypothesis significance level was set to ($p<5\%$), and to data calculation and chart drawing, the SPSS computer software was used.

RESULTS

Analyzing of research findings showed that: dumbbell and plyometrics exercises had significant impact on vertical jumping of minor female basketball players ($p<5\%$), there was not also any significant difference between impact of tow type of dumbbell and plyometrics exercises of students vertical jumping in basketball ($p<5\%$).

DISCUSSION AND CONCLUSION

The aim of this study was to examine impact of plyometrics and dumbbell exercises on vertical jumping of minor female basketball players. In studding first hypothesis we found that plyometrics exercises have significant impact on vertical jumping. Plyometrics exercises lead to increase in constriction speed from extrovert to introspective phase. The nature of plyometrics exercises is that if they are done with maximum endeavor, the muscles power is increased (25). The results of this study are in accordance with Kampo et.al (2009) and Brenda (2003) studies (26). Kampo et.al showed that plyometrics exercises are led to significant difference in jumping capability, after 6 weeks (26).

Also results of Brenda et.al (2003), about the impact of 7 weeks exercise was consistent to Naluei (2010), Behdari (2004), Dashti Khavidki (2010), Miller et.al (2006), katzamen (2006), Simler (2011), Murphy and Sparse (2003), Matavekge et.al (2001), and Simler (2011) [38, 40, 39, 13, 9, 10, 7, 2, 19], but it was inconsistent with results of Paul et.al (2003), Chimra et.al (2004), Marcovic et.al (2005), Aghdabi (2006) [28, 37]. Contingency interpretation of inconsistency of present study, should be found in difference of kind of exercises, duration and severity of exercises, test participant gender, type and age of Paul et.al, Chimra et.al, Marcovic, Kampo and Aghdabi studies. For instance, in Chimra et.al (2004), number of participants was 20, and their sample composed of academic students' athletes. Also in Marcovic et.al (2005), the participants of study composed of active males and the morphologic characteristics of these participants was examined as well, and exercise duration was 10 weeks. Also in Aghdabi (2006), the exercise duration was 6 weeks. The participant's type was composed of female college students of sporting practices course. The kind of plyometrics exercises of special exercise was 100 m running, while in recent study, the participants are



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minor female student's basketball players, between 11-12 years old, exercise duration 4 weeks, and deep jumping with low severity was chosen as special exercise and also 8 participants were in each group. Regarding second hypothesis, dumbbell exercises led to increase in vertical jumping (45/5) comparing to pretest and control group. Primarily potency increase in dumbbell exercise is dependent on to factors:

Due to increase in movement units in each constriction and recalling nerve excitations, this causes consequently enhancement in more movement units' activation [22]. Also in dumbbell exercises, initial increase of IemG activity and explosive potency is dependent on tow factors which include: increasing of movement unit's involvement in each constriction and enhancement in nerve impulse that eventually leads to activation of more movement units [32]. Apart from achieving nerve-muscular harmony, increasing of IMG activities and absolute power, is rather due to morphological adaptation hypertrophy. Capillary density, mitochondrial concentration and capacity of anaerobic enzymes are also increased in the muscle, consequent to dumbbell exercises, which leads to absolute power enhancement [27]. Results of this study are consistent with Wilson et.al [42]. Their results showed that dumbbell exercises with 30% of maximum power, has led to explosive power increasing of athletes up to (18 percent). Results of present study are consistent with findings of Noorshahi (2010), Lander et.al (1989), Wilson and Murphy (1996), Armin et.al (2009), Yousefi (2010), and Chigarli (2006), which evaluated the impact of exercises with dumbbell on vertical jumping as positive [23, 36, 41, 33, 35], and are inconsistent with findings of Clutch et.al (1983), that perform exercises for 16 weeks, 2 times per week, and 2 study groups: first group performed plyometrics and dumbbell exercises and was led to 3.57 cm increase in their vertical jumping. And second group who just performed dumbbell exercises, faced to 0.11 cm decrease in vertical jumping [30].

Inconsistency contingency of present study with Clutch et.al (1983) should be found in difference between duration of exercises, used tests, age and gender of participants. In Clutch et.al duration of exercises was long and 16 weeks. The weekly sessions was 2 time. Participants' age wad in adult range, and their gender was male. While in the present study, participants were selected from minor group between 11-12 years and female. All exercise duration was short and 4 weeks, and 3 times per week. Regarding third hypothesis: there is no significant difference between (impacts of tow exercise short term methods with dumbbell and plyometrics), we concluded after data analyzing that there is no significant difference between impacts of tow exercise methods on vertical jumping, and regarding the significance level ($p < 0/05$), third hypothesis was accepted.

Results of this study is consistent with studies of Taher Gandomani (2006), Hamd-al-Allah Hadi (2011), Imani (2011), Arazi et.al (2004), Rezaei (2005), and Kalvandi (2010), who concluded that there is no significant difference between impact of tow exercise methods [4, 1, 14, 15, 20, 24]. But, results are inconsistency with Taiwan (1983), Soleimani (1996), and Pirani (1994) and Ferdosi, Mohammad Hasan et.al (2009) [16,17,21]. Taiwan (1983), in comparison of 3 athlete groups showed that plyometrics exercises have more impacts on power and speed capacity development than dumbbell exercises. Pirani (1993), has evaluated the impact of plyometrics exercises more positive on speed activities. Also Ferdosi (2009), examined difference of impact of dumbbell and plyometrics exercises on rectus femurs and biceps femurs, from surface electromyography's point of view on 45 male college students of sport exercise course. Their findings showed that there is significant difference between impact of to dumbbell and plyometrics exercises on explosive power, and plyometrics exercises has more impact on explosive power rather than dumbbell exercises. Perhaps, differences in participants age and gender and also exercise duration and participants number, have led to inconsistency of this study with those mentioned studies. Considering results of this study, it is concluded that dumbbell and plyometrics exercises, could have significant impact with a gradually and improving growth, on vertical jumping of minor female basketball players. Therefore, regarding current situation and facilities, each of plyometrics and dumbbell exercises could be used in place of the other exercise, or as combination.





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Table 1: Descriptive data of control group and experimental groups (plyometrics and dumbbell exercises)

Variables	Plyometrics group	Dumbbell exercise group	Control group
Weight (kg)	3/1 46	3/9 50/3	9/2 48/5
Age (year)	0/18 11/51	0/22 11/38	0/28 11/46
Tall (cm)	3/4 156/7	5/7 158/8	4/4 158/4





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Table 2: Test results+ dependant for comparison of vertical jumping average plyometrics exercise group with dumbbell exercise group and pretest/after test control.

Vertical jumping (cm)	Dominance average and variation		Change (%)	Value+ dependant	Significant level
	Pretest	After test			
Plyometrics exercise	4/2 27/43	2/8 38/87	+38/1	-7/67	0/0001
Dumbbell exercise	6/3 23/1	6/2 33/62	+45/5	-7/282	0/0001
Control group	2/8 27/75	4/5 28/81	+3/82	+3/82	0/28

Table 3: Changes resources and statistical indexes

Changes resources/ statistical indexes	Squares sum	Squares average	F value	Significance level
Intra groups	475/1	237/5	19/7	0/0001
Intergroup	253/2	12/1		
Total	728/2	-		

Table 4: Determining the difference of vertical jumping average using Tookie test

	Dumbbell group	Control group
Plyometrics group	0/13 0/99	-9/4 0/0001
Dumbbell group	-9/5 0/0001	Average variation Significance level





Studying Magnetic Field Impact during Meteorites Arrival

Mohammad Bamdad* and Hossein Masoumi Goudarzi

Department of Physics, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Mohammad Bamdad
Department of Physics,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran
Email: mbamdad99@gmail.com



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ABSTRACT

Meteorites are absorbed to different points when they arrive to the earth, and based on meteorites composition elements, they have different burning ratios. In this study we examine meteorites arrival to the earth magnetic field based on their constructing elements, and investigate the impact of magnetic field on meteorites from laboratory point of view, so that we select Gaussian surface from earth magnetic field, and establish it in the laboratory form as Helmholtz coil and we have simulated meteor, when it access the earth magnetic field as an element stone which is on the plasma, or Ferro sulfate (3) which is on methane gas, and investigate Ferro sulfate effects which is agitated and burnt on methane (meteor) during access to Helmholtz coil (earth magnetic field) in different cases.

Keywords: magnetic field, impact, meteorites arrival

INTRODUCTION

Physics scientists and astrologists thought that meteorites during access and impact to the earth were not influenced by any other forces, except curve movement which is due to gravity and radius and circuital rates. We concluded that another force such as the earth magnetic field, percentage and the elements type of meteorites, influence on meteorites deviation. Meteorites and other asteroids deviation are like a piece of iron which enter rapidly into magnetic field and absorb either to N pole or S pole. So, if this magnet is too large is not absorbed to the magnet tip and provide to possibilities. It absorb one of the magnet poles (earth pole deviation and earth circuit movement), moves to near position to (it absorb to the earth center in curve form, which has more gravity).



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If meteor which the main constituent of it accesses earth magnetic field, it is deviated and absorbed, that the meteor's absorption is by the earth gravity and meteor potential itself, that tend to move directly. And the cause of meteor deviation is the earth magnetic field, which tends to deviate toward earth poles.

The subjects of present study include:

- A) Establishing the magnetic field in laboratory platform.
- B) Establishing meteor arrival, using different elements and gases.
- C) Studying meteor access to earth magnetic field regarding initial meteor rate and earth interrupted field.
- D) To estimate contact point of meteorites for possible events and meteor raining.

Keywords: Helmholtz coil, meteor, magnetic field, driving force, current, magnetic, Ferro sulfate (3), methane gas 0.92

MATERIALS AND METHODS

- Utilized materials in this test are Helmholtz coil with 100 fixed round and 10 cm radius in 10 cm distance.
- Driving force with fixed current 7.5-20 Ampere and 12 V voltage.
- Burner
- Ferro sulfate (3) or elemental stone
- Ampere meter
- Methane gas 0.90 or 0.92 or plasma

Apparatus description and working method**The aim of apparatus production**

Some meteorites were contacting to the earth in the past, but our ancestors who were watching the contact moment of this phenomenon had no idea about the cause of this event, till they gradually recognized the rate, potential and gravity force of these meteorites, and after that they found the earth gravity. They recognized 3 factors as the impact cause of all meteorites and this important principal and factor; the earth gravity has been neglected or forgotten in calculations after long years, till now. We conclude after frequent investigations, that in addition to previous cases which have discovered by scientists, the earth magnetic field and meteorites impact to earth could also be mentioned, besides the influence of other physical factors on meteorites arrival to the earth. We focused entirely on studying the earth magnetic field. Since we could not go directly to the earth magnetic field around it, and examine this important phenomenon which it could be in the form of a significant discovery, decided to simulate this huge magnetic field in laboratory platform, and tried to simulate meteorites during arrival to the earth, so we conducted sampling from the earth magnetic field in Gaussian surface format and create the earth magnetic field in and apparatus.

General description of apparatus

We simulated the earth magnetic field to Helmholtz coil, which initial produced field of this coil was several times more than the prime magnetic field around the earth. When meteorites access the earth magnetic field, if this field has little impact about 0.1 degree on meteorites after passing impact time and traveling distance to earth surface (which magnetic field and Van Alan belt has 16000 km distance from earth surface), this 0.1 degree has several km impact on meteorite in the A point, which regarding the earth magnetic field and that 0.1 degree impact on meteorite, leads to it contacts the earth 27.92 km far, according to mathematical equations. It means that A point will contact the earth 27.92 km far. And if the meteorites is larger, it could be avoided the impact of meteorite with human and cattle that be safe.



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Description of simulator apparatus of this natural factor in laboratory format is that we connected Helmholtz coil which generates magnetic field to a driving force with constant Ampere power, that this coil converts simulated Gaussian surface of electric field into magnetic field. In this coil the earth Gaussian surface has been simulated. Now, the access moment of meteorite into this magnetic field should be simulated, which several elements and element stones could be used for this purpose.

- We could use methane or plasma gas for initial energy and rate of meteorites.
- We should install an ampere meter in some part of apparatus to ensure constant current.

The influence of air flow on meteorites arrival is one of the other important issues which should be noticed, because sever air flow and movement can have reverse impact on our examination. To avoid air influence error, the apparatus should be placed under a safe chamber. The earth magnetic field is very less than our generated field, and this is due to that earth magnetic field distance is long away from its surface, but we want to observe influence into simulated apparatus in much lower distance about 50 cm. Therefore, our laboratory meteorite should has significant deviation, so that we could have correct conclusion. But, in our opinion and according to evidences and conclusions and also our examinations, it could be concluded that in addition, gravity concentration of the earth magnetic field has effect, as well. Tow magnetic poles of the earth could be mentioned, which have been stabled near the equator, and is regarded as one of the primary reasons of meteorites absorption to one of these 3 zones.

As we mentioned before, meteorites have more affinity to absorb some of the certain zones on the earth (1. magnetic poles, 2. magnetic heart, 3. Equator), that item 1, 2 have not been investigated by any scientist, even theoretically. Coils' radius; coils' distance from each other; creation of magnetic field; and inserted current to the coils, are of very important items for electromagnetic section of the circuit, which should increase and decrease proportionally. But chemical part of this apparatus that includes selected kind of meteorite or type of existed gas have no specific relation. Coils' radius is distance between tow coils. For instance, it means that radius of tow coils is 10 cm, the distance between tow coils should be 10 cm. in the other hand wire rounds in tow coils should be the same, so that the field is not deteriorated, and the field remain constant. Tow currents are generated in this apparatus, which both lead to its performance improvement: 1. Inductive current, 2. Generated current by driving force. It should be careful that flame life time is very short, so selected element for meteorite should be placed in flame life time. It means that react rapidly with flame and be deviated in the coil. It worth emphasizing again that deviation angle in environment is low and after transferring several kilometers reaches to several degrees.

Apparatus functionality

Tow Helmholtz coils was located against each other, in parallel with 10 cm radius between both coils. The input wire of each coil is consisted of 2 wires, which one end is connected to phase and another end to neutral of power source. Of course, to ensure safe functionality of apparatus, we install off/on switch and ampere meter on related field as series. Now we could observe current amount which is inserted into Helmholtz coil, by using ampere meter. Current and number of coil's rounds, are directly related to generated magnetic field. Therefore, as higher as the number of rounds, is more intense the magnetic field. However, coil's radius and distance of each other is conversely related to generated field. Therefore, a significant constant relation should be created between these 4 items (1. current, 2. rounds of coil, 3. coils' radius, 4. Distance between to coils), so that it could influence on our laboratory meteorite and deviate considered element in the coil.

Chemical part of this apparatus is important because we want to simulate a meteorite in the form of fire flame and chemicals, which has magnetic property and arrives with high speed into the earth magnetic field, while it is burning. Therefore, we used methane and Ferro sulfate (3) to do that. We place fire burner between tow coils and lighting up the burner and connecting current to the coils, we can inject slowly some Ferro sulfate (3) on the fire, using a fire resistant needle. In this state, Ferro sulfate (3) is burnt and agitated due to methane gas heat, and sulfate is removed, and it cause to Ferro(3) elevation in coils, which these coils deviates residue Ferro (3) remaining from reaction, due to magnetic field formation, that is the access time of meteorites into the earth magnetic field. Ferro





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sulfate (3) could be replaced with Ferro sulfate debris or elemental stone, or methane could be replaced with plasma gas. We know that qvB are three perpendicular factors in this examination. According to right hand rule, forefinger shows v direction, which is created by gas flame, and thumb finger shows the f direction, and remaining bowed fingers show B direction. It worth mentioning that f shows Ferro (3) deviation direction, which can be in 2 forms.

- 1) Internal-direction
- 2) External-direction

Created magnetic field for 20 ampere current, according to this equation ($B = \frac{8 * m * \pi * N * i}{5 * \sqrt{5} * r}$):

$$(8 * 4 * \pi * 100 * 20) / (5 * \sqrt{5} * 10^{-1}) = 15.3_{-18.2} \text{ G}$$

This is created current by apparatus which is significant:

Findings

Results obtained from examination suggest to following issues.

- Current and magnetic field ratio:
Output shows that created magnetic field is elevated as current increases, linearly.
- Current and Ferro sulfate (3) deviation:
Output shows that, if Ferro (3) deviation angle is 3° after burning, so it is deviated 26 mm maximally in this apparatus (5 cm flame), which are in 2 internal or external direction form. Therefore, as magnetic field and coil's radius, this deviation could be increased significantly.
- Helmholtz coil's rounds to created magnetic field ratio:
Helmholtz coil's radius which is distance between 2 coils was constant, that has reverse relation with magnetic field. Therefore, as Helmholtz coil's radius, or distance between tow coils is higher, created magnetic field is lower.
- Results show that above apparatus which is simulation of Gaussian surface of the earth magnetic field, should be placed in following equation in defined physical situations: $B = \frac{8 * m * \pi * N * i}{5 * \sqrt{5} * r}$, to be able to deviate burnt Ferro (3) from Ferro sulfate (3) ideally, using 0.92 methane gas.

DISCUSSION AND CONCLUSION

Due to lacking historical and scientific background, other investigations have been studied, which are mentioned bellow:

- i. Performing examination in different situations.
- ii. Elevating of the earth magnetic field in simulated sample.
- iii. Estimating the impact point of space subject, in the access time to magnetic field.
- iv. Calculations and output, with applying impact of air flow.
- v. If we suppose minimal deviation as 3° on remaining Ferro (3) comparing balance state, deviation in x direction could be calculated from $\tan \theta$ equation, since flame is located in the middle of coil and has 5 cm distance from the end of apparatus.

Performing frequent examinations in different currents, it was concluded that the earth magnetic field could deviate meteorites in special situation that observed as Gaussian surface in this examination, in the access time, rather toward 2 magnetic poles and magnetic heart of the earth. This huge scientific activity which happens onto the earth planet surface was performed in the laboratory and Gaussian form with Helmholtz coil, which could be several times more than the earth magnetic field, since there is very shorter distance to show this deviation in laboratory format, so that the field should compensate this short distance. With ideal stated conditions of this study and performing examination, following results has been observed:

1. Helmholtz coil could be Gaussian surface of the earth magnetic field.
2. Ferro sulfate (3) could play the role of meteorite, in reaction with methane gas flame.





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3. Created magnetic field in constant current in this examination is several times more than the earth magnetic field.
4. Meteorite in the time of access to magnetic field, reach to the earth after traveling some distance and has more deviation comparing arrival time to magnetic field.
5. Deviation of meteorites which crashed to the earth surface has not ever been calculated in theoretical and practical calculations.
6. Electromagnetic field which is created by Helmholtz coil, could deviate Ferro sulfate (3).
7. The earth magnetic field could deviate meteorites.

Results confirm that this simple method with industrialization capability, could be new step in calculation of meteorites impact point, regarding the impact of magnetic field on the earth and calculative physics, physics-astronomy sciences and astronomy forecasting, and is applicable regarding industrial simulated form in a laboratory format. Since direct calculations and researches on meteorites are not cost and time effective, therefore this simulated scheme is cost effective tool, and enhances possibility of frequent examinations. Also it could be perform in other apparatus with more coil's rounds and different current intensity, which we can reach more domain of this apparatus output. The created magnetic field on this apparatus is investigating, as well. Since, magnetic field distance from the earth surface is large, and the numerical value of the earth magnet is low, we could amplify magnetic field in this apparatus to observe Ferro (3) deviation, because distance of location of Ferro (3) burning surface to apparatus surface is short. If we are going to create a magnetic field as large as the earth magnetic field in this apparatus, or manufacture an apparatus as large as this value, we should apply a constant equation as follows to the apparatus:

$$\frac{2 * \pi * n * I}{5 * \sqrt{5} * r} \rightarrow (8 * 4 * \pi * n * i) / (5 * \sqrt{5} * r) = 0.625$$

$$(8 * 4 * \pi * n * i) / (11.5 * r) = 0.625 \rightarrow (9.011 * n * i) / (r) = 0.625 \rightarrow (n * i) / (r) = 0.0693$$

If we multiple n in I and then divide it to r, the earth magnetic field is constant too (0.625 gauss). The aim of this 3 unknown particles equation is to calculate (r, in) values to reach to the earth magnetic field.

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RESEARCH ARTICLE

Impact of Three Different Types of Training on Body Composition Blood Pressure Anthropometric Circumference and Selected Fitness Variables among Over Weight Males

Kaukab Azeem^{1*} and Abdulhameed Al Ameer²

¹Faculty, Physical Education Department King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia.

²Associate Professor, Physical Education Department King Fahd University of Petroleum & Minerals, Saudi Arabia.

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*Address for correspondence

Kaukab Azeem
Faculty, Physical Education Department
King Fahd University of Petroleum & Minerals,
Dhahran, Saudi Arabia
Email: kaukab@kfupm.edu.sa



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ABSTRACT

Introduction: Learning starts when an individual born and ends when he dies (Aristotle). Aerobic means, with oxygen during aerobic exercise a large portion of the required energy is obtained from the aerobic energy system. (Reid and Thomson, 2003), the aerobic capacity is the maximal amount of energy that can be produced by the system. (Stratton et al., 2004), reveals that the resistance training schedule is designed particularly to improve muscular strength and endurance through increased workload. **Purpose:** The purpose of this investigation was to find out the effect of three different trainings on the selected variables among over weight males from pre to post test. **Method:** Sixty subjects was selected for this study. The participants were segregated in three groups namely, strength training group, aerobics training group, and strength training cum aerobic training group.(strength training total subjects N=20), (aerobic training total subjects N=20), and (strength training cum aerobic training total subjects N=20), age group between 18 to 22 years. 12 weeks trainings were employed on the participants, 45 minutes of training per session, weekly two times. Pre and post test was conducted before and after the training protocol. The selected variables for this study is as follows; body composition (body mass index), blood pressure (systolic & diastolic pressure), anthropometric measurements (waist and hip circumference), muscular strength (bench press 1RM), muscular endurance (sit-ups test), flexibility (sit and reach test), speed (50M sprint), muscular power (standing broad jump). **Statistical application;** To compare the mean

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differences from pre to post test, mean, standard deviation and 't'- tests will be computed by the help of Statistica Software. Results and Discussion: The analyzing of data shows an improved performance with regard to the strength training, aerobic training and combined training protocols on the selected fitness variables among overweight males. Moreover the strength training group had not shown any changes with regard to the blood pressure and shows significant changes regard to body composition and waist and hip line. Aerobic training group had shows significant changes among the subjects with regard to the body composition, blood pressure, and anthropometric measurements. The combined training group had shows significant changes in body composition, anthropometric circumference and insignificant changes in blood pressure. Furthermore the combined training group had shows greater performance in the selected fitness variables, body composition and anthropometric circumference. Conclusion: It is concluded that the combined training program is more effective protocol in enhancing fitness level and improving health of the overweight males.

Key words: Training, combined, variables, performance

INTRODUCTION

Learning starts when an individual born and ends when he dies (Aristotle). Education makes an individual a real human being. It is an essential human virtue. Man learns something at every moment and on every day. Education equips the individual with social, moral, cultural and spiritual aspects and thus makes life progressive, cultured and civilized. About education, (P.O.Bannerji), said "it is the development of the power of adaptation to an ever changing social environment". Body composition refers to the relative amount of muscle, fat, bone, and other vital parts of the body. A person's body weight will not change over time. The weighing machine shows only the body weight of an individual, but it does not give clear picture with regards to fat and lean body mass. Body mass index (BMI) is a simple technique to find out the clear picture about the health and to maintain (Johnson and Nelson, 1988). The most common method to measure the body composition is with help of body mass index (BMI). The body mass index (BMI) is a simple statistical measurement which compares a person's weight and height by $BMI = \text{weight in kgs} \backslash (\text{height in meters})^2$

The term anthropometric refers to comparative measurements of the human body. The anthropometric measurements commonly used as indices of growth and development for infants include length, weight, and head circumference. Accurately measuring children with physical abnormalities is often a challenge. Anthropometric measurements have been a part of physical education research and evaluation since its inception. The earlier research on this topic was emphasizes on the changes in muscle size, brought about through exercises, (Clarke and Clarke, 1989). According to (Hoff & Helgerud, 2003), aerobic refers to variety of activities like walking, jogging and running for a measured time. This produces beneficial changes in the body, specially the action of the lungs, heart and blood circulation. Aerobic training is a type of exercise that improves the cardio-vascular system, strengthens the heart, and improves the body's ability to deliver oxygen to the muscles. Maximum strength is not important in the majority of the sports. It is important only in those sports in which very heavy resistance have to be tackled e.g., weight lifting, Power lifting, throws events and etc. in many sports, however, there are faces of movement when the muscles, most apply maximal or near maximal force example cross position on roman rings, start and acceleration face in sprints, take off in jumps. In such sports maximum strength is important. The importance of maximum strength lies on the fact that in majority of the sports it serves as the basis for good explosive strength and strength endurance. (Gene Hooks, 1974), Stated that the strength is the key for success in various sports and games.

(Gene Hooks, 1974), Stated that the strength is the key for success in various sports and games. The value of strength in athletes is not a new idea. There is a vast need for everyone involved in sports for a better understanding of



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strength. Most coaches recognized that strength is a valuable asset for athletics success. The main components which influence the physical performance of an athlete are strength, speed, agility, endurance, power, coordination, balance, flexibility, and body controls. (Daniel, 1982) stated that strength training is the most important ingredient in the process of making an athlete and it enhances performances along with success not only in rehabilitation, but in preventing injuries as well. Proper strength training yields benefits for any athlete young or old. As a result is stronger, faster, more flexible, more enduring and less likely to suffer from sports injuries. Strength training use directly to improve maximum strength, power or strength endurance and it leads to intensive demands on muscles, tendons, ligaments, and joints.

(Bloomfield, et. al., 1994) investigated a study on the importance of resistance training for sports performance have been supported by studies which have demonstrated that resistance training in the form of weight training and more recently, plyometric training have improved some competitive performances. Most characteristically this has been repeated as and development in vertical jumping ability. Many earlier research studies had revealed that resistance training has enhanced muscular strength, but failed to induce changes in dynamic supporting performances. (Wescott, 1995), Muscular strength is the amount of force that a muscle can exert and it is an important fitness component in performing motor skills and in jumping events in athletics). (Stratton et al., 2004), reveals that the resistance training schedule is designed particularly to improve muscular strength and endurance through increased workload demand and may include the use of free weights, machine weights, elastic tubing/stretch bands, hydraulic machines or body weight exercises (for example: push-ups, chin-ups).

(Kaukab Azeem, et.al 2006), Weight training is beneficial for athletes and important and part of the athlete's training program. Upper body strength is very important and part of the training program for the following sports men and women globally i.e., cricketers, basketball players, boxers, baseball players, wrestlers, judo players, etc. (American Academy of Pediatrics, 2001; Faigenbaum et.al., 2002; Wescott, 1995), participating actively in any strength training or resistance training programs also improved and maintains musculoskeletal health, strengthens bone, facilitates weight control, and also improves cardio-vascular risk profile. In this study it was revealed that two times training per week also has shown improvements in strength (Bell, 1990; Faigenbaum et al., 2002; Flanagan et al., 2002). Anthropometric variables are the dimensions of the structure of human body taken at specific sites to give measures of length girth, and width, (Clarke and Clarke 1989). Aerobic means, with oxygen during aerobic exercise a large portion of the required energy is obtained from the aerobic energy system. The aerobic capacity is the maximal amount of energy that can be produced by the system (Reid and Thomson, 2003). Systolic pressure is the highest blood pressure of the cardiac cycle occurring immediately after systolic of the ventricles of the heart (Fox, 1993). Diastolic pressure is the lowest arterial blood pressure of the cardiac cycle occurring during diastolic of the heart (Fox, 1993). It is the height of the individual taken standing erect on a horizontal surface with his head and face in forehead plane or it is the straight height of the subject up to the point of vertex, (Kansal,1996). Intensity is expressed as a percentage of load or 1RM (Bompa, 1999). Strength is the force exerted by the important muscles group of the body in one maximal contraction, (Judith, 1985). Weight is the measurement of the total body mass, (Yobu, 1983). (Kaukab Azeem, 2015), reveals that muscular strength includes a variety of training modalities, including body weight exercises, elastic bands, plyometric exercises for (upper and lower body), multi machines, free weight machines and hydraulic machines. (Kaukab Azeem 2015), stated that the exercise is a medicine and resistance training in particular is one of the most important medicine in controlling certain types of diseases, i.e., obesity, joint pains, muscle weakness, neuro-muscular coordination, etc.

Objectives

The ultimate goal of this research project was to study the impact of Strength training, aerobic training and strength cum aerobic training program on the selected variables. The training emphasized on the reduction of body mass index (BMI) and anthropometric circumference among over weight males. Furthermore the trainings were highlighting the effect on selected fitness variables with regard to performance among the participants. To find out





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the best effective training program among the three different training groups. Furthermore to bring awareness about the strength training, aerobic training and strength cum aerobics training methods this effects on the selected variables among the overweight males.

The main goal can be achieved through following objectives.

1. To design an effective strength training program for overweight males
2. To design an effective aerobic training program for overweight males
3. To design an perfect training schedule in combination with strength and aerobic training program for overweight males
4. To find the effect of strength and aerobic training respectively on the body composition, blood pressure, anthropometric circumference and selected fitness variables.
5. To find the effect of strength cum aerobic training on the body composition, blood pressure, anthropometric circumference and selected fitness variables.
6. To find out the difference in performance between strength training, aerobics training and strength cum aerobic training group.

MATERIALS AND METHODS

The tests considered for this study is namely, body composition (BMI), Blood pressure, anthropometric measurements (waist and hip circumference), and selected fitness variables are as follows, muscular strength, muscular endurance, Speed, Flexibility, and muscular power. BMI of subjects was find by weight (kgs), height (meters), with the help of electronic weighting machine and stadiometre respectively, and calculated with the help of simple calculation (weight in kgs/ height in (m)²). The blood pressure of the participants was taken at the KFUPM Clinic. The anthropometric measurements (waist and hip circumference), was taken by the help of steel tape in (cms) at the department of physical education. Selected fitness variables were tested at the stadium by the help of standard sports equipment. The data was collected for pre and post test and recorded. For analyzing the data from pre to post test the following statistical tools was considered, mean, standard deviation, and t-test, with the help of statistica soft ware.

Selection of Subjects

The purpose of this study was to find out the effect of different training programs on body composition, blood pressure, anthropometric measurements and selected fitness variables from pre to post test among the over weight males. To achieve the purpose of this study a group of 60 over weight males will be selected randomly from the King Fahd University of Petroleum & minerals, Saudi Arabia. The age of the selected participants was between 18 to 22 years. The participants from 25 to 30 BMI was considered for this study and segregated into three groups namely strength training group (N=20), and aerobic training group (N=20). Strength cum aerobic training group (N=20) is considered to employed on the overweight males for 12 weeks, weekly 2 times, 45 minutes of training per session respectively.

Selection of Variables

The various scientific literatures pertaining to the strength training, aerobic training and strength cum aerobic training exercises on selected variables from books, journals, periodicals, health magazines, research papers and online. Keeping all facts in the total frame of my mind the following consideration is made with regard to feasibility criteria, availability of instruments, and the relevance of the variables of the present study, the following variables was consider for this study.



**Kaukab Azeem and Abdulhameed Al Ameer****Instrument Reliability**

Standard equipments were used to assess the dependent variables. Blood pressure with the help of (sphygmomanometer), was measured at the KFUPM clinic, Dhahran, Saudi Arabia. Body composition was investigated by the help of Body mass index (BMI), Anthropometric measurements (waist and hip circumference), was measured by the help of steel tape in (cms) The selected fitness variables was tested by the standard instrument at the Department of Physical Education.

Orientation of the Subjects

The testers explained the purpose of this study to the subjects. The doubts of the participants were address and the important instruction was given to the participants with regard to attendance, their active participation during the training program for 12 weeks.

Training Program

The training program was employed for twelve weeks, two times in a week, 45 minutes of training per session, strength training group-1 (10 exercises), aerobic training group-2 (brisk walking program), and strength cum aerobic training group-3 (10 exercises + brisk walking). The training was designed based on FITT principle and pre and post test were taken before and after the training protocol.

RESULTS AND DISCUSSION

The below tables from 5 to 7 shows the analyzing data for the three groups namely; strength training group-1, aerobic training group-2, and strength cum aerobic training group-3

Analyzing data for strength training group-1

The analyzing of data reveals that the mean and Standard deviation with regard to body mass index (BMI) among the participants from pre to post test were (28.43, 1.79) and (27.40, 1.78). The participants had shows improvement from pre to post test by losing weight. This is very clear that the strength training had positive impact on body composition among the subjects in reducing weight from pre to post test. Pre to post test with regard to the systolic pressure with mean and standard deviation were (120.60, 0.94) and (120.50, 0.83) respectively. Mean and standard deviation with regards diastolic pressure were (80.30, 0.57) and (80.05, 0.37) respectively. Strength training program had shown no changes in the participants with regard to the blood pressure. The waist circumference of the subjects from pre to post test with mean and S.D were (97.85, 9.07) and (95.90, 8.22), respectively. The influence of strength exercise on overweight participants with regard to the waist line had decrease from pre to post test. A waist circumference of a person more than 39" is likely or prone to diabetes and other cardio-vascular diseases. Individuals with big belly and waist line above the 39" must include strength exercises for at least four times in a week to reduce the tummy and waist circumference to enhance and maintain quality of life. A low balanced diet with strength training program will be beneficial for the overweight individuals. The hip circumference from pre to post test with mean and Standard deviation were (111.52, 6.67) and (109.75, 7.03) respectively. The strength training program had shows positive influence in reducing hip girth of the overweight subjects from pre to post test. Mean and Standard deviation with regard to parallel bench press performance were (47.25, 10.93) and (67.95, 12.93) respectively. The participants had shows greater performance on the influence of strength training in muscular strength from pre to post test. Pre to post test with mean and Standard deviation of sit ups test improvement were (21.15, 6.26) and (27.20, 5.58) respectively. The overweight practitioner's had shows improvement from pre to post test. Sit and reach test performance from pre to post test with mean and Standard deviation were (16.75, 5.23) and (21.65, 4.57), respectively.



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The influence of strength training had shows improved performance with regard to the flexibility of the participants from pre to post test, which is very encouraging and significant. 50 M sprint test among the participants from pre to post test had shows improved performance with mean and standard deviation were (8.87, 1.29) and (8.28, 1.28) respectively. The influence of strength training had shows some improvement in speed among the participants from pre to post test of twelve weeks training protocol. Effect of strength training program from pre to post test with regard to standing long jump with mean and standard deviation were (1.70, 0.19) and (1.93, 0.23) respectively.

Analyzing data for aerobic training group-2

The analyzing of data reveals that the mean and Standard deviation with regard to body mass index (BMI) among the participants from pre to post test were (28.59, 1.87) and (27.30, 1.86). The overweight males had shows encouraging results by losing weight from pre to post test. This is very clear that the aerobic training had positive impact on body composition among the participants in reducing weight from pre to post test. Recent research studies had shows that the reducing body weight will improves the health and which is the seal of individual health and it can controls high blood pressure and coronary heart diseases. Pre to post test with regard to the systolic pressure with mean and standard deviation were (121.35, 1.02) and (120.20, 0.41) respectively. Mean and standard deviation with regards diastolic pressure were (81.00, 1.03) and (80.20, 0.41) respectively. Aerobic training program had shown significant changes in the participants with regard to the blood pressure. The waist circumference of the subjects from pre to post test with mean and S.D were (98.6, 9.4) and (95.6, 9.39), respectively. The influence of aerobic exercise on overweight participants with regard to the waist line had decrease from pre to post test. A waist circumference of a person more than 39" is likely or prone to diabetes and other cardio-vascular diseases. Persons with large tummy and tummy above the 39" must include aerobic exercises for at least four times in a week to reduce the tummy and waist circumference to maintain better life. A low balanced diet with aerobic training program will be beneficial for the overweight individuals. The hip circumference from pre to post test with mean and Standard deviation were (112.82, 8.05) and (109.65, 10.44) respectively. The aerobic training program had shows positive influence in reducing hip girth of the overweight subjects from pre to post test. Mean and Standard deviation with regard to parallel bench press performance were (47.50, 11.06) and (64.45, 13.75) respectively. The participants had shows improved performance on the influence of aerobic training on muscular strength from pre to post test. Pre to post test with mean and Standard deviation of sit ups test improvement were (21.40, 4.96) and (26.80, 2.62) respectively. The selected participants had shows improvement from pre to post test. Sit and reach test performance from pre to post test with mean and Standard deviation were (15.45, 4.85) and (22.0, 5.44), respectively. The influence of aerobic training had shows improved performance with regard to the flexibility among the overweight males from pre to post test, which is very encouraging and significant. 50 M sprint test among the participants from pre to post test had shows improved performance with mean and standard deviation were (8.99, 1.54) and (8.14, 1.50) respectively. The influence of aerobic training had shows some improvement in speed among the participants from pre to post test of twelve weeks training protocol. Effect of aerobic training program from pre to post test with regard to standing long jump with mean and standard deviation were (1.72, 0.18) and (1.89, 0.21) respectively.

Analyzing data for combined training group -3

The analyzing of data reveals that the mean and Standard deviation with regard to body mass index (BMI) among the participants from pre to post test were (28.53, 1.72) and (27.08, 1.79) respectively. The overweight males had shows improvement from pre to post test by losing weight. This is very clear that the strength cum aerobic training (combined training) had positive impact on body composition among the subjects in reducing weight from pre to post test. Recent research studies had also shows that the reducing body weight will improves the health of the individuals. Pre to post test with regard to the systolic pressure with mean and standard deviation were (121.10, 1.02) and (120.55, 0.76) respectively. Mean and standard deviation with regards diastolic pressure were (81.05, 0.88) and (80.40, 0.50) respectively. Strength cum aerobic training program had shows some changes in the participants with regard to the blood pressure. The waist circumference of the subjects from pre to post test with mean and S.D were



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(99.55, 9.70) and (96.15, 9.58), respectively. The influence of combined training on overweight participants with regard to the waist line had shows improvement by reducing from pre to post test. Individuals with big belly and waist line above the 39" must include combined training program for at least four times in a week to reduce the tummy and waist circumference to improve and maintain eminence of life. A low balanced diet with combined training program will be beneficial for the overweight trainers. The hip circumference from pre to post test with mean and Standard deviation were (112.48, 7.83) and (108.90, 10.10) respectively. The combined training program had shows positive influence in reducing hip girth of the overweight subjects from pre to post test. Mean and Standard deviation with regard to parallel bench press performance were (47.50, 11.06) and (54.45, 13.75) respectively. The participants had shows greater performance on the influence of combined training in muscular strength from pre to post test. Pre to post test with mean and Standard deviation of sit ups test improvement were (20.95, 5.34) and (28.55, 5.12) respectively. The overweight participants had shows improvement from pre to post test. Sit and reach test performance from pre to post test with mean and Standard deviation were (16.05, 5.53) and (23.60, 5.63), respectively. The influence of combined training had shows improved performance with regard to the flexibility of the subjects from pre to post test, which is very encouraging and significant. 50 M sprint test among the overweight males from pre to post test had shows improved performance with mean and standard deviation were (8.93, 1.62) and (7.77, 1.12) respectively. The influence of combined training had shows some improvement in speed among the participants from pre to post test of twelve weeks training protocol. Effect of combined training program from pre to post test with regard to standing long jump with mean and standard deviation were (1.69, 0.19) and (2.02, 0.25) respectively.

The following below studies are in support of this present study

(Kelley, 1995), conducted a study and the results showed that the aerobic exercise resulting small reductions on resting systolic and diastolic blood pressure among normotensive adults.(W.L. West Cott & et.al, 2001), evaluated strength exercise performed slowly and at regular speed for intensity and effectiveness. In both studies, super slow training resulted in fifty percent greater increase in strength than regular speed training although both groups demonstrated significant strength gains. (Kaukab Azeem, 2012), had investigated about the impact of physical activity on body composition among subjects had shows improved performance from pre to post test. (B.V. Reddy 2014) investigated in this study and the results had shows encouraging findings that the interval training, circuit training and combined interval and circuit training groups performed better on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance. (D.Sailoo, & et.al., 2014) in this study the effect of nine weeks of weight training protocol had shows enhanced performance with regard to sit-ups performance, which is significant. (Raghu N & et.al., 2014) in a study the analysing of data shows significant performance with regard to body composition, muscular strength & endurance, and flexibility among the participants on the effect of aerobic training from pre to post test. (P.Arul and et.al., 2014) It was find from the results of the study muscular strength has improved significantly after the effect of twelve weeks resistance and free weight training programmes. On sit-ups, push-ups and half squat jump. (K.Sreedhar, 2014) in an study investigated the sand running program has resulted in a significant increase in cardio vascular endurance, explosive power, muscular Endurance, VO₂ maximum among school boys. (P. Srinivas, 2014), reveals in this study that there was a significant differences with regard to body composition among the selected participants. (Kaukab Azeem, and et.al, 2015) reveals that the combined sports training program on overweight college students had shows changes in the body composition. (Mettilda T, 2015), had investigated and reveals that the result of the study shows Kho-Kho players have significantly higher level of cardio vascular endurance as compared to Kabaddi players. (Rupendra Farswan & et.al, 2015) In this investigation the result revealed that the experimental group has significant effect on muscular endurance and flexibility after 12 weeks aerobic training when compared to the control group. (Bhavani A, 2015) investigated in the study on 1500 students and that the students had shows significant differences among them in relation to their body composition. (Abida B, & et.al 2015) in a study had reveals that the fartlek training had shows significant improvement in the fitness and cardio-vascular endurance among the subjects. (Patil D 2015), in this study investigated about the effect of aerobic exercise on selected participants and had found significant changes in body



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composition. (Rajkumar.P.Malipatil, & et.al, 2015), Significant difference found between pre test and post test of Experimental group in Cardio-vascular Endurance, Sit & Reach Test and Vital Capacity, but insignificant difference observed in Body Mass Index. (R.S.Varma and et.al, 2015), Investigated and found significant difference in sit ups, standing broad jump, shuttle run, 50 yard dash and 12 minute run and walk and moreover result showed Tennis players are better in all test items in comparison to Volleyball players except Agility.

CONCLUSION

It was concluded that the effect of strength training had shows significant changes from pre to post test among overweight males with regard to body composition, anthropometric circumferences and selected fitness variables. Moreover insignificant changes were concluded with regard to blood pressure among the strength training group participants. It was concluded that the effect of aerobic training had shows significant changes from pre to post test among the participants on the body composition, anthropometric circumferences, blood pressure and selected fitness variables. It was concluded that the effect of combined training group had shows significant changes from pre to post test among the subjects regard to body composition, anthropometric circumferences and selected fitness variables. Furthermore insignificant changes were recurred with regard to blood pressure among the strength training group participants. It is also concluded and evident from this study that the combined training protocol is more effective program in compare with other two groups i.e. strength training group and aerobic training group.

Recommendations

This is recommended for the overweight males to opt the combined training program (strength cum aerobic training) to enhance fitness level, to reduce more weight, to get back in better shape by reducing hip & waist line circumference and to maintain quality of life.

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Table-1: The below table shows about the Dependent and Selected Fitness Variables

DEPENDENT VARIABLES	
Sl.no	Selected health variables; Body composition, Blood pressure, Anthropometric circumference
1	Body Mass Index (BMI)
2	Blood pressure (Systolic & Diastolic Pressure)
3	Waist and hip Circumference
Selected Fitness Variables	
1	Muscular strength
2	Muscular endurance
3	Flexibility
4	Speed
5	Explosive power

Table-2: The below table shows the details of Independent Variables

Sl.no.	INDEPENDENT VARIABLES
1	Strength Training Program
2	Aerobics Training program
3	Strength cum aerobic training program

Table-3: Shows the details of the selection test of Body composition, Blood pressure, Anthropometric circumference

Sl.no.	Variables	Test	Unit of measurements
1	Body Composition	Body mass index (BMI)	Wt in(kgs) / Ht (cm) ²
2	Blood pressure	Sphygmamometre	mm.Hg
3	Anthropometric measurements	Waist and hip	Steel tape (cms)





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Table-4: Shows the details of the selection test of the selected fitness variables

SI.no.	Selected Fitness Variables	Test	Unit of measurements
1	Muscular strength	Bench press	Kgs
2	Muscular endurance	Sit-ups (30 seconds)	Repetitions (score)
3	Flexibility	Sit and reach test	Cms
4	Speed	50 M .Sprint	Score (seconds)
5	Explosive power	Standing broad jump	Cm

Table-5: Below table shows the results of strength training group -1

Variables	Test	Strength Training Group N=20		
		Mean	S.D	P-value
BMI	Pre	28.43	1.79	0.00*
	Post	27.40	1.78	
Blood pressure (sys)	Pre	120.60	0.94	0.16
	Post	120.50	0.83	
Blood pressure (dia)	Pre	80.30	0.57	0.05*
	Post	80.05	0.39	
Waist circumference	Pre	97.85	9.07	0.00*
	Post	95.90	8.22	
Hip Circumference	Pre	111.52	6.67	0.00*
	Post	109.75	7.03	
Muscular strength	Pre	47.25	10.93	0.00*
	Post	67.95	12.93	
Muscular Endurance	Pre	21.15	6.26	0.00*
	Post	27.20	5.58	
Flexibility	Pre	16.75	5.23	0.00*
	Post	21.65	4.57	
Speed	Pre	8.87	1.29	0.00*
	Post	8.28	1.28	
Explosive power	Pre	1.70	0.19	0.00*
	Post	1.93	0.27	





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Table-6: The below table shows the results of Aerobics training group -2

Variables	Test	Aerobic Training Group N=20		
		Mean	S.D	P-value
BMI	Pre	28.59	1.87	0.00*
	Post	27.30	1.86	
Blood pressure (sys)	Pre	121.35	1.02	0.00*
	Post	120.20	0.41	
Blood pressure (dia)	Pre	81.00	1.03	0.00*
	Post	80.20	0.41	
Waist circumference	Pre	98.6	9.4	0.00*
	Post	95.6	9.39	
Hip Circumference	Pre	112.82	8.05	0.00*
	Post	109.65	10.44	
Muscular strength	Pre	47.50	11.06	0.00*
	Post	64.45	13.75	
Muscular Endurance	Pre	21.40	4.96	0.00*
	Post	26.80	2.62	
Flexibility	Pre	15.45	4.85	0.00*
	Post	22.00	5.44	
Speed	Pre	8.99	1.54	0.00*
	Post	8.14	1.50	
Explosive power	Pre	1.72	0.18	0.00*
	Post	1.89	0.21	

Table-7: The below table shows the results of strength cum aerobics training group-3

Variables	Test	Strength cum Aerobic Training Group, N=20		
		Mean	S.D	P-value
BMI	Pre	28.53	1.72	0.00*
	Post	27.08	1.79	
Blood pressure (Sys)	Pre	121.10	1.02	0.01*
	Post	120.55	0.76	
Blood pressure (dia)	Pre	81.05	0.88	0.00*
	Post	80.40	0.50	
Waist circumference	Pre	99.55	9.70	0.00*
	Post	96.15	9.58	





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Hip Circumference	Pre	112.48	7.83	0.00*
	Post	108.90	10.10	
Muscular strength	Pre	47.50	11.06	0.00*
	Post	54.45	13.75	
Muscular Endurance	Pre	20.95	5.34	0.00*
	Post	28.55	5.12	
Flexibility	Pre	16.05	5.53	0.00*
	Post	23.60	5.63	
Speed	Pre	8.93	1.62	0.00*
	Post	7.77	1.12	
Explosive power	Pre	1.69	0.19	0.00*
	Post	2.02	0.25	





RESEARCH ARTICLE

Comparison of Impact of 16 weeks Regulatory Exercises with and without Diet on Reducing back Lower Dose and WHR in 30-40 year Females with Overweight Records

Fatemeh Nasaji *and Bizhan Goodarzi

Department of Physical Education, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Fatemeh Nasaji
Department of Physical Education,
Boroujerd Branch,
Islamic Azad University,
Boroujerd, Iran.
Email: f.nasaji@gmail.com



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ABSTRACT

The aim of this study is to compare the impact of 16 weeks regulatory exercises, with and without diet on back lower dose and WHR in 30-40 years females with over weight records. Participants included 26 obese females, from referrals of health clinics of Boroujerd city in 2013, with back lower dose, which participated in this project voluntarily and were divided randomly into 3 groups each consists 12 participants, including: experimental group 1, (regulatory exercises and diet), experimental group 2, (regulatory exercises), and group 3: control (with no physical exercises). Group 1 was provided by selected regulatory exercises with diet, for 16 weeks (3 sessions per week, each session 1 hour), and second experimental group was only provided by regulatory, treatment exercises for 16 weeks. Control group was not offered any exercise. To measure back arc, the Cobb device was used. Dependant t-test, one way variance analyzing, and Tooke follow up test were used to data analyzing. Results showed that a cycle of selected regulatory exercise with and without diet, had significant impact on reducing back lower dose and WHR of 30-40 years females with over weight records ($\leq 0/0001P$). Also, there was significant difference between effect of a cycle of regulatory exercises with and without diet on weight loss ($p \leq 0/0001$). In contrast, there was no significant difference between effect of selected physical exercises with and without diet, on reducing back lower dose in 30-40 years females with over weight records ($p \geq 0/0001$).

Keywords: WHR, lower dose, diet



**Fatemeh Nasaji and Bizhan Goodarzi****INTRODUCTION**

Today, the positive effects of physical treatment exercise on rehabilitating and regulating of body disorders, is not uncovered for anybody. Treatment exercise for male and female could be beneficial, if it performs correctly. But, there are special cases that have seemed ambiguous and complicated, for a long time, including pregnancy, delivery and its after care issues. Pregnancy creates several different physiologic issues for pregnant females, comparing other times. During this time, the body gets significant heart-vessel, hormone, respiratory, metabolic and muscular-skeleton adaptations (Rahmaninia and Hogati, 2008).

Today's hot discussion is about obesity, over weight and weight loss. When the received calorie is more than utilized calorie, obesity is formed. Some factors cause obesity, including: inherent factors, over eating, fat tissue metabolism shift, body exercise reduction with no decrease in food intake. Obesity referred to over average fat intakes in body, which in turn, is dependant on the kind and number of fat cells, and over weight is referred to a part of body weight that regarding body height and size is more than standard and normal weight (Sobhani et.al, 1999). Recently, obesity and over weight, as one of the largest health problems, challenges many people in different countries. Obesity and over weight, lead to hypertension, second type diabetes, depression, heart-vessel diseases, and kidney, uterus, esophagi, and stomach, liver, bile disorders, arthritis, and muscular-skeleton damages. Back lower dose is regarded as one of muscular-skeleton damages (Robinson, 2001). Forming back arc in fat people especially with obesity in abdomen, which is one of the obesity side effects, most successful approach weight loss and finally reducing back lower dose consists of received calorie reduction, physical activity growth, healthy nutrition, fat intake reduction. Mentioning this introduction, present study investigates the effect of 16 weeks regulatory exercises with or without diet on reducing back lowers and WHR dose in 30-40 years females with over weight records.

Problem statement

Backbone has 4 natural curves which its back curve is called lower dose. When back curve exceeds than natural limit, it is called hyper lower dose or back dimple. Due to connection between pelvis and backbones via cross bone, any change in pelvis location leads to change in backbone's arcs, especially back curves (Mahdavinezhad et.al, 2013). Obesity and slimness could be regarded as a natural phenomenon of body. Around one third of the world population is fat, one third is slim and remaining has normal body. As far as the received energy is equal to required energy of body, the weight remains constant, but if the received energy is more than required, the body supplies its need and saves additional energy. Saved fat cells in body transform to some triglycerides which release required energy for other tissues, when it is necessary. However this physiologic system provides the possibility of body life rescuing for some months, but over eating and low movement situation in life causes to increase fat savings and creates adverse sanitary consequences. Overweight and obesity is one of the problems of developed and developing countries, which is increasing in our country as well, and is growing up, with some years of delay comparing other countries with high percentage of obesity (Khalag, 2009). Adverse information exists about significant relation between body mass and disorders. Fabris et.al (2005), studied the changes in body situation in people with obesity disease. In their sample, 1.78 percent of fat participants and 3.23 percent of slim participants suffered from acute back lower dose. Accordingly, Keratinova et.al (2007), stated that fat tissue growth could lead to hide the skeleton disorders, but in the other hand it is likely that this increasing has effective role in enhancement of backbone stability. These researchers showed that children with higher weight have more favorable body style. Youdas et.al (2006), also emphasized in tow studies on back backbone area, and concluded that difference in body mass index may not have significant impact on stand up back curve status in males with no back disorder record.

Muscular power in females is also lower than males. In the other hand females during pregnancy which follows by abdomen size growth, applies more pressure on backbone. Furthermore, Relaxin hormone which is secreted in pregnancy has relaxing effects on all body joints including backbone joints (Caguneri et.al, 1999), and some researchers consider this hormone in pregnant female backache (Bryndhilson et.al, 1998). Over weight causes





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increase in applied load on backbone and this over load leads to impose some changes in backbone. There is relation between obesity and inter spinal discs (Parkkola, 1992). It is obvious that bottom parts of spinal are more exposed to extra load. In the other hand, spinal curves have fundamental role in absorption of applied loads on it and its strength (Sobhani, 1999). This study, regarding above issues, seeks to answer this question that: whether regulatory exercises with and without diet, can lead to decline in back lower dose and WHR, in 30-40 years old females with over weight?

Purposes of study

Main purpose

Studding the effect of 16 weeks regulatory exercises with and without diet on decline of back lower dose and WHR in 30-40 years females with overweight.

Special purposes

1. Determining the impact of a cycle of selected regulatory exercises and diet on decline of back lower dose in 30-40 years females with overweight.
2. Determining the impact of a cycle of selected regulatory exercises without diet on decline of back lower dose in 30-40 years females with overweight.
3. Determining the impact of a cycle of selected regulatory exercises and diet on decline of WHR in 30-40 years females with overweight.
4. Determining the impact of a cycle of selected regulatory exercises without diet on decline of WHR in 30-40 years females with overweight.

Hypothesizes

1. A cycle of regulatory selected sport exercises with diet has significant impact on decline of back lower dose in 30-40 years females with overweight.
2. A cycle of regulatory selected sport exercises without diet has significant impact on decline of back lower dose in 30-40 years females with overweight.
3. A cycle of regulatory selected sport exercises with diet has significant impact on decline of WHR in 30-40 years females with overweight.
4. A cycle of regulatory selected sport exercises without diet has significant impact on decline of WHR in 30-40 years females with overweight.

Background of study

Obesity

Obesity could be explained as over fat residue or accumulation in body tissues. Usually, obesity is caused from over food eating more than physiologic requirement limit.

Food diet

The amount of food intakes for each person is called food diet. The nutrition is suitable which has enough vitamins, minerals, proteins, and metabolites. Imbalance between metabolites intake and energy consumption leads to nutritional deficiency or its saving in the form of fat.





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Selected regulatory exercises program

Conceptual definition: good and routine exercises and sport activities which is recommended to body health and metabolism (accumulated fats in body tissues). Operational definition: given exercises to the patient for recovering and treatment of back lower dose during 16 weeks.

Back lower dose

Conceptual definition: backbone has natural curve in the back area. Over increase of back curve in this area is called back dimple or lower dose (Udas et.al, 2000).

Operational definition

In this method, Udas approach is used to measure back lower dose, using flexible ruler. For this purpose, the tester indicates and signs tow defined T12 to S2 points (Magee, D.J, 2002). After indicating and signing of these tow spines, one end of the ruler is put in 11th back spine and the other end is put on first Sakrel spine, and with ruler pressing, a curve just like the back curve is formed, which after transferring the curve into the paper sheet, the curve angle is calculated using 1-1 equation.

$$\theta = 4 \left[\text{Arctg} \left(\frac{2H}{L} \right) \right]$$

Equation 1-1:

Where θ is curve angle, L distance between start point and end point of the curve, and H is distance between deepest curve point to L line (Heart, D. Rose, S, 1986). WHR Conceptual definition: WHR or waist to tall ratio is the most important criteria to predict the risk of obesity. WHR is an examination index for people.

Operational definition: WHR is ratio of waist to pelvic (size of waist of half tall size) in people. Halt (2000), performed a study about 1200 employed young and mid age males with back lower dose, he selected 56 persons randomly from this sample with 25-52 years old and put them under tow control (28) and experimental (28) groups, and then performed pretest from both groups, regarding his study purposes, which was examining the effect of regulatory exercises on back lower dose deficiency and balance and agility. Then he put experimental group under regulatory exercises and conclude following results after finishing the course. A) first, the most significant reasons of lower dose and backache in these persons are constant and little impacts, permanent pressures, and aging; B) after presenting regulatory exercises, the dynamic balance and agility in participants increased. C) Providing the sport and regulatory exercises, had significant positive impact on back lower dose and also decreasing the little backaches and caused to increase reaction rate in participants in the work place (Halt, 2000). Luis et.al (2006), investigated and studied regulation and recovery of backbone curve angle (lower dose), using sport exercises in halter lifting athletes. For this purpose, they selected 18 lifting athletes with back lower dose and exposed to 10 weeks regulatory exercises and conclude following results after the end of course: A) there was reduction in backbone curve angle and backache in athletes; B) balance and activity of athletes have been increased; C) body strength and muscular power in the back of halter lifters have been increased; D) there was significant difference between regulatory exercises with heart-vessel potency and also muscular power and strength in abdomen area.

METHODOLOGY

Present study is a semi experimental study due to having control and experimental groups and pretest, posttest layout, and is practical and applicable regarding purpose of study. Practical studies are done using results of fundamental studies to improve attitudes, approaches, materials and methods, products, structures and patterns of human societies. The aim of practical study is to improve practical knowledge in a specific area.





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Samples and statistical samples, and sampling method

Statistical sample of this study consists of entire female referrals with back lower dose and over weight to the health and medical clinics of Boroujerd city in 2013, which regarding that this statistical sample has no limit, we chose only one clinic. Statistical sample of the study included 26 females with back lower dose and over weight which participated voluntarily in this research project and were divided randomly onto 3 experimental group 1 (regulatory exercises), experimental group 2 (regulatory exercises with food diet) and control group (with no body exercises).

Study variables

Independent variable

Back lower dose and waist to pelvis ratio (WHR)

Dependant variable

Selected regulatory exercises and food diet

Data gathering method

Data gathering method is library and field method. In library section, we will gather required information using books and articles (literatures) for present study. In field research section 240 female participants with 30-40 year age and fat percentage of 7/35, 158/45 cm were selected and randomly divided into tow experimental groups (with physical exercises and food diet) and (with food diet and no physical exercise) which were studied during 16 weeks. Food diet with selected physical exercises group, participate in sport exercises, concerning dictated food diet (reduction of 500 k.cal of daily required body energy), for 16 weeks, 3 time per week, each time for 60 minutes. The food diet group with no physical exercises, observed dictated diet during 16 weeks, constantly, and control group continued their ordinary life. Evaluations were performed during 2 pretest and post test phases, which weight, tall, skeleton structure and back lower dose of participants, were finally calculated.

Data gathering tool

1. WHR index: to calculate obesity, the waist to pelvic ratio was used.
2. Cobb device was used to measure back curve size.
3. (seca) digital scales with 100 gr accuracy was used to measure the weight of participants.
4. (seca) tall meter with 1 mm accuracy was used to measure the tall of participants.

Data analyzing method

Obtained data were analyzed using tow descriptive and conclusive methods. To organize, summarize and classify raw scores and describe sample sizes, descriptive and abundance statistics, with mean and index deviation were used. In conclusive findings section, descriptive and analytic indexes were used to data analyzing. Also descriptive statistics such as abundance distribution, mean and index deviation, and Kolmogorov-Smirnov test, Levine test, dependant t test, one way variance analyzing test and follow up Tookie test, were used to analyzing research hypothesis.





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FINDINGS

Descriptive statistics

Descriptive information of participants which include weight and tall data of samples, are illustrated in tables. Regarding presented data in table index deviation of age, weight and tall variables show that participants in experimental and control groups are in approximately same level of these variables.

Analytical statistics

Kolmogorov- Smirnov test

The aim of this test is to determine that whether concerning sample (sample volume), was obtained of a sample with normal distribution? Normal distribution test is one of the most common applications of distribution match test. Kolmogorov-Smirnov test is appropriate for this purpose. The results are shown in table 2.

According to research variable analysis using Kolmogorov-Smirnov test, which was observed about all variables of study, in tow experimental groups and control group, regarding obtained Z value, it could be concluded that concerned sample (sample volume) has been gathered from a normal distribution sample.

Leven test for variance congruity

The purpose of this study is to determine congruity between study variables variances. In table 3 results of Levine test is shown regarding results shown in table 3, study variables analysis using Leven variance congruity test, showed that variances of fat percentage, fat weight and body weight without fat variables have no required congruity and equality, therefore t test with variance inequity condition, was used to analyze related hypothesis to these variables.

Hypothesizes analysis

Waist to pelvic ratio (WHR)

Regarding obtained results from analysis of existing variables, using dependant t-test statistical methods, the proposed hypothesizes was analyzed.

H 1: a cycle of selected regulatory exercises with food diet has no significant impact on reduction of back lower dose in 30-40 years females with over weight.

H 2: a cycle of selected regulatory exercises without food diet has no significant impact on reduction of back lower dose in 30-40 years females with over weight.

H 3: there is no significant difference between impacts of a cycle of selected regulatory exercises with and without food diet on reduction of WHR in 30-40 years females with over weight.

In the case of fist experimental group (regulatory exercises and food diet), comparing pretest and posttest medians, shows that WHR values in participants after regulatory exercises and food diet has declined 33.8% , which regarding obtained t value of 9.81 and significance level of 0.0001, this change is significant. Therefore zero hypothesis of this study is rejected. In the case of second group (regulatory exercises), comparing pretest and post test medians shows that WHR values of participants after regulatory exercises has declined 11.01%, which regarding obtained t value of 6.24 and significance level of 0.0001, this change is also significant. Therefore, zero hypothesis of this study is rejected. In contrast, obtained results from comparison of pretest and posttest of control group (obtained t value of -1.88 and significance level 0.87) is consistent with no significant difference between these tow phases. To study the impact of a



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cycle of selected regulatory exercises with and without food diet on WHR reduction, one way variance analysis was used. Results are shown in table 5. As results data in table 5 shows, regarding obtained F value of 62.59 and significant level of 0.0001, it indicated no significant difference in WHR value of participants in 3 groups. To determine difference level of WHR median in 3 groups, Tooke test was used which results are shown in table 6.

Examining difference between 3 groups shows that in all cases there is significant difference between medians of groups. Also comparing 2 groups changes showed that WHR of participants after regulatory exercises and food diet had 33.8% decline, while this reduction was 11.01% for regulatory exercises. Consequently, null (zero) hypothesis is rejected and it is concluded that there is significant difference between effects of a cycle of regulatory exercises with and without food diet on WHR reduction in 30-40 years females with over weight. Comparing pretest and posttest of WHR between first and second experimental groups and control group is shown in table 1.

Back lower dose

Regarding obtained results from variables analyzing, using dependant t test statistical methods, hypothesis of this study was investigated.

H 1: the impact of a cycle of selected regulatory exercises on back lower dose reduction of 30-40 years females with over weight is not significant.

H 2: the impact of a cycle of selected regulatory exercises on back lower dose reduction of 30-40 years females with over weight is not significant.

H 3: there is no significant difference between impact of a cycle of selected regulatory exercises with and without food diet on back lower dose in 30-40 years females with over weight.

In the case of first experimental group (regulatory exercises and food diet), comparison of pretest and post test medians shows that back lower dose of participants after regulatory exercises and food diet has declined 9.79 % which regarding obtained t value of 6.95 and significant level of 0.0001, this change is significant. Therefore, zero hypothesis of study is rejected. In the case of second experimental group (regulatory exercises), comparison of pretest and post test medians show that back lower dose of participants after regulatory exercises has declined 9.99%, which regarding obtained t value of 8.63 and significant level of 0.0001, this change is significant. Therefore, the zero hypothesis of study is rejected. In contrast, obtained results of comparison of pretest and post test of control group (obtained t value of 1.13 and significance level of 0.28) is consistent with no significant difference between these two phases. To study the effects of a cycle of selected regulatory exercises with and without food diet, on back lower dose reduction, one way variance analysis was used. Results are shown in table 8.

As results of table 8.4 shows, regarding obtained F value of 27.96 and significance level of 0.0001, there is significant difference in back lower dose of participants in 3 groups. To determine difference level of average back lower dose size in 3 groups, Tooke test was used, which results is shown in the table 9.

Studying difference between 3 groups shows that there is no significant difference between means of to experimental groups. Accordingly, zero hypotheses was accepted and resulted that there is no significant difference between a cycle of selected regulatory exercises with and without food diet on back lower dose of 30-40 years old females with over weight. Comparing pretest and posttest of back lower dose between first and second experimental groups and control group is shown in table 2.

CONCLUSION

The aim of present study is to compare the effect of 16 weeks regulatory exercises on reduction of back lower dose and WHR in 30-40 years old females with over weight. Participants included 26 fat females with back lower dose from referrals of Boroujerd city medical and health clinics in 2013, which participated voluntarily in this research





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project and were divided randomly into 3 experimental group 1 (regulatory exercises and diet, experimental group 2 (regulatory exercises and control group 3 (with no physical exercise), each group contains 12 participants. Experimental group 1 was offered 16 weeks (3 course per week, 1 hour each one) with food diet, experimental group 2, was offered only regulatory-treatment exercises. Any physical exercise was not offered to control group during this time. Cobb device was used to measure back curve. Dependant T-test, one way variant analyzing and follow up Tookie test were used to data analyzing. Results showed that a course on selected regulatory exercises with and without diet had significant effect on reduction of back lower dose and WHR of 30-40 years females with over weight ($P \leq 0/0001$). Also, there was significant difference between a course of selected regulatory exercises with and without diet on reduction of WHR in 30-40 years old females ($P \leq 0/0001$). In contrast, there was no significant difference between effect of a course of selected regulatory exercises with and without food diet on reduction of back lower dose in 30-40 years old females with over weight ($P \geq 0/0001$).

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Table: 1. The mean and standard deviation of weight and tall of experimental and control groups

Variables	Regulatory exercises group	Regulatory exercises with diet group	Control group
Age (year)	37.20 ± 2.61	36.76 ± 2.47	36.98 ± 3.002
Weight (kg)	92.66 ± 6.25	92.99 ± 6.24	93.84 ± 6.15
Tall (cm)	163.1 ± 5.49	162.17 ± 5.34	161.1 ± 4.88

Table 2. Normal sample distribution test (Kolmogorov-Smirnov)

Back lower dose		WHR		Kolmogrov-Smirnov	
Sig.	Z	Sig.	Z		
0.999	0.384	0.98	0.45	Pretest	First experimental group
0.944	0.527	0.403	0.893	Posttest	
0.826	0.628	0.433	0.417	Pretest	Second experimental group
0.663	0.729	0.992	0.433	Posttest	
0.826	0.628	0.999	0.384	Pretest	Control group
0.663	0.729	0.944	0.527	Posttest	





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Table 3. Leven test to calculate congruity between variances

Sig.	F	Leven Test	
0/31	1/07	Pretest	WHR
0/54	0/395	Posttest	
0/054	4/24	Pretest	Back lower dose
0/084	3/34	Posttest	

Table 4. Comparison of WHR changes in experimental groups and control group

Sig.	t	Change (%)	posttest	pretest	WHR
0.0001	9.81	- 33.8	0.528 ± 0.122	0.798 ± 0.128	Regulatory exercises with food diet
0.0001	6.24	- 11.01	0.679 ± 0.109	0.763 ± 0.117	Regulatory exercises
0.087	-1.88	+ 1.63	0.746 ± 0.037	0.734 ± 0.298	Control group

Table 5. Studying the effect of a cycle of regulatory exercises with and without diet on WHR reduction

Sig. level	F value	Squares median	Squares sum	WHR
0.0001	62.59	0.243	0.486	Intra-group
		0.004	0.128	Intergroup
		-----	0.614	Total

Table 6. Determining median difference of WHR using Tookie test

Control group	Regulatory exercises	WHR
* 0.28 ** 0.0001	* 0.183 ** 0.0001	Regulatory exercises with food diet
median difference * Sig. level **	* 0.097 ** 0.002	Control group

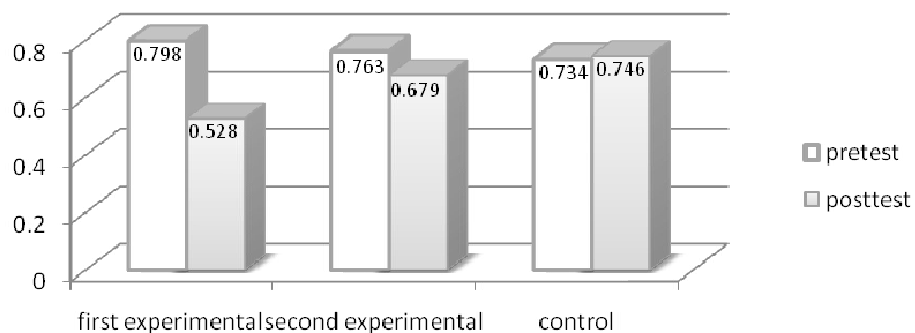


Chart 1.: comparing pretest and posttest of WHR in 3 studied groups





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Table 7. Comparing back lower dose changes in experimental groups and control group

Sig.	T	(%) changesc	Post test	pretest	Back lower dose
0.0001	6.95	- 9.79	46.463 ± 2.2	51.506 ± 3.36	Regulatory exercises with diet
0.0001	8.63	- 9.99	48.11 ± 4.24	53.45 ± 4.98	Regulatory exercises
0.28	1.13	-0.021	56.32 ± 1.04	56.44 ± 1.14	Control group

Table 8. Studying the effects of a cycle of selected regulatory exercises with and without food diet on back lower dose reduction

Sig. level	F value	Squares median	Squares sum	Back lower dose
0.0001	27.96	103.09	206.19	Intra-group
		3.69	121.65	Intergroup
		-----	327.85	Total

Table 9. Determining the difference of back lower dose using Tookie test

Control group	Regulatory exercises	Back lower dose
* 4.92 ** 0.0001	* -0.303 ** 0.92	Regulatory exercises with food diet
standard deviation * significance level **	* 5.22 ** 0.0001	Control group

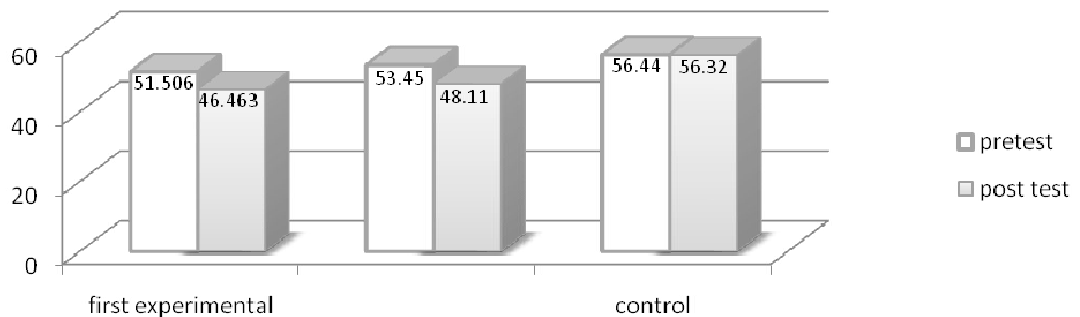


Chart 2.: comparison of pretest and posttest changes of back lower dose in 3 studied groups





RESEARCH ARTICLE

Studies on Application of Organic Based Nutrients to Three Types of Soils in Different Seasons on Growth and Yield Attributes of Mulberry

Anjinappa Umesh¹ and Bheemanna Sannappa^{2*}

¹Ph.D. Scholar, Department of Studies in Sericulture Science, University of Mysore, Mysuru – 570 006, India.

²Assistant Professor, Department of Studies in Sericulture Science, University of Mysore, Mysuru-570 006, India.

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*Address for correspondence

Bheemanna Sannappa
Assistant Professor
Department of Studies in Sericulture Science
University of Mysore
Mysuru-570 006, India.
Phone: 0821-2419408, Cell: +91-9448614385
E-mail: drbsannappa@gmail.com



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ABSTRACT

Field trials were conducted to study the efficacy of organic based nutrients on growth and yield attributes in five year-old established irrigated mulberry garden (V-1) in three types of soils (sandy clay loam, clay and red loamy) of Challakere, Hiriyur and Molakalmur taluks, Chitradurga district of Karnataka state, respectively during monsoon, winter and summer seasons of 2013-14 and 2014-15 (two years) in order to supply the nitrogen requirement (100%) for mulberry. The growth and yield attributes of mulberry were statistically analyzed at $p \leq 0.05$ and $p \leq 0.01$. The results of the current study revealed that, growth (plant height, number of shoots / plant, number of leaves / plant, leaf area and leaf area index) and yield parameters of mulberry were significantly superior with the plots that were supplied with vermicompost (Equivalent to 50 % of Rec. FYM) + FYM (50% of Rec. FYM) + N-biofertilizer + P-biofertilizer + 200N + 110P + 140 K kg/ha/yr, followed by sheep manure (Equivalent to 50% of Rec. FYM) + FYM (50 % of Rec. FYM) + N-biofertilizer + P-biofertilizer + 200N + 110P + 140 K kg/ha/yr in red loamy soil during monsoon season. These parameters were significantly inferior in control (Rec. FYM (20MT/ha/yr) + 350N + 140P + 140K kg/ha/yr in clay soil during summer season.

Key words: Mulberry, organic based nutrients, seasons, soil types, growth and yield attributes.



**Anjinappa Umesha and Bheemanna Sannappa****INTRODUCTION**

Mulberry (*Morus alba* L.) is a deep rooted, perennial and high biomass producing plant serves as a sole source of food for the growth and development of silkworm, *Bombyx mori* L. and return the silk production. Silkworm being monophagous insect derives almost all the nutrients essential for its growth from the mulberry leaf. Hence, silkworms should be fed with quality mulberry leaves in abundant quantity for harvesting superior quality cocoons. It was estimated that, mulberry leaf contributes to an extent of 38.20 per cent for successful cocoon crop production (Miyashita, 1986). Growth, yield and quality of mulberry depend on the soil type, variety, plant nutrient, agronomical practice and agro-climatic condition, which reflects on the quality of silk production. Mulberry leaf productivity is highly dependent on plant nutrients like nitrogen, phosphorus and potassium and is known to respond well to the addition of organic manures. Hence, native soil fertility alone cannot be relied upon for the production of quantity and quality of mulberry leaf, unless the soil is replenished with external sources through manures and fertilizers. The organic production system aims at largely to utilize the available biomass of the farm to enrich soil fertility, to supply balanced nutrients to the plants and also to reduce the cost of production as well as the environmental pollution (Naika *et al.*, 2002). According to Sujathamma *et al.* (2014), the quantity of organic manures and inorganic fertilizers for mulberry is quite high as compared to agricultural crops. Excessive use of chemical fertilizers in mulberry cultivation cause deleterious effects on the survivability of soil flora and fauna besides soil health. In mulberry, organic carbon (> 0.75%) and soil moisture (~70%) have tremendous influence on leaf yield and quality. In addition to major nutrients, mulberry requires various micronutrients and this can be achieved only by the application of organic manures.

Application of organic manures to the soil either in the form of organic or inorganic inputs are known to supply nutrients to the plants, release the nutrients slowly and limit the loss of plant nutrients by leaching and volatilization under adverse soil conditions (alkaline or acidic). Organic manures release plant nutrients slowly and adding these manures to cultivated soils improves the level of soil organic matter, increase the ability of soil to supply nutrients to plant with improved soil structure and nutrient availability (Reddy and Reddi, 2010). In contrast to the organic manures, continuous use of chemical fertilizers affect soil health in addition to environmental pollution, impair the balanced availability of different plant nutrients which results in wide spread deficiencies including those of micronutrients (Krishna and Bongale, 2001). Further, the chemical fertilizers are becoming costlier day by day due to escalating costs and scarce availability of commodities. The highly intensive mulberry cropping system causes depletion of nutrients in soil and excess usage of inorganic fertilizers and pesticides cause deleterious effect on soil health (Shashidhar *et al.*, 2009). Hence, it is imperative to integrate various sources of plant nutrients through application of organic manures, chemical and bio-fertilizers in optimum quantity to enhance the qualitative and quantitative characters of mulberry.

MATERIALS AND METHODS**Study area**

Field experiments were conducted in three farmers' fields of Challakere, Hiriyur and Molakalmur taluks of Chitradurga district, Karnataka, consisting three types of soils *viz.*, sandy clay loam, clay and red loamy, respectively during the years 2013-14 and 2014-15 for three seasons *viz.*, monsoon, winter and summer in order to record the growth and yield parameters of mulberry raised through the application of organic based nutrients (FYM, compost, vermicompost, sheep manure and biofertilizers) in established irrigated mulberry (V₁) with a spacing of (150 + 90 cm) x 60 cm. The experimental plots were situated in the Central Dry Zone (Zone-IV) of Karnataka and lies between 13° 34' to 15° 02' North latitude and 75° 37' to 77° 01' East longitude and having temperature of 37°C (Max.) and 15°C (Min.). The experiments were laid out in Randomized Block Design consisting of eight treatments with three replications. Treatments were imposed to irrigated mulberry garden based on the recommended FYM @ 20





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MT/ha/yr. However, compost, vermicompost and sheep manures were applied based on the recommended quantity of FYM (MT/ha/yr). The N biofertilizers (*Azospirillum brasilense*) (@ 23 kg/ha/yr) and P biofertilizer (*Aspergillus awamori*) (@ 5 kg/ha/yr) and chemical fertilizers (NPK) were applied in kg/ha/yr. The cultivation practices were followed as per the recommended package developed for mulberry cultivation under irrigated condition (Dandin and Giridhar, 2010).

Treatments

T ₀	Recommended FYM (20MT/ha/yr)+350 N+140 P+140 K kg/ha/yr (Control)
T ₁	Rec. FYM+N-biofertilizer+P-biofertilizer+200 N+110 P+140 K
T ₂	Compost (Equivalent to 50 % of Rec. FYM+FYM (50% of Rec. FYM) + 350N+140P+140K
T ₃	Vermicompost (Equivalent to 50 % of Rec. FYM) + FYM (50 % of Rec. FYM) + 350 N+140 P+140 K
T ₄	Sheep manure (Equivalent to 50 % of Rec. FYM) + FYM (50 % of Rec. FYM) +350 N +140 P+140 K
T ₅	Compost (Equivalent to 50 % of Rec. FYM)+FYM(50% of Rec. FYM)+N-biofertilizer+P-biofertilizer +200 N+110 P+140 K
T ₆	Vermicompost (Equivalent to 50 % of Rec. FYM) +FYM (50 % of Rec. FYM) +N-biofertilizer+P-biofertilizer+200 N+110 P+140 K
T ₇	Sheep manure (Equivalent to 50% of Rec. FYM) +FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200 N+110 P+140 K.

Observations recorded

The following observations on growth and yield parameters of mulberry were recorded at 60th days after pruning.

Plant height (cm): Plant height was measured from the base of the plant to the tip of the fully opened leaf of all the shoots of five labeled plants and mean plant height was calculated using the following formula:

Plant height (cm) =	Total plant height (cm)
	Number of plants

Number of shoots/plant: Number of shoots per plant was recorded from the five labeled plants and mean number of shoots per plant was calculated using the formula:

Number of shoots/plant =	Total number of shoots
	Number of plants

Number of leaves/plant: Number of leaves was counted from the five labeled plants and mean number of leaves per plant was calculated using the following formula:

Number of leaves/plant =	Total number of leaves
	Number of plants

Leaf area (LA)/plant (cm²): Leaf area of third fully opened leaf from top was determined using the following formula:

Leaf area = Length x Breadth x Correction factor (0.6898)

Leaf area was multiplied with number of leaves per plant and leaf area/plant was computed.

Leaf area index (LAI): LAI is the ratio between leaf area to plant spacing and was calculated by using the following formula:





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Leaf area index (LAI) =	Leaf area (cm ²)	
	Plant spacing (cm ²)	

Leaf yield (kg/ha/crop): The leaves were harvested from five randomly selected plants and the average fresh leaf weight (kg)/plant was recorded. Further, the leaf yield (kg/ha/crop) was calculated based on the leaf yield/plant. Leaf yield (kg/ha/crop) = Total number of plants x Average leaf yield/plant (kg). The data was analyzed statistically for test of significance using Fisher's method of "Analysis of Variance" and the level of significance for 'F-test' was tested at $p=0.05$ and $p=0.01$ as per the procedure outlined by Cochran and Cox (2000).

RESULTS AND DISCUSSION

Results on the growth and yield parameters of mulberry raised through the application of organic based nutrients in three locations of Chitradurga district of Karnataka state, consisting of three types of soils in three different seasons for the two consecutive years 2013-14 and 2014-15 are tabulated in Tables 1 to 6 (pooled data) and are interpreted in the light of earlier works in the following paragraphs.

Plant height (cm): Plant height is one of the important growth parameter greatly contribute towards leaf yield of mulberry as it is mainly cultivated for leaf production for feeding the larvae of *Bombyx mori*. It is evident from Table 1 that, application of organic manures along with biofertilizers and reduced dose of inorganic fertilizers to the soil exhibited varied results with respect to plant height of mulberry. Pooled data of two years showed that the application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₆) to mulberry under irrigated condition recorded significantly ($p\leq 0.01$) higher plant height. Among three types of soils, red loamy (Molakalmur) and among three seasons, monsoon registered significantly ($p\leq 0.01$) more plant height. The interactions of treatments x locations and locations x seasons showed significant ($p\leq 0.01$) results for plant height, while treatments x seasons and treatments x locations x seasons did not show significant influence on plant height. Further, application of sheep manure (Equivalent to 50% of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₇) found next best with respect to plant height. However, plant height was significantly lower in control (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) with clay soil (Hiriyur) during summer season. The current findings are similar to the work of Janardhan (2006), who reported that the recommended dose of FYM along with chemical fertilizers produced the highest plant height compared to control. Similarly, Singh *et al.* (2012) opined that significantly higher plant height was found when mulberry plots that are received NPK @ 75:50:50 kg + vermicompost (@10 MT/ha/yr) + *Azotobacter* biofertilizer (@ 10 kg/ha/yr). Sujathamma *et al.* (2014) recorded increased shoot length significantly with the application of 50% RDF + Aishwarya granules + Biophos granules + Biopotash granules at 2 or 3 days after pruning. Application of poultry manure with recommended dose of inorganic fertilizers (NPK) to rainfed mulberry registered significantly maximum plant height (Chakraborty *et al.*, 2014). Further, Chakraborty and Kundu (2015) also reported that the application of poultry manure along with *Azotobacter* biofertilizer with reduced dose of inorganic fertilizers (NPK) for rainfed mulberry significantly more plant height.

Number of shoots/plant: It indicates the number of tillers or branches derived from a single plant and contribute greatly to the leaf yield. Average data of two years showed that statistically ($p\leq 0.01$) more number of shoots/plant was recorded with the application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₆) followed by application of sheep manure (Equivalent to 50% of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K(T₇) to mulberry under irrigated condition in red loamy soil during monsoon season. Among the interactions, treatments x locations and locations x seasons, exerted significant ($p\leq 0.01$) influence on number of shoots/plant. However, treatments x seasons and treatments x locations x seasons had seldom effect on number of shoots/plant. Number of shoots/plant were less in





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control (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) among organic based nutrients in clay soil during summer season. The observations are in close conformity with the findings of Shivakumar *et al.* (1999) who reported that the combined application of organic manures and inorganic fertilizers has increased the number of shoots/plant as compared to control. Similarly, Singh *et al.* (2012) who observed that the application of inorganic fertilizers - NPK (@ 75:50:50 kg/ha/yr) along with vermicompost (@10 MT/ha/yr) and *Azotobacter* biofertilizer (@ 10 kg/ha/yr) increased the number of shoots/plant. The current findings are similar to the results of Chakraborty *et al.* (2014), who opined that the application of poultry manure along with recommended dose of inorganic fertilizers (NPK) to mulberry under rainfed condition recorded statistically more number of shoots/plant. Further, Chakraborty and Kundu (2015) also reported that the application of poultry manure along with *Azotobacter* biofertilizer with reduced dose of inorganic fertilizers (NPK) for rainfed mulberry exhibited better results with respect to number of shoots/plant.

Number of leaves/plant: As mulberry is mainly grown for leaf purpose for feeding the silkworm and furthermore number of leaves/plant greatly determines the quantum of leaf production per unit area. Application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₆) to red loamy soil in monsoon season to irrigated mulberry recorded statistically ($p \leq 0.01$) more number of leaves/plant. In contrary to plant height and number of shoots/plant, interestingly the combined influence of treatments x locations, treatments x seasons and locations x seasons exerted significant ($p \leq 0.01$) results for number of leaves/plant. However, treatments x locations x seasons did not differ considerably for the said parameter. Number of leaves/plant was significantly less in control (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) in clay soil during summer season. These observations are similar to the work of Rashmi *et al.* (2009), who reported that the number of leaves/plant was maximum with combined application of biofertilizers + organic manures (compost, vermicompost, green manure and castor cake) + chemical fertilizers to M₅ mulberry. Similarly, Rajaram *et al.* (2013) also observed that the application of organic manures (FYM) and inorganic fertilizers (NPK) had increased the number of leaves/plant as compared to control. Chakraborty and Kundu (2015) also reported that the application of poultry manure along with *Azotobacter* biofertilizer with reduced dose of inorganic fertilizer (NPK) for rainfed mulberry recorded significantly more number of leaves/plant.

Leaf area /plant (cm²): Leaf area is important for photosynthesis and its estimation indicates both assimilating area and growth. For crop production, leaf area per unit land area is more important than leaf area of individual plants. Application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₆) to irrigated mulberry in red loamy soil in monsoon season recorded statistically ($p \leq 0.01$) maximum leaf area/plant followed by application of sheep manure (Equivalent to 50% of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₇). Among the interactions, treatments x locations, treatments x seasons and locations x seasons also found significant ($p \leq 0.01$) for leaf area/plant, while treatments x locations x seasons did not differ significantly. The leaf area/plant was significantly ($p \leq 0.01$) less in control (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) in clay soil during summer season. The current observations are similar to the findings of Reddy *et al.* (2012), who reported that the leaf area/plant was more with the application of RDF + *Azotobacter* biofertilizer + VAM + *in-situ* green manuring to V-1 mulberry. Similarly, Chakraborty *et al.* (2014) also observed that the application of poultry manure along with recommended dose of inorganic fertilizers (NPK) to mulberry under rainfed condition noticed statistically more leaf area/plant. Further, Chakraborty and Kundu (2015) too noticed more leaf area/plant with the application of poultry manure along with *Azotobacter* biofertilizer with reduced dose of inorganic fertilizers (NPK) for mulberry.

Leaf area index: Leaf area index indicates the extent of leaf area or lamina per unit area (plant spacing). Application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₆) followed by application of sheep manure (Equivalent to 50% of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T₇) to irrigated mulberry recorded statistically ($p \leq 0.01$) more leaf area index in red loamy soil during monsoon season. Further, treatments x locations, treatments x seasons and locations x seasons also registered significant observations for leaf area index. However, treatments x





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locations x seasons did not show significant results. Notably, leaf area index was least when mulberry raised in control treatment (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) (T_0) in clay soil during summer season. Increased leaf area index in mulberry in organic based nutrients in red loamy soil during monsoon season might possibly due to supply of more nutrients to the plant as evidenced in the leaf area parameter.

Leaf yield (kg/ha/crop): It is the final indicator of the produce which determines the quantum of leaf production and greatly contributed by the growth attributes. Pooled data of two years indicated that the application of vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K (T_6) followed by application of sheep manure (Equivalent to 50% of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K(T_7) to mulberry under irrigated condition registered significantly ($p \leq 0.01$) maximum leaf yield in red loamy soil during monsoon season. Among the four interactions, treatments x locations, treatments x seasons and locations x seasons found significant, while, treatments x locations x seasons did not show significant results for leaf yield. Leaf yield was considerably minimum in control (Rec. FYM (20 MT/ha/yr)+350N+140P+140K kg/ha/yr) (T_0) in clay soil during summer season. The current study indicated that the combined use of organic manures and biofertilizers by curtailing chemical fertilizers increased leaf yield of mulberry. The current findings are similar to the work of Janardhan *et al.* (2006), who reported that the recommended dose of FYM and chemical fertilizers produced higher leaf yield. Similarly, Narayanaswamy *et al.* (2006) reported that, the application of different kinds of organic manures in combination with inorganic fertilizers recorded significantly higher leaf yield as compared to NPK fertilizers alone in S_{36} mulberry. Similarly, Rashmi *et al.* (2009) observed that significantly maximum leaf yield was found with combined application of biofertilizers along with organic manures (compost, vermicompost, green manure and castor cake) and chemical fertilizers to M_5 mulberry. As per Shashidhar *et al.* (2009), significantly higher leaf yield was registered when S_{36} mulberry raised with combined application of organic manures, biofertilizers, green manures and chemical fertilizers. Similarly, Rao *et al.* (2011), who reported that the maximum leaf yield was found with the application of chemical fertilizers along with FYM, green manure and seri-compost to mulberry. Significant leaf yield was observed with the application of RDF along with *Azotobacter* biofertilizer, VAM and *in-situ* green manuring to V-1 mulberry (Reddy *et al.*, 2012), Further, Sangeetha *et al.* (2012), who observed that the application of silkworm litter-pupal waste (SLPW) compost along with vermicompost recorded significantly higher leaf yield followed by vermicompost alone. Singh *et al.* (2012) also reported that the significantly more leaf yield was in the plot that received NPK (@ 75:50:50 kg), vermicompost (@10 MT/ha/yr) and *Azotobacter* biofertilizer (@ 10 kg/ha/yr). Sori and Bhaskar (2013) reported that, application of inorganic fertilizers (NP) at 25% to mulberry under rainfed conditions can be reduced without affecting mulberry fresh leaf yield and quality variables by supplementing mulberry garden with integrated use of inorganic fertilizers, FYM and bio-inoculants. Similarly, Chakraborty *et al.* (2014) opined that the application of poultry manure with recommended dose of inorganic fertilizer (NPK) for rainfed condition of mulberry significantly higher leaf yield. According to Sujathamma *et al.* (2014), significantly increased leaf yield of mulberry was recorded with the application of 50% RDF + Aishwarya granules + Biophos granules + Biopotash granules at 2 or 3 days after pruning. Chakraborty and Kundu (2015) also reported that the application of poultry manure along with *Azotobacter* biofertilizer with reduced dose of inorganic fertilizers (NPK) for rainfed mulberry significantly increased leaf yield.

CONCLUSION

In the present investigation, organic manures, inorganic fertilizers and bio-fertilizers in different combinations at recommended quantity were applied to V_1 mulberry variety under irrigated condition to three types of soils in three seasons. The better growth and yield of mulberry was obtained with the plots that are supplied with vermicompost (Equivalent to 50 % of Rec. FYM)+FYM (50 % of Rec. FYM)+N-biofertilizer+P-biofertilizer+200N+110P+140K to red loamy soil in monsoon season.





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Table 1: Plant height (cm) of mulberry as influenced by organic based nutrients in three types of soils among different seasons

T	L	S	TxL			TxS			LxS			TxLxS															
			L1	L2	L3	S1	S2	S3	S1	S2	S3	L1			L2			L3									
T0	96.95	L1	113.8	S1	125.8	T0	98.18	90.44	102.2	T0	107.4	96.86	86.64	L1	124.6	114.4	102.3	T0	109.9	98.54	86.11	97.95	90.75	82.62	114.2	101.3	91.20
T1	104.4	L2	108.4	S2	114.6	T1	104.7	98.85	109.7	T1	115.7	104.8	92.78	L2	117.7	107.9	99.49	T1	116.3	105.4	92.50	108.5	99.09	88.93	122.4	109.9	96.92
T2	110.3	L3	122.3	S3	103.9	T2	108.6	106.9	115.4	T2	122.0	109.7	99.32	L3	135.2	122.2	109.8	T2	119.7	108.5	98.00	117.1	105.7	97.69	129.1	114.8	102.3
T3	117.0					T3	116.0	114.8	120.2	T3	128.1	116.6	106.3					T3	126.2	116.3	105.4	124.3	113.8	106.2	133.5	119.7	107.4
T4	115.4					T4	112.4	103.2	130.5	T4	126.4	115.2	104.5					T4	122.7	112.5	102.2	115.0	102.6	99.65	148.6	130.4	117.6
T5	118.7					T5	119.8	111.3	125.0	T5	130.0	118.4	107.5					T5	130.5	120.6	108.5	121.2	110.1	102.6	138.4	124.8	111.7
T6	130.2					T6	127.6	122.6	140.6	T6	140.9	130.8	119.0					T6	138.4	129.4	115.0	131.6	122.4	113.8	152.7	140.6	128.1
T7	125.7					T7	122.8	118.8	135.4	T7	136.2	126.0	114.8					T7	133.3	124.0	111.4	128.0	118.1	110.4	147.3	135.9	123.2
F-value	25.63**	29.11**	3718**				62.80**			1.189 ^{ns}					42.03**									0.784 ^{ns}			

T: Treatments (T0 to T7) L = Locations L1 = Challakere (Sandy clay loam soil) L2 = Hiriyur (Clay soil) L3 = Molakalmur (Red loamy soil)
 S : Seasons S1 = Monsoon S2 = Winter S3 = Summer **: Highly significant (p = 0.01) NS = Non-significant

Table 2: Number of shoots/plant in mulberry as influenced by organic based nutrients in three types of soils among different seasons

T	L	S	TxL			TxS			LxS			TxLxS															
			L1	L2	L3	S1	S2	S3	S1	S2	S3	L1			L2			L3									
T0	11.91	L1	13.58	S1	13.67	T0	12.37	10.62	12.74	T0	12.24	12.14	11.35	L1	14.00	13.59	13.14	T0	12.71	12.36	12.05	10.98	10.88	9.899	13.02	13.09	12.11
T1	12.73	L2	12.10	S2	13.45	T1	13.12	11.41	13.67	T1	13.20	12.91	12.09	L2	12.69	12.26	11.35	T1	13.59	13.05	12.70	12.00	11.62	10.61	14.02	14.05	12.95
T2	13.02	L3	14.07	S3	12.62	T2	13.19	12.05	13.82	T2	13.55	13.12	12.39	L3	14.33	14.51	13.38	T2	13.77	13.12	12.60	12.83	12.18	11.29	14.21	14.07	13.18
T3	13.46					T3	13.77	12.69	13.97	T3	13.85	13.66	12.82					T3	14.23	13.79	13.29	13.30	12.75	11.84	14.12	14.44	13.34
T4	13.50					T4	13.68	11.74	14.50	T4	13.68	13.55	12.69					T4	14.01	13.73	13.50	12.39	11.90	11.02	14.75	15.00	13.75
T5	13.47					T5	13.86	12.29	14.24	T5	13.95	13.66	12.79					T5	14.40	13.86	13.34	12.92	12.40	11.56	14.52	14.75	13.47
T6	14.17					T6	14.39	13.15	14.95	T6	14.34	14.38	13.56					T6	14.77	14.39	14.02	13.77	13.25	12.43	15.12	15.52	14.23
T7	13.94					T7	14.23	12.90	14.69	T7	14.33	14.18	13.31					T7	14.54	14.35	13.77	13.58	12.95	12.18	14.88	15.21	13.97
F-value	29.29**	1663**	628.2**				15.70**			1.200 ^{ns}					42.91**									0.102 ^{ns}			

T: Treatments (T0 to T7) L = Locations L1 = Challakere (Sandy clay loam soil) L2 = Hiriyur (Clay soil) L3 = Molakalmur (Red loamy soil)
 S : Seasons S1 = Monsoon S2 = Winter S3 = Summer **: Highly significant (p = 0.01) NS = Non-significant





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Table 6: Leaf yield (kg/ha/crop) of mulberry as influenced by organic based nutrients in three types of soils among different seasons

	T	L	S	TxL			TxS			LxS			TxLxS														
				L1	L2	L3	S1	S2	S3	S1	S2	S3	L1			L2			L3								
T0	9158	L1	10577	S1	11124	T0	9024	8802	9647	T0	10092	8741	8639	L1	11657	10301	9771	T0	10098	8336	8488	9979	8322	8105	10199	9366	9875
T1	10205	L2	9870	S2	10208	T1	10407	9460	10776	T1	11262	9746	9606	L2	10809	9451	9549	T1	11651	10061	9510	10654	9546	8790	11480	10531	10218
T2	10514	L3	11046	S3	9960	T2	10809	9944	10889	T2	11381	10180	9981	L3	11505	10873	10760	T2	11752	10373	9701	10850	9998	9484	11541	10688	10758
T3	10732					T3	10842	10235	11125	T3	11502	10483	10218					T3	11808	10616	10006	11020	9989	9791	11583	10938	10857
T4	10593					T4	10702	9897	11578	T4	11425	10355	10017					T4	11827	10479	9900	10763	9161	9185	11686	11565	11085
T5	10775					T5	10926	10130	11270	T5	11208	10559	10259					T5	11965	10692	10122	10951	9772	9688	11627	11214	10969
T6	11063					T6	11103	10416	11676	T6	11782	10882	10531					T6	12056	10902	10350	11192	10128	9926	12098	11615	11315
T7	10933					T7	11000	10302	11505	T7	11637	10740	10429					T7	12007	10751	10241	11078	9986	9841	11826	11484	11204
F ¹ Value	31.50**	110.6**	311.2**	3.851**			3.128**			38.2**			0.224**														

T: Treatments (T0 to T7) L = Locations L1 = Challakere (Sandy clay soil) L2 = Hiriyur (Clay soil) L3 = Molakalmur (Red loamy soil)
 S : Seasons S1 = Monsoon S2 = Winter S3 = Summer **: Highly Significant (p = 0.01) NS = Non-significant





RESEARCH ARTICLE

From Intertextuality to Mise-en-abyme: John Hollander's "Science and Human Behavior"

Mehrdad Moazami Goudarzi*

Department of English Language and Literature, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Mehrdad Moazami Goudarzi
Department of English Language and Literature,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran.
Email: Milfendereski212@gmail.com



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ABSTRACT

The paper examines the relationship between the concepts of intertextuality and especially its subcategory, *mise-en-abyme* and John Hollander's "Science and Human Behavior" and the way by which the meaning is transformed through the references derived from other literary texts especially those of ancient Greek and Shakespearian drama. According to Andre Gide and Lucien Dällenbach, *mise-en-abyme*—containing the relationship between the worlds' of two texts through iconic doublings existing in both texts as the rings of a chain trying to link and connect two texts to each other both in terms of their form and content—is a post-modern literary term that focuses on finding intertexts or traces in other texts. Hollander is one of the modern poets whose poems own a considerable amounts of these intertexts or clues taken from ancient Greek and Shakespearian drama. He was under the influence of the mentioned ones and this influence led him to write "Science and Human Behavior" in a way that three witch characters are as the same in Shakespeare's *Macbeth*. When one reads this poem, it seems that he/she is involved in a series of clues or signs that are taken from ancient Greek and Shakespeare's *Macbeth*, consequently the poem have *mise-en-abyme* within itself.

KEYWORDS: Intertextuality, Mise-en-abyme, Ancient Greek, Shakespearian Drama, Chain of Clues.





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INTRODUCTION

From the time that Julia Kristeva in 1967 came about to originate and formulate the literary term “intertextualite,” a snowballing amount of researches focused on it in order to broadcast an innovative and novel ideal regarding criticism and on the whole literature. Critics that are the followers of intertextuality repeatedly contact such schools of the new-born criticism as post-structuralism in France and deconstruction in America, but also along with an extensive scope of intellectuals captivated by the new-fangled term and the countless hermeneutic potentials it appears to promise. Fairly evident, the notion of intertextuality has faced numerous dissimilar, if not opposing, clarifications, understandings and interpretations. To some extent, it signifies the critical equivalent of postmodernism, or indicating the eternal essential of any art, or marking the textual procedure, or limited to convinced and accurately defined characteristics of a text. Approximately, after at least fifteen years after the coinage of the term by Kristeva in 1967, it started its path going to be flourished and globalized. As an outstanding difference and a protest toward the traditional and fixed socio-cultural values, used frequently by the forerunners, it nowadays aids old-fashioned literary canons and scholars to display their assumed aspect of modernism. The notion of intertextuality, regarding its difference in the interpretation; therefore, has many subcategories amongst which *mise-en-abyme* (taken from French) is considered in this essay. Similar to its umbrella term, intertextuality, it paves the way of interconnectedness between the texts in a more detailed and minute way that the reader would be able to find mirrors in the text reflecting other texts. The terms was coined by the French novelist and critic, the winner of Nobel Prize, Andre Gide (1869-1951), and later expanded by other critics such as Anne Jefferson and Lucian Dällenbach in order to give a vaster view to the readers while reading a text. Susan Hayward state that “mise-en-abîme is a play of signifiers within a text, of sub-texts mirroring each other” (230). By play of signifier and signify, one means that a text might be a kind of reflection or, better to say, a mirror like reflection of other texts, all collected, unified and harmonized in one unique structure aesthetically. This mirror reflection might create some ambiguities, but these ambiguities are considered as techniques used by the authors in order to create beauty of the text.

Hayward also states that “[t]his mirroring can get to the point where meaning can be rendered unstable and in this respect can be seen as part of the process of *deconstruction*” (231). By deconstruction, she mean substitution of signified with signifier which is the substitution of meaning and content in a literary work with those of the other or others. As well as cinema, *mise-en-abyme* has its representation in the field of poetry and especially pattern poetry. John Hollander’s vast reading of ancient and modern sources and literary canons influenced him to create pieces of poems that are in connection with other literary works. It seems that his works are quotations taken from other great literary works and have their roots in other literary careers, i.e. they are weather reflection of others or reflected on other literary works. An important fact about this kind of Hollanderian *mise-en-abyme* is that this reflection occurs both in meaning and shape which is a special and particular characteristics of Hollander’s poetry distinguishing, separating and overvaluing his poetry from his contemporaries and previous poets such as E. E. Cummings, John Ashbery, A. R. Ammons, D. H. Lawrence, Louis MacNeice, Décio Pignatari, George Herbert, Geoffrey Hill, Paul Siegell, Lewis Carroll and so many other alike. Therefore, the present paper aims at studying Hollander’s “Science and Human Behavior” through the lenses of intertextuality and its subcategory *mise-en-abyme*

MATERIALS AND METHODS

As a unique and well-established sub-category of intertextuality, *Mise-en-abyme* (also written *mise en abîme*) is a phrase taken from French which literally denotes placed or settled into abyss. By the emergence of the phrase in literature as well as other fields of arts such as cinema, drama, etc., it advances a huge bunch of specific wits in the canon of modern criticism since the time it was coined by the French novelist and critic André Gide. Regarding the definition of *mise-en-abyme*, Brian McHale, in *Postmodernist Fiction* (1987), states that “*Mise-en-abyme* is one of the most potent devices in the postmodernist repertoire for foregrounding the ontological dimension of recursive structures. Since then, the concept has undergone a process of development and sophistication in French poetics” (124).





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No one can undoubtedly recall the notion of *Mise-en-abyme* as a term which is private to postmodernist scripts and writing however, on the other side, it might be brought into being in all eras and ages, in all literary genres, styles, moods, manners, and modes. Nonetheless, the clarifying point should focus on the question that why postmodernist script has subjugated, established and progressed it so comprehensively which refers to the fact that "*mise-en-abyme* is another form of short-circuit, another disruption of the logic of narrative hierarchy, every bit as disquieting as a character stepping across the ontological threshold to a different narrative level" (McHale 125). Thus, every influencing part in this notion should be constructing pieces of a well-established hierarchy. Heraldry referring to the study of family lineage and coats of arms has a sort of inquisitive dialect and language in which "the *abyme* or *fess-point* is the exact centre of an escutcheon [and] to place something *en abyme* simply means to depict it in the middle of the shield" (Whatling 1). Here the *abyme* means a central and key point which must exist in all members of a family from long years ago until the time that the family exists in future and they are supposed to be linked to each other by such an emblem and sign which acts as a mirror reflecting other previous members to the present and future ones with "the meaning of the bearings on the main shield" (ibid). Going to literature, the term *mise-en-abyme* is used by André Gide, a smart scholar of heraldry studies, in order to designate a system of self-reflexive embedding discovered and originated in several forms of arts. For instance, Gide clarified in his journal:

In a work of art I rather like to find transposed, on the scale of the characters, the very subject of that work. Thus in paintings by Memling or Quentin Metzys, a small dark convex mirror reflects the interior of the room in which the action of the painting takes place. Likewise in Velázquez's painting of the *Meniñas*, [...] in the play scene in *Hamlet*, and in many other plays. None of these is altogether exact. What would explain better what I would want to do in my *Cahiers*, in *Narcisse* and in *La Tentative*, would be a comparison with the device from heraldry that involves putting a second representation of the original shield '*en abyme*' within it. (31)

From André Gide's view, the use of *mise-en-abyme* in literature should be the same as what he learned from the science of heraldry which refers to connecting or placing a second depiction or representation of the original or primary shield called '*en abyme*' inside it. Going to painting and the study of shapes and comparing these two with literature, the visual and pictorial elements are more tangible when one is to analyze the notion of *mise-en-abyme*. Thus, when there is a combination of painting, shapes, and literature; the study, comprehension and discovery of *mise-en-abyme* become more deliberate and thoughtful. As a self-reflexive phenomenon, *mise-en-abyme* is the combination of "reflections in the mirror" and as "a reflection of what is outside the picture" aiming at contextualising and placing an idea or activity within an appropriate context and then clarifying what exists within it (Whatling 2). This refers to the function of being *meta-narrative* alluding the methods in which the use of the term shares in bringing about the observer's reception of the narrative context within which it happens.

On the other hand, Dällenbach in *The Mirror in the Text* states that "[t]he term became especially common in discussions of *avant-garde* novels, both those known as the *nouveau roman* in the 1950s and the *nouveau nouveau roman* in the 1970s" (163). Dällenbach in another work named *Mirror*, delineates *mise-en-abyme* as "any internal mirror that reflects the whole of the narrative by simple, repeated, or 'specious' (paradoxical) duplication" (52). Therefore, the concept of internal mirror which focuses on the reflection of duplication of the text in narrative has the central role in the definition of *mise-en-abyme*. Consequently, the mirror or the image of the mirror as the basic components leads to develop the trilogy (three types) of *mise-en-abyme*. By internal mirror, "Dällenbach means the duplication of the whole within one of its parts. He argues that the *mise-en-abyme* is interchangeable with the analogy of the mirror" (qtd. in Bosworth 4). Dällenbach derives the notion of the mirror out of visual and pictorial art. In his idea, mirrors are occasionally engaged in portraits and paintings to reveal and show the spectators something which would not be observable on the condition that the mirror were not there. In a similar vein, a *mise-en-abyme* in a literary career might shed thoughtful light on other portions or features of the text which are unseen, invisible, undistinguishable or less apparent without the use of the mirror that is considered as a useful and assisting analogue. As a result, simple, infinite, and paradoxical duplications signify three categories of *mises en abyme* marked in Dällenbach's description.





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The concept of *mise-en-abyme*, therefore is the interconnectedness of two literary worlds with each other in a way that they might find their fundamental roots in each other.

FINDINGS AND DISCUSSION

The Poem, "Science and Human Behavior," written by John Hollander focuses on classical references that are to be considered as intertext clues or *mises* in the realm of intertextuality and its sub-category *mise-en-abyme*. The poem has some connections with classical and Greek drama in which Fate (human destiny), as a very important feature, played an important role and it could be considered as the central concept in the development and narration of drama. In the poem, the references to classical drama are in form of personification and the form of narration in a way that there is the Greek personification of fate represented in the three female characters who interconnect the boundaries of one's existence and "feeling" (line 2) in order to identify the circle of his/her life.

John Hollander's "Science and Human Behavior"

(for B. F. Skinner) (1)

Feeling that it is vaguely undignified
 To win someone else's bet for him by choosing
 The quiet girl in the corner, not refusing
 But simply not preferring the other one; (5)
 Abashed by having it known that we decide
 To save the icing on the chocolate bun
 Until the last, that we prefer to ride
 Next to the window always; more than afraid
 Of knowing that They know what sends us screaming (10)
 Out of the movie; even shocked by the dreaming
 Our friends do about us, we vainly hope
 That certain predictions never can be made,
 That the mind can never spin the Golden Rope
 By which we feel bound, determined, and betrayed; (15) ("SHB" Lines 1-15)

As apparent at the beginning of the poem, a dedication to "B. F. Skinner" (line 1) as a professional at the knowledge and science of human Behavior, therefore, the persona of the narrator of the poem starts the poem mentioning the importance of human Behavior and focuses on a set of meaningful catchphrases in order to demonstrate human's uneasiness with expectable actions and moods. The poem mentions the fact that there is something beyond the power of human which adjusts and has the control over all human's Behaviors, actions, and moods. Hollander refers to some actions including requesting "a girl" to dance (line 4), specific aspect of the physiology of an individual such as eating a "chocolate" (line 7) and or "riding" (line 8), and inquisitiveness of abstracts such as being "afraid" (line 9), "dream" (line 11), "hope" (line 12), and "betrayal" (line 15). The persona of the poem, who might be Hollander himself or Skinner argues that men instinctively in search of finding ways to refuse the idea that they are being monitored or under the control of some other forces such as "the Golden Rope / By which we feel bound, determined, and betrayed" (lines 14-15). Through the lenses of behavioral science, the first stanza focuses on human's rejection of being controlled by external forces; but the question which is related to the use of *mise-en-abyme* is that these sources are refer to Fate or destiny and their representations are "three sisters" (line 42) mentioned in the last lines of the poem. In ancient texts Fates are Greek goddesses of destiny who controlled human lives and sometimes





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are called as Moirai. Regarding *Fates* (three witches in the poem), in *The Probert Encyclopaedia of Mythology* (2002), Matthew Probert states that:

In Greek and Roman mythology, the Fates were the three goddesses, Clotho (represented as holding the distaff or thread), Lachesis (decided how much time or thread of life was to be allowed to each person), and Atropos (one who cuts the thread of life), sometimes called the Destinies, or Parcae; who were supposed to determine the course of human life. They are represented, one as holding the distaff, a second as spinning, and the third as cutting off the thread. (80)

Therefore, in Greek mythology it is believed that they have the control of human being at their hands and whenever they desire, they give time to human being and then cut the thread (metaphor for death) as they wish. The passage in the poem also puts the emphasis on such an idea of human destiny which is under the control of Three Fates and by the literal progression of the poem, this notion becomes more and more tangible. For the first time in the poem in line 10, the pronoun “they” is mentioned for the Three Fates but not clearly. In other lines of the poem, they are those who are in charge of human’s control but humans do not want to be “bound, determined and betrayed” (lines 14-15). These three words are the duties of each Three Fates, the first one, Clotho is fasten to hold the distaff or thread of human life, the second Lachesis is to determine and decide how much time or thread of life was to be allowed to each person, and the third one, Atropos is to deliver human to the next world and cut the thread of life:

But rather, if such a thing exists at all, (16)
 Three nasty Thingummies should hold it, twisting
 Strand onto endless strand, always resisting
 Our own old impulse to pull the string and see
 Just what would happen, or to feel the small (20)
 But tingling tug upon the line, to free
 The captives so that we might watch them crawl
 Back into deeper water again. It is well
 To leave such matters in their power, trusting
 To the blase discretion of disgusting (25)
 Things like the Two who spin and measure, and
 The Third and surely The Most Horrible,
 Whom we'd best forget, within whose bony hand
 Lies crumpled the Secret she will never tell. (29)

(“SHB” Lines 16-29)

As other Hollanderian poems, capitalization is very important and this is why he capitalized three opening words of line 17. Hollander makes the reference or *mise* more evident in line 17 when he uses “Three nasty Thingummies” alluding Three Fates which are doing something unpleasant for human being and this is why they are called as nasty and disgusting. Another reference for “Three nasty Thingummies” (line 17) may be discovered in Shakespeare’s well-known play named *Macbeth*. During the course of the play, the witches, also mentioned as the *weird sisters* are the representation of dim and gloomy thoughts and unconscious lures to devil:

Which Secret concerns the nature of the string (30)
 That all Three tend, and whether it be the wire
 Designed to receive the message or to fire
 The tiny initial relay. In the end,
 The question is whether merely Determining
 Or really Knowing is what we most pretend (35)
 To honor because it seems most frightening
 Or worship because we hold it most to blame.





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I once saw Dr. Johnson in a vision:
 His hat was on his hand, and a decision
 Of import on his lips. "Our will," he said, (40)
 "Is free, and there's an end on't." All the same,
 Atropos and her sisters, overhead,
 Grinned at this invocation of their name. (43)

("SHB" Lines 30-43)

In Old and archaic English, *weird* denotes fate or something which is concerned with fate or destiny and it is the quantity of their character in the drama to perform as if they are the forces of destiny and fate. The same situation exists in Hollander's "Science and Human Behavior" and the three female characters who might be also witches or goddesses are in charge of fate of human being. Like the character of Macbeth who does not desire to be under the control of fate, the speaker urges for alternatives to reject those forces. In line 30, the word "Three" again refers to Three Fates and other following lines are also describing their duties as the controllers of human destiny which resulted even in direct mentioning of their names in line 42, "Atropos." Hollander in the concluding lines of his poem wants to put the emphasis on his own contradictory idea of fate and free will of human being and for doing so, he refers to Dr. Johnson's idea regarding the notion of fates by employing his direct statement as a part of his poetry as he states that he observed Dr. Johnson and borrowed his words: "'Our will,' he said, / Is free, and there's an end on't" (lines 40-41). Consequently, there is a kind of interconnection between John Hollander's "Science and Human Behavior," William Shakespeare's *Macbeth* and the Greek mythology of Three Fates which creates a sort of trilogy of *mises* along with an emphasis borrowed from Dr. Johnson's idea on fate.

CONCLUSION

Intertextuality refers to representation and emergence of the elements, characters, and meaning of a text as the original one in the second or departure text or texts which entails the existence of both of them. Going to its elaborated sub-category, *mise-en-abyme*, coined by the French novelist and critic Andre Gide, there is a chain-like relationship between the texts in a way that they are the reflective or mirror images to each other. Wenche Ommundsen, who focuses on the meta-textual implication of such intertexts, defines *mise-en-abyme* as "an embedded self-representation or mirror-image of the text within the text, may [...] refer to the whole work which includes it [...] to a particular element within that work, or it may take as its subject the processes of fictional creation and communication" (10). Due to the fact that it is not the whole text which is reproduced and only some fundamental features of it, it is supposed to use the phrase "mirror-text" instead of *mise-en-abyme* in the inquiry within the body of narrative works of literature (Ommundsen 146). Considering John Hollander's pattern poetry; intertextuality is to be divided into three sub-categories and due to the fact that in pattern poetry the form and structure (grammar, etc.) are important, therefore the second perspective called structural intertextuality is applied. Beside, its subcategory, *mise-en-abyme* is also divided into three types and John Hollander's poetry deals with all of them including *simple*, *repeated* and *paradoxical* through which he connects his poems to Greek and Roman mythologies in order to create aesthetics unity and harmony within them. One his early poems name "Science and Human Behavior" have its roots from Greek mythology and the myth of Three Fates which links the poem to William Shakespeare's *Macbeth* and Dr. Johnson's idea of fate and free will.

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DEA and Relative Efficiency Evaluation

Mohammad Nikravan^{1*}, Ahmad Charmian² and Mehrdad Moazami Goudazri³

¹Department of Physical Education, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

²Department of Management, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

³Department of English language and Literature, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

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*Address for correspondence

Mohammad Nikravan
Department of Physical Education,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran.
Email: Milfendereski212@gmail.com



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ABSTRACT

The aim of this research was to evaluate the relative efficiency of Lorestan Education and Learning Organizations. For this purpose, the researchers used DEA which is based upon mathematic planning. This study was practical due to its objectives, and was descriptive due to its methodology. The statistical society included 10 Organizations and 14 learning regions of Lorestan. The statistical society in this research was equal to sample group. In order to collect the data needed, the researchers used many library researches, internet researches, documentary ones, thesis based researches, and informational ones about the efficiency. The main variables in this research consisted of the number of employees, the amount of budget, and the number of annually new comer students as the input variables and the number of graduated students and their average as output variables. Moreover, the researchers used CCR model with DEA to evaluate the efficiency of each organization. According to the efficiency, efficient and inefficient organizations were identified and also efficient and inefficient regions were categorized and ranked using AP model. According to the results obtained, among 24 organizations, 6 organizations were efficient and the rest of them were inefficient. The efficiency of those organizations located in big cities having more budget and human resource allocation were lower.

KEYWORDS: Performance Evaluation, Relative Efficiency, DEA, Ranking, AP.





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INTRODUCTION

In this era, the incredible changes and evolutions of management science make the evaluation systems inevitable. This is in a way that the lack of evaluation systems in different organizational dimensions can be considered as one of the reasons of organizational illnesses. The lack of evaluation and controlling in a system means the lack of relationship between the inner and outside environment of an organization and the results finally lead to the death of the organization. For each organization, it is necessary to have a system of evaluation to evaluate the performance of its sub-categories. Evaluation or controlling is one of the managers' tasks. In fact, what we cannot measure, we cannot control, and what we cannot control, we cannot manage. To evaluate the performance of their organizations, managers use different kinds of measurements such as effectiveness, efficiency, quality, productivity, profitability, flexibility and so on (Taheri 1999, p. 9). Today, evaluating performance in different organizations is one of the necessary tasks in order to compare the competition regarding inside and outside the country. Evaluating performance not only shows the ability of management, but also shows the existing problems in units' performance. Evaluating performance and its changes over time can really help evaluation of some aspects such as quality of using, sources, feedback of activities, weaknesses, deviations from plans and the corrections done (Shakiba 2010, p. 4).

Literature Review

Evaluation of Performance: The formal form of performance evaluation system in personal and organizational level first introduced by Robert Owen in Scotland in 1800. Generally speaking, it refers to the control of organizational or individuals' results and comparing them to what is done and what was supposed to be done (Mir Sepasi 2005, p. 430). Evaluation performance in governmental section has got three main usages including; the improvement of decisions, the improvement of responsibility, and the improvement of governmental services (Epstein 1991, pp. 161-193). **Efficiency:** From Peter F. Drucker's view point, it refers to doing the tasks properly. Therefore, efficiency is at least a comparison between the sources we expect to reach the goals and the activities we do, and the sources that we really use (Fallah 2007, p. 18). Efficiency in DEA is calculated from the ratio of total weight (amount) of outputs on total weight (amount) of inputs. **DEA:** It refers to a mathematical method which is taken from the techniques of research in mission and it is used to evaluate the performance of a group of similar decision maker units with multiple inputs and outputs (Saremi and Shahriari 2003, p. 39).

This analysis divides the units under the evaluation into two groups of **efficient** and **inefficient** ones. **Efficient** units refer to those whose efficiency is equal to 1. **Inefficient** units are ranked through gaining degree of efficiency, but efficient ones that their degree is equal to 1 cannot be ranked through a classic DEA system. The amount of the efficiency of 1 is related to a DMU via a method and is considered as a scale in order to evaluate the efficiency of that DMU comparing other DMUs (Moazami Goudarzi 2011, p. 9). **Decision Maker Unit:** It refers to a separated organizational unit which uses similar inputs and with the same procedure produces the same outputs. It is also controlled by the manager or the head of the organization and it has got a systematic procedure (Fazli and Azar 2002, p. 104). **Input:** It is a factor that when it increases, efficiency decreases and when it decreases, efficiency increases (Gheysari and et al 2007, p. 15). **Output:** It is a factor that when it increases, efficiency increases, and when it decreases, efficiency also decreases. Therefore, efficiency has a direct relationship with output (Gheysari and et al 2007, p. 15). **Budget:** Today, budget only is not considered as the income and cost of an organization for a period of time, but it is considered as a tool in order to plan and help the managers. It is the financial plan of an organization for an economical year or a period of time. In this research, by budget, the researchers mean all financial sources that are considered for Lorestan Educational Organization. Considering the issues mentioned, there have been done many researches in Iran. One of these researches which is done via DEA method belongs to Behrooz Azizi in 2004. He evaluated 19 branches (regions) of Tehran Educational Organization and concluded that the regions number 2, 3, 4, 6, 9, 10, 11, 14, and 15 were efficient and the rest of them were inefficient. Another research belongs to Gholam Hossein Khorshidi and Hossein Mickael Pour under the title of "the evaluation and study of efficiency and profitability in Iranian Educational System using DEA" in 2000. He concluded that in all provinces the efficiency was 49.8 percent.





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RESEARCH METHODOLOGY

This study was practical due to its objectives, and was descriptive due to its methodology. The statistical society included 10 Organizations and 14 learning regions of Lorestan. The statistical society in this research was equal to sample group. In order to collect the data needed, the researchers used many library researches, internet researches, documentary ones, thesis based researches, and informational ones about the efficiency. The main variables in this research consisted of the number of employees, the amount of budget, and the number of annually new comer students as the input variables and the number of graduated students and their average as output variables. Moreover, the researchers used CCR model with DEA to evaluate the efficiency of each organization. According to the efficiency, efficient and inefficient organizations were identified and also efficient and inefficient regions were categorized and ranked using AP model.

FINDINGS

As it is shown in the table below, among 24 organizations, 6 of them have the efficiency of 1 and 18 of them have the efficiency lower than 1. For those organizations that have the efficiency of 1 the researchers used AP ranking model whose results are shown.

The Questions of the Research

The 1st Question: Is the efficiency of the organizations having more employees higher?

Using DEA and the results obtained from table 1, the organizations are efficient that have lower employees. Therefore, the efficiency of the organizations having more employees is lower.

The 2nd Question: Is the efficiency of organizations having more budget higher?

According to the method used and the results obtained, organizations having lower budget are more efficient. Therefore, the efficiency of the organizations having higher budget is higher.

The 3rd Question: Is the efficiency of the organization located in bigger cities higher?

According to the results obtained, the organizations are considered as efficient that are located in smaller cities. Therefore, the efficiency of the organizations located in bigger cities is lower.

CONCLUSION

The ranking of decision maker units is one of the most important concepts in DEA. In this study, which was to evaluate the efficiency of Lorestan Educational Organization and their rank, the following results were obtained: In CCR model according to input, 6 organizations from 24 of them (about 25 percent) were efficient. The efficient organizations were those whose efficiency is 1. Moreover, 18 of them were inefficient and the ranking was based upon the efficiency they had. In addition, for efficient organizations, the researchers used AP model and at the end, the pattern units were determined for inefficient organizations. In AP, the bigger target function we had, the ranking of the unit was higher, and because the amount in the organization ranked H was the higher one, therefore this organization was in the 1st rank. Organizations located in the bigger cities and having more employees and budget had less efficiency. Therefore, we concluded that the organization in H region was the most efficient and the organizations in A region were the most inefficient ones.

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Table 1 .The efficiency of organization using AP)

No.	Code	CCR	AP	Rank
1	A	0.2135	0.2135	24
2	B	0.2900	0.2900	22
3	C	0.9086	0.9086	10
4	D	0.3855	0.3855	18
5	E	0.9086	0.9086	9
6	F	1	1.0083	5
7	G	0.4455	0.4455	14
8	H	1	1.5098	1
9	I	0.3890	0.3890	17
10	J	0.2967	0.2967	20
11	K	0.9104	0.9104	8
12	L	0.3132	0.3132	19
13	M	0.4088	0.4088	16
14	N	0.2336	0.2336	23
15	O	0.8362	0.8362	12
16	P	0.2919	0.2919	21
17	Q	1	1.0741	3
18	R	0.4398	0.4398	15
19	S	1	1.0040	6
20	T	0.8780	0.8780	11
21	U	1	1.3674	2
22	V	1	1.0110	4
23	W	0.9661	0.9661	7
24	X	0.8196	0.8196	13





Academic Achievements and Socio-Economic Status of the Bodybuilder's - a Study

Kaukab Azeem

Faculty, Physical Education Department, King Fahd University of Petroleum & Minerals, Saudi Arabia.

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*Address for correspondence

Kaukab Azeem

Faculty, Physical Education Department,
King Fahd University of Petroleum & Minerals,
Saudi Arabia.



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ABSTRACT

Academic achievement is the outcome of education and an extent to which a student or teacher has achieved their educational goals. (Annie Ward, and et al, 1996) stated that the academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested. The purpose of this study was to find out the academic achievements and socio-economic background of bodybuilders of telangana region, India. A sample size of 300 bodybuilders from all the districts of the Telangana, India was considered for this study. The data was collected with the help of an interview schedule, exclusively prepared for this study. The data so collected is analyzed and the results are interpreted based on the interpretation of the data the following conclusions are presented and discussed. The data was analyzed by the help of Simple calculations and percentages. The analysis of the data reveals about the educational achievements and socio-economic background of the bodybuilders and has also thrown up interesting findings. The educational attainments shows that not a single bodybuilder was illiterate, 18% of them studied upto SSC level, and 2.0% studied post graduation & above. Division secured in exams: distinction 0.8%, first division 19.4%, third division 30.4%. IT exposure: 40% of them have knowledge of IT & 60 % of them not. About 80 % of bodybuilders having media exposure, 3.0% participated at national level, 5.0% state level, 17.0 % district level, 75% gym/club level. 11.0 % of bodybuilders agreed that there is an adverse effect of bodybuilding on studies and 89.0 % not opined. Attitude of society towards bodybuilding: encouraging 30.0%, discouraging 40.0%, neutral 30.0 % . The Occupation of bodybuilders: students 45.0 %, unemployed 35.0 %, partial employed 15.0 %, employed 5.0 %. Educational qualifications of their fathers: 33.0% are illiterate, 11.0 % studied below SSC level, 22.0 % upto SSC, 31.0 % studied upto graduation level, and 3.0 % studied upto post graduation level. The education level of mother's: 50.0% illiterate, 47.0% upto intermediate level, 3.0 % studied upto graduation level. Household income of bodybuilders: below 2500 RS 41.3 %, 2501 to 10,000 RS 54.7 %,

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10,001 & above 4.0 %.The present study has shows the educational and socio-economic background of a significant number of bodybuilders is characterized by low household income and poor educational and occupational background of their parents.

Key words: Bodybuilders, Status, Academic, Socio- economic, Achievements.

INTRODUCTION

Globally today increasing number of doctors are prescribing progressive-resistance training both as a preventive against physical deterioration and an efficient means of rehabilitation after deterioration has already taken place. However, a bodybuilder does not live in isolation; he is a part of the society in which he lives. His level of education and the socio-economic background to which he belongs is of great relevance in order to appreciate the sport of bodybuilding and those who practice it in their true and total frame of reference. Keeping this in view, the researcher who is himself a practicing bodybuilder with many achievements to his credit at the state and national level, has under taken the present study. Academic achievement is the outcome of education and an extent to which a student or teacher has achieved their educational goals. (Annie Ward, and et al, 1996) stated that the academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important, procedural knowledge such as skills or declarative knowledge such as facts. The socio-economic status affects on the students outcomes (Bahrudin and Luster 1998). (Battle & Lewis 2002), stated that a person's education is closely linked to their life chances, income, and well being. (Crosnoe, Robert, & et.al, 2004) reveals that the School environment factors, such as school size, neighborhood, and relationship between teachers and students also influence test scores. (Tompsonowski, Phillip and et al, 2008) investigated that the Physical activity is very important tool for academic achievement. Research studies have shown that physical activity can increase neurotic activity in the brain. The additional funding of private schools leads to better academic performance and more access to resources such as computers, which have been shown to enhance academic achievements stated by(Crosnoe et al, 2004). (Eamon 2005) investigated that the students from low socio-economic background who attend schools with poorly funding do not perform as well as students from higher social classes. The purpose of this study was to find out the academic achievements and socio-economic background of bodybuilders of Telangana region, India.

MATERIALS AND METHODS

The details about different aspects of methodology, i.e., collection of data, interview schedule, sampling design, etc, have been presented. For the purpose of this study, a sample size of 300 bodybuilders randomly selected from all the districts of the Telangana region of Andhra Pradesh, India. The age of the subjects was between 18 to 25 years. The data was collected with the help of an interview schedule, exclusively prepared for this study. The data was analyzed by the help of Simple calculations and percentages.

RESULTS AND DISCUSSION

The data so collected is analyzed and the results are interpreted, based on the interpretation of the data the following results are presented and discussed. The educational attainments shows that not a single bodybuilder was illiterate, 18% of them studied upto SSC level, and 2.0% studied post graduation & above. Division secured in exams: distinction 0.8%, first division 19.4%, third division 30.4%. IT exposure: 40% of them have knowledge of IT & 60 % of them not. About 80 % of bodybuilders having media exposure, 3.0% participated at national level, 5.0% state level, 17.0 % district level, 75% gym/club level. 11.0 % of bodybuilders agreed that there is an adverse effect of bodybuilding on studies and 89.0 % not opined. Attitude of society towards bodybuilding: encouraging 30.0%,



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discouraging 40.0%, neutral 30.0 %. The Occupation of bodybuilders: students 45.0 %, unemployed 35.0 %, partial employed 15.0 %, employed 5.0 %. Educational qualifications of their fathers: 33.0% are illiterate, 11.0 % studied below SSC level, 22.0 % upto SSC, 31.0 % studied upto graduation level, and 3.0 % studied upto post graduation level. The education level of mother's: 50.0% illiterate, 47.0% upto intermediate level, 3.0 % studied upto graduation level. Household income of bodybuilders: below 2500 RS 41.3 %, 2501 to 10,000 RS 54.7 %, 10,001 & above 4.0 %.

The findings of the study present a picture of hope about the academic profile of bodybuilders. All of them are educated, showed satisfactory academic performance, pursued their education in English medium private institutions, passed the examination in first attempt, and have got reasonably good media and IT exposure. A large majority of them have foreign bodybuilders as their role models, opted that bodybuilding because of their intrinsic interest in the game, and opined that bodybuilding does not affect their studies adversely. Even though they have set for themselves reasonably high professional goals to be achieved, however, they are of the opinion that they have not achieved these goals as their participation is confined to competition at college/gym/district level only. Only 30 % of the bodybuilders are of the opinion that the attitude of the society towards bodybuilding is positive. However, the socio-economic background of bodybuilders leaves much to be desired. The educational background of the parents of bodybuilders in general and that of their mothers in particular is relatively poor. While fathers of only 8 % bodybuilders are government employees, a substantial proportion of them (over 30 percent) have their own petty business, and a staggeringly high 60 % are working on low salaried jobs in private establishments and informal sector. Similarly, the household income of about 75 % bodybuilders is in the lower income ranges of "below Rs.2500" and "Rs 2501-5000". A large majority of the bodybuilders do not have any income of their own as a very small number of them are employed/partially employed. This is supported by this study that the socio-economic status affects student's academic outcomes (Baharudin et al 1998). Low socio-economic status prevents access to resources and leads to additional stress and conflicts at home that affect all aspects of child's life including academic achievements (Eamon 2005).

CONCLUSION

The present study has shown that socio-economic and educational background of a significant number of bodybuilders is characterized by low household income and poor educational and occupational profile of their parents. It was also seen that the bodybuilders whose fathers are educated and have got a government job or who belong to middle income groups did well in terms of education, however, their counterparts whose number is quite large, who belong to either lower as well as higher income groups and whose fathers are less educated and have their own business, put up a poor show on all parameters of educational attainments.

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Table-1. Shows the Level of education of bodybuilders

Sl. No.	Particulars	Frequency	Percentage
1.	Illiterate	-	-
2.	Below S.S.C.	53	18.0
3.	S.S.C.	147	49.0
4.	Intermediate	50	17.0
5.	Graduation	43	14.0
6.	P.G & above	7	2.0
	Total	300	100.0

Table-2. Shows the division secured in the examination

Sl. No.	Division	Frequency	Percentage
1.	Distinction	2	0.8
2.	1 st Division	48	19.4
3.	2 nd Division	22	8.9
4.	3 rd Division	75	30.4
5.	Failed	100	40.5
	Total	247	100.0

Table-3. Shows IT exposure of the bodybuilders

Sl. No.	IT Exposure	Frequency	Percentage
1.	YES	120	40.0
2.	NO	180	60.0
	Total	300	100.0

Table-4. Shows the Knowledge of sending / receiving E-mails

Sl. No.	Sending / receiving E-mails	Frequency	Percentage
1.	YES	66	22.0
2.	NO	234	78.0
	Total	300	100.0





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Table-5. Shows Media exposure of bodybuilders

SI. No.	Responses	Frequency	Percentage
1.	YES	240	80.0
2.	NO	60	20.0
	Total	300	100.0

Table-6. Shows the Participation of bodybuilders at different levels

SI. No.	Competitions	Frequency	Percentage
1.	National level	10	3.0
2.	State level	15	5.0
3.	District level	50	17.0
4.	College / Gym level	225	75.0
	Total	300	100.0

Table-7. Shows the achievements of professional goals by the bodybuilders

SI. No.	Achievements of Professional Goals	Frequency	Percentage
1.	YES	70	23.0
2.	NO	230	77.0
	Total	300	100.0

Table-8. Shows adverse effects of bodybuilding on studies

SI. No.	Building on Studies	Frequency	Percentage
1.	YES	33	11.0
2.	NO	267	89.0
	Total	300	100.0

Table-9. Shows attitude of society towards bodybuilding

SI. No.	Attitude	Frequency	Percentage
1.	Encouraging	90	30.0
2.	Discouraging	120	40.0
3.	Neutral	90	30.0
	Total	300	100.0

Table-10 Shows whether the facilities for pursuing interest in bodybuilding are existing?

SI. No.	Whether Facilities Existing	Frequency	Percentage
1.	YES	75	25.0
2.	NO	225	75.0
3.	Neutral	90	30.0
	Total	300	100.0





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Table-11. Shows the Occupation of bodybuilders

SI. No.	Particulars	Frequency	Percentage
1.	Students	135	45.0
2.	Unemployed	105	35.0
3.	Partially employed	45	15.0
4.	Employed	15	5.0
	Total	300	100.0

Table-12. Shows the educational qualifications of fathers

SI. No.	Educational	Frequency	Percentage
1.	Illiterate	99	33.0
2.	Below S.S.C.	33	11.0
3.	S.S.C.	66	22.0
4.	Intermediate	57	19.0
5.	Graduation	36	12.0
6.	Post-graduation	9	3.0
	Total	300	100.0

Table-13. Shows the education qualifications of mothers

SI. No.	Educational	Frequency	Percentage
1.	Illiterate	151	50.0
2.	Below S.S.C.	62	21.0
3.	S.S.C.	57	19.0
4.	Intermediate	21	7.0
5.	Graduation	9	3.0
6.	Post-graduation	-	-
	Total	300	100.0

Table14 Shows the occupation of fathers of bodybuilders

SI. No.	Occupation	Frequency	Percentage
1.	Government employees	25	8.3
2.	Private employees	177	59.0
3.	Own business	98	32.7
	Total	300	100.0

Table-15 Shows household income of bodybuilders

SI. No.	Household Income of Bodybuilders	Frequency	Percentage
1.	Below Rs. 2,500	124	41.3
2.	Rs. 2,501 – 5,000	104	34.7
3.	Rs. 5,001 – 7,500	42	14.0
4.	Rs. 7,501 – 10,000	18	6.0
5.	Rs. 10,001 & above	12	4.0
	Total	300	100.0





Satisfaction as Key Feature of Educational Performance

Ahmad Charmian¹, Mohammad Nikravan^{2*}, Mehرداد Moazami Goudazri³ and Khalil Ahangaran⁴

¹Department of Management, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

²Department of Physical Education, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

³Department of English Language and Literature, Boroujerd Branch, Islamic Azad University, Boroujerd, Iran.

⁴Central Organization, Islamic Azad University, Tehran, Iran.

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*Address for correspondence

Mohammad Nikravan
Department of Physical Education,
Boroujerd Branch, Islamic Azad University,
Boroujerd, Iran
Email: Milfendereski212@gmail.com



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ABSTRACT

The aim of this research was to study the relationship between students' satisfaction as the universities' customers and their educational performance for Khoramabad Azad University. This study was practical due to its objectives, and was descriptive due to its methodology. The statistical society included 1500 students of Khoramabad Azad University among whom the researchers selected 338 persons. In order to collect the data needed, the researchers used, in addition to library researches, questionnaires. The alpha coefficient for the questionnaires was 0.79. Moreover, the researchers used SPSS and software to analyse the data. Finally, the result showed that the degree of satisfaction was %62 which was the lowest degree of customer oriented evaluation.

KEYWORDS: Satisfaction, Educational Performance, Customers.

INTRODUCTION

The value and importance of customer in a systematic overview are discussed in two alternatives including (1) the "value of customer for seller" and (2) the "value from customer's viewpoint." Each customer shapes a relationship with seller that company should save it and expand it. This is because of the reason that the relationship with customer does not exist by itself, rather it should be created (Gronroos 2007). Companies and institutions by using relational marketing tried to understand customers' needs and therefore provide valuable services in order to satisfy



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them. Moreover, by doing so, they tried to make them loyal and consequently make this program a long term one. In academic education, quality is defined based upon standards or established objectives. Therefore, customer oriented concept is a new one in academic education. This concept has got important thoughts and ideas within. According to such a view, designing educational system should be due to the real needs of customers and it should not be based upon designers' ideas and in a closed environment. Customer oriented viewpoint, at least, has this benefit that it relates educational objectives to customers' scientific needs. Academic educational organizations have different kinds of customers. These customers also have different needs. Robinson mentioned the importance of marketing in universities and divided customers into three groups based upon ordonnance and dependency. For them, the first customers are students, the second ones are educational agendas and employees, and the third ones are related individuals or groups of individuals (Robinson 1979). Regarding such a definition, a university is successful that is aware and conscious of its customers' needs and tries to be customer oriented. Therefore, this university repeatedly evaluates the results related to its customers and also identifies and anticipates the results for its customers.

Literature Review

Customer Satisfaction: It refers to customer's pleasure or satisfaction about the product and service, but after comparing the product or service with what he/she expected (Kotler 2001). Moreover, it is defined as the real performance of a company that meets the customers' expectations. Regarding such a view, if company's performance meets customers' expectations, the customers feel satisfaction; otherwise they feel unsatisfied (Kotler2011).

Educational Performance: It refers to doing an action in order to reach a desirable result, dominancy and success in a skill or a set of information. It mentions the level of institutional learning of individual which is evaluated through different educational tests, average, participation in activities and so on. On the whole, educational performance refers to learners' learning in educational activities which is estimated and evaluated through tests. Educational performance evaluation is one of the most important components in educational procedure for academic situations. Evaluation is the heart and the center of student's experience. Moreover, it is the style of testing and evaluation that identifies what students learn and what instructor teaches. In this field of study, there have been done many researches. Mr. Mohammad Mehdi GharehBaghi (2008) studied the level of students' satisfaction according to EFQM model and concluded that there was a balance between satisfied and unsatisfied individuals in Mazandaran University. It means that 50 percent of the students were satisfied about the university and 50 percent of them were unsatisfied. In another research done by Ms. HamidehSamavi (2008) the customer oriented concept and its usage in academic system of Khuzestan Province was investigated. The researcher, finally, concluded that students and faculty members were not satisfied about the quality of educational services of the Khuzestan University.

RESEARCH METHODOLOGY

This study was practical due to its objectives, and was descriptive due to its methodology. The statistical society included 1500 students of Khoramabad Azad University among whom the researchers selected 338 persons. In order to collect the data needed, the researchers used, in addition to library researches, questionnaires. The alpha coefficient for the questionnaires' reliability was 0.79. The validity of the questionnaires was confirmed by 15 scholars and professors who studied them. Moreover, the researchers used SPSS and software to analyse the data.

FINDINGS

In this research we used SPSS software version 19. There are 6 alternative hypotheses.

The hypotheses are as following:

The First Hypothesis: The relationship between students' satisfaction and the number of their absence.





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The null hypothesis: There is no significant relationship between students' satisfaction and the number of their absence.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and the number of their absence.

According to table 1, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and the number of their absence. But this relationship is inverse and this is because of the negative amount of Spearman test. It means that the more degree of satisfaction for the students we have, the less number of absences we have.

The Second Hypothesis: The relationship between students' satisfaction and their average.

The null hypothesis: There is no significant relationship between students' satisfaction and their average.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and their average.

According to table 2, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and their average.

The Third Hypothesis: The relationship between students' satisfaction and their participations (lecturing, presenting article and so on).

The null hypothesis: There is no significant relationship between students' satisfaction and their participations.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and their participations.

According to table 3, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and their participations.

The Fourth Hypothesis: The relationship between students' satisfaction and their mid-term grades.

The null hypothesis: There is no significant relationship between students' satisfaction and their mid-term grades.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and their mid-term grades.

According to table 4, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and their mid-term grades.

The Fifth Hypothesis: The relationship between students' satisfaction and their interests toward educational subjects.

The null hypothesis: There is no significant relationship between students' satisfaction and their interests toward educational subjects.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and their interests toward educational subjects.

According to table 5, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and their interests toward educational subjects.

The Sixth Hypothesis: The relationship between students' satisfaction and educational motivation.

The null hypothesis: There is no significant relationship between students' satisfaction and educational motivation.

The Alternative hypothesis: There is a significant relationship between students' satisfaction and educational motivation.

According to table 6, the significance and correlation coefficient, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there is a significant relationship between students' satisfaction and educational





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motivation. Finally, according to the results obtained, there is a significant relationship for two variables and no significant relationship for two variables.

CONCLUSION

In this research we study the relationship between students’ satisfaction as the universities’ customers and their educational performance for Khoramabad Azad University. This study is practical due to its objectives, and is descriptive due to its methodology. The statistical society includes 1500 students of Khoramabad Azad University among whom the researchers select 338 persons. In order to collect the data needed, the researchers use, in addition to library researches, questionnaires. The alpha coefficient for the questionnaires is 0.79. Moreover, the researchers used SPSS and software to analyse the data. Finally, the result show that the degree of satisfaction was %62 which is the lowest degree of customer oriented evaluation. Moreover, there are significant relationships between all variables. However, it is inverse for the first one. Therefore, we can conclude that there is a relationship between students’ satisfaction and educational performance.

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Table 1 (Spearman test)

N	Spearman	Significance
338	-0.521	0.000

Table 2 (Spearman test)

N	Spearman	Significance
338	0.384	0.000

Table 3 (Spearman test)

N	Spearman	Significance
338	0.199	0.000

Table 4 (Spearman test)

N	Spearman	Significance
338	0.110	0.044





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Table 5 (Spearman test)

N	Spearman	Significancy
338	0.584	0.000

Table 6 (Spearman test)

N	Spearman	Significancy
338	0.651	0.000

[5].





RESEARCH ARTICLE

A Journey from Post-modernism to Post Post-modernism: David Foster Wallace's the Infinite Jest

Maryam Soltan Beyad¹ and Abdolreza Goudarzi^{2*}

¹Ph. D. Faculty Member, Department of Language and Literature, University of Tehran, Iran.

²Ph. D. Student, Department Language and literature, Alborz Campus, University of Tehran, Iran.

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*Address for correspondence

Abdolreza Goudarzi

Ph. D. Student,

Department Language and Literature,

Alborz Campus, University of Tehran, Iran.

Email: a.rezagoudarzi@yahoo.com



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ABSTRACT

Postmodernism and Post postmodernism, two subsequent movements, have dominated culture, literature, art, philosophy, history, economics, architecture, fiction, and literary criticism since the late-20th-century to the present time. Although post postmodernism is emerging from and reacting to postmodernism, in basic features, they contradict each other. It is to say that, one writing in postmodernism should deliberately be in touch with the minute features of postmodernism, while one writing in post postmodernism should be dealing with the opposite of those features, belonging to post postmodernism. Among the outstanding post postmodern fictions, *The Infinite Jest* (1996)- an encyclopedic work- by David Foster Wallace (1962-2008) is the one in which the chief characteristics of post postmodernism can be found. Focusing on *The Infinite Jest* and considering two subsequent movements in literature- Postmodernism and Post post-modernism- the aim of this paper is to study the identity of a post postmodern man in an age when communicating applications and softwares like What'sapp, Viber, Telegram, as well as social networks such as Facebook, Twitter, You Tube, and to name a few besides the cutting edge gadgets like cell phones, and tablets have made it paradoxically possible to have a sort of sharing among the fragmented individuals. In fact this fragmentation, as a good opportunity to find sameness to start communication, is surprisingly embraced rather than criticized in Post postmodernism in contrast with what is evident in postmodernism. In the other words, every fragmented man is considered to be an active agent, communicator, and finally a producer rather than a sole passive watcher, reader, and one way communicator as was presented in the postmodern works. In *The Infinite Jest*, David Foster Wallace shows that the post postmodern man has succeeded in adopting

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such a sort of new identity and also creating new opportunity to express it to be able to come out of the postmodern passivity.

Keywords: Postmodernism, Post Postmodernism, Communication, Technology, Social Networks, Identity.

INTRODUCTION

Entering a new millennium coincides with a great deal of changes in all parts of a society as well as the so-called human network in which people live, interact, correspond and relate to each other. Undoubtedly, the 20th century is to be called as the most notable example of changes amongst other ones and the 21st century even more. There are many changes in the first one which has been even malfunctioned and reversed in the later. For instance, if one wants to count the 20th and 21st centuries' great changes, in general, he/she would be able to mention:

(1) change in Political Power—since 1900 there has been a general change trend of political power shifting from the privileged few (nobility and monarchy) to the majority in society; **(2) change in the Balance of World Power**—in 1900, the world was dominated by European monarchies and their empires (imperial powers such as Britain, Germany, Austria-Hungary, Russia and USA; **(3) change in the Distribution of Wealth**; and the last and the most important one in this discussion **(4) Technological and Scientific Changes**—New communications technology such as telephones, facsimiles and electronic mail enable us to contact people around the world almost instantly, instead of waiting days, months or longer, for a letter or messenger to deliver a message. (Rpfuller, 2015) As a matter of fact, the last one, Technological and Scientific Changes, is more obvious in 21st century and it is to say that it can be taken as the main differentiating factor between these two centuries. By technology, we mean something more than the common advancement of human being in 1960s until 1990s. In fact, Technology in the years after these periods was mostly focused on the issues such as intercommunication and notably social networks in a way that social network tools and applications through the cutting edges gadgets like cell phones revolutionized the ways of communications and in turn almost entirely replaced the traditional ways of informing as well as communication. Hence, in the age of technology and e-communication, there exists a great deal of importance on the desires and needs of the users who are considered as the crucial parts running and using these social nets. Needless to say, the old-fashioned ways now have their path to the world of disappearance, and each person is involved in the quest and the structure of the social nets. For instance, “for those who do get their news from social media sites, there are different desires and formats needed for each demographic/user group, requiring targeted sharing techniques for maximum effect” in a way that “on **Facebook**, 70 percent get most of their news from friends and family, versus the only 13 percent who get it from news organizations and journalists, 10 percent who get news from non-news organizations and nine percent who aren't sure” as well as “on **Twitter**, only 36 percent get news links from friends and family, as opposed to the 27 percent who get it from traditional news orgs and journalists, the 18 percent who get it from non-news organizations and the 19 percent who simply don't know” (socialmediatoday, 2015). This is why one could say that man is living in the Age of Information and the method for the distribution of information are continuously shifting and speedily evolving and this is very touchable in the use of communicative devices such as smart phones.

Undoubtedly, literature, as a manifesto, or better to say the real representation of human life, is not far or separated from such a shift and advancement. In the world of literature, there are two important periods, the elements of which, to some extent, are in contrast with each other. To mention the names, Postmodernism—first entered the philosophical lexicon in 1979, with the publication of *The Postmodern Condition* by Jean-François Lyotard (Gary, 2015)—and Post Post-modernism—beginning with a simple premise: we no longer live in the world of postmodernism, famously dubbed *The Cultural Logic of Late Capitalism* by Fredric Jameson in 1984—are to be considered as the two recent movements in literature whose elements, interestingly, are opposed to each other. In the clarification of post modernism, Lyotard “employs Wittgenstein's model of language games (1953) and concepts





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taken from speech act theory to account for what he calls a transformation of the game rules for science, art, and literature since the end of the nineteenth century” (ibid). While as Jeffrey T. Nealon states, “*Post-Postmodernism* surveys a wide variety of cultural texts in pursuing its analyses—everything from the classic rock of Black Sabbath to the post-Marxism of Antonio Negri, [...], from reading experimental literature to gambling [...]” (2012). That is to say, if an author wants to write a piece of literary work, especially a novel, he/she would have the influence of such a shift in both the meaning and the content of the work. By this so-called influence, one would mean an impact, which is mostly evident in the identity of the characters of a novel. By this, we could easily be able to differentiate the characters’ identity from each other—the identity of a postmodern man as a postmodern character and the identity of a post postmodern man as a post postmodern character. Therefore, the object of this paper is to study the identity of a post postmodern man in the period when communicating application and softwares like What’sapp, Viber, Telegram, as well as social networks such as Facebook, Twitter, You Tube, LinkedIn, Instagram and the like have made it paradoxically possible to have a sort of sharing among the fragmented individuals, something which is amazingly embraced rather than criticized. As the pioneer of Post postmodernism, David Foster Wallace (1962-2008) creates a kind of encyclopedic novel, *The Infinite Jest* (1996), a novel which is like communicating software like Telegram including 171 characters, among which one functions as an admin, here; Hal seems to be the protagonist of the story. Furthermore, it should be noted that the novel was written in Late Capitalism, in the age of Facebook and other mentioned softwares and social networks, the influence of which on the identity of the shared fragmented characters who try to find sameness rather than difference is notably vivid. The Post postmodern man now looks outward rather than inward to escape taking refuge in the world of illusion against what we witnessed in postmodern literature. In postmodern novels loneliness and alienation are focused and the characters’ identity is lost and decentered following Derrida’s Deconstruction. However, in post postmodernism, the characters’ loneliness is a unique one; thanks to modern technology, they are lonely, but at the same time they are given a golden opportunity to come out of their loneliness and be active while looking for a new notion and a remedy for themselves.

METHODOLOGY

To focus on the art of writing a novel, whether a postmodern novel or a post postmodern one, an author should definitely consider the elements and the principles of each period he/she writing in or about. Likewise, Wallace—was not far from such a circle—as a novelist, was interested in human, in his pain. In fact, he was a responsive artist who was eager to find a healing for the post postmodern man; however in postmodern novels the problems are based on merely a cause and effect relations, the pains are presented with giving no solution; that is, the characters are left alone in their alienation. Nevertheless, Wallace not only depicts the pain of human being like a postmodern author, but also introduces his works as a sort of solution for such a pain and alienation, and this separated him from his previous postmodern authors and introduced him as the forerunner of post postmodernism. His encyclopedic novel, *The Infinite Jest*, can be considered as a kind of social network connecting the people—the characters in the novel—to each other to remove the alienation and pain of them, in fact this is an epitome of Wallace’s post postmodernism, the opposite side of the earlier, that is, postmodernism. Before going to the minute clarification of post postmodernism, it is of obligation to mention some of the most important elements of the postmodernism. In postmodernism there is

- The Suspicion and rejection of Master Narratives
- Social and cultural pluralism
- Skepticism of progress, anti-technology reactions
- Sense of fragmentation and decentered self, conflicting identities;
- Alternative family units
- Subverted order, loss of centralized control, fragmentation
- Trust and investment in micro politics, identity politics
- Hyper-reality, image saturation, simulacra seem more powerful than the real
- Demystified culture
- Art as process, performance, production, intertextuality





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- Art as recycling of culture authenticated by audience and validated in subcultures sharing identity with the artist
- Play, irony, challenge to official seriousness, subversion of earnestness;
- Hybridity, promiscuous genres;
- Cyborgian mixing of organic and inorganic, human and machine and electronic
- and Hypermedia as transcendence of physical limits of print media
- the Web or Net as information system. (anglefire, 2015)

As it is clear according the above elements, one could say that unlike the age of postmodernism which deals somehow with anti-technological reactions, post postmodernism puts the emphasis mostly on the interaction between man and technology in a way that he can even define himself through the use of it, something which finally led to creating a sort of new identity for himself. However, Alan Kirby in 2006, emphasizing on the existence of this new form of communication, delivered “an entirely pessimistic socio-cultural assessment of post-postmodernism” (p. 58). It is as if the people in this assessment are dealing “with the triteness and shallowness resulting from the instantaneous, direct, and superficial participation in culture made possible by the internet, mobile phones, interactive television and similar means as one phones, clicks, presses, surfs, chooses, moves, downloads” (ibid). In fact it is possible to say that unlike the man of postmodernism who is a sole reader, watcher, and listener, the man of post postmodernism is a phone user, a clicker on internet, the one who gets everything only by a press, surfs on internet and social networks to find what he/she desires, chooses, moves and downloads and finally what is important is that he can share them. Thus it is crystal clear that one born before the late 1980s is totally different from the man of the recent age. They—before the late 1980s—were dealing with those texts and things that were introduced to them but men in post postmodernism choose what to read and see and they can share what they find interesting give online comments by a giving at least a “like”! And through the virtual world of internet he is likely to find those similar to him from every aspect you might imagine, from religion and politics to health care and beauty!

Reality is another aspect that is challenged through the changes from postmodernism to post postmodernism. Kirby states that “whereas postmodernism called ‘reality’ into question,” the later expresses “the real implicitly as myself, now, interacting with its texts” suggesting that “whatever it does or makes is what is reality” (2006). Therefore, for a man who lives in the age of post postmodernism reality is what he deals with at the moment. Another outstanding difference between postmodernism and post postmodernism relies on the fact that the primary one “favoured the ironic, the knowing and the playful, with their allusions to knowledge, history and ambivalence,” while the newer and later one mostly deals with “typical intellectual states [in terms of] ignorance, fanaticism and anxiety” (ibid). This is why the people in the first period are surrounded with texts full of irony and allusive features whereas the situation is changed for the man of later period. Considering the fact mentioned concerning Postmodernism’s presenting the pains and presenting the pains being its ultimate goal, Charles Reginald Nixon, being aware of Post postmodernism’s high sensitivity to the social and political problems as the source of many pains of modern man, in *The Works of D. F. Wallace and Post Postmodernism* states from the tongue of Hardt and Negri:

Post postmodernism rooted in social and political condition of the society, for this reason, first of all it is tried to work on the impact of the Capitalism on society in general and emergence of Post postmodernism in particular in a period when according to him the spread of global capitalism is ‘complete.’ It represents a time in which there is no ‘outside’ to capitalism. For Hardt and Negri, this is the period in which ‘capitalism no longer looks outside but rather inside its domain, and its expansion is thus intensive rather than extensive.’ In turn, Nealon describes this as the most significant factor that transforms the economic realities of post-postmodernism into a totalized cultural logic (Nixon, 2013; Hardt and Negri, 2000, p. 255). As a matter of fact, one could undoubtedly proclaim that there would be no emergence of post postmodernism if there was no suitable social and political condition. Therefore, a new concept such as Post postmodernism needs a suitable framework for its emergence and capitalism is the one. Thus it is important to say that this capitalization should be completely spread through the global situation and it has its focus





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on its domain rather than the outside of its circle and one should keep in mind that the expansion and horizons of this sort of capitalism are more intensive rather than to be extensive. On the minute comprehension of post postmodernism, one can refer to Fredric Jameson's idea as a kind of clarifying issue: The comparison with Jameson's articulation of postmodernism as the 'cultural logic of late capitalism' can help us to understand the shift from postmodernism to post-postmodernism. For, in Jameson's crucial definition of postmodernism, it is the equalizing spread of capitalist expansion that produces a cultural practice of absolute equalization of space and surface; it is 'what you have when the modernization process is complete and Nature is gone for good. (Jameson, 1991, p. ix)

Thus, it is the shift that matters and this change is no longer possible without the existence of capitalism. When this so-called process goes on, humanity and his identity come to the age of technology and this is the emergence of post postmodernism that changes the non-active, silent, reading, alienated and painful human to the active, speaking, writer, producer and lively man who is an agent, being responsible for the creation of communication and intercommunication between people whom he/she may know or not, anywhere any time to challenge the already established concepts of space and even time. "This is the post-postmodernist derivative of Jameson's ideas. In the condition of totally globalized capitalism, it is the intensification of already existing surfaces that matters" (Jameson 2003, p. 108.). "This logic requires the increasing capitalization of what is existent: through branding, through the production of excess value, through the multiplication of meanings rather than surfaces" (Nixton 2013). Therefore, this is when the existence and the actions of man have got the importance and humanity plays the role of an admin who is responsible for creation of meaning that is in accordance with the norms and the desires of him/her and those who have the same norms. This is the time that all the parts and the members of the society can talk in their own voices and now this new identity seems to be highly active. Additionally, when man puts his steps through the age of technology, one could definitely be sure that postmodernism no longer exists as Alan Kirby says "postmodernism is dead and buried. In its place comes a new paradigm of authority and knowledge formed under the pressure of new technologies and contemporary social forces" (2006). By technology and specifically social forces, one could notice the use of the mentioned social networks and application such as Facebook and alike. "Put simply, many of the fiction writers who have come on the scene since the late 1980s seem to be responding to the perceived dead end of postmodernism, a dead end that has been reached because of postmodernism's detachment from the social world and immersion in a world of non-referential language" (McLaughlin, 2004, pp. 53-68.).

What happens to human and his identity in Post postmodernism when connecting with the others instantly, when sharing his interests in Face book and the likes? When bombarded by lots of advertisement on TV? Opposite to the post-modern stance of technological wariness, contemporary writers use the abundant availability of information on other cultures and lifestyles in order to connect with and understand individuals contradictory to themselves. They do not shy away from technology, but rather embrace it. Instead of being wary of its power, contemporary writers use the social aspects of technology in order to connect with those around them and those halfway around the world.

FINDINGS

For Wallace, as a post postmodern novelist, the minute features of post postmodernism are more important than writing a bestseller novel. It is to say that when he was busy creating characters like Hal and many alike, he mostly considered the way that people behave, act and communicate in the world of reality. They are in search of finding their own selves and their own desired identities. They want to communicate with other characters around, those having the same desires and needs. As Nicoline Timmer states: Nevertheless, a reader of *Infinite Jest* is surely able to see Hal as a self, albeit not as a unified and emotionally coherent and stable self. How can that be? Is Hal's self simply not a proper narrative self then, but something else (whatever that may be), or should we perhaps find a solution in another direction and come up with a more adept concept of what counts as a narrative? (2010, p. 322.)





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At the beginning of novel, we note that Hal is not stable and emotional character while the reason is not clear. There is something hidden and mysterious about him and this hidden part of his psyche has made him a lonely person. When we go through the process of reading the novel, we understand that Mr. Incandenza, Hal's father, committed suicide in a very horrifying and frightening manner and the important fact for Hal is that he found him dead at the age of "thirteen going on really old" (Wallace, 1996, p. 248). Consequently, the reader gradually gets familiar with the very sad, tragic and very frightening past time of Hal that directly leads to his alienation. And so, we become aware of Hal's tragic and potentially scarring past. Therefore, as a former postmodern man he is limited with his psychic pain and solitude, but as a post postmodern character he does not want to keep his passivity, instead he is in search of finding a way to escape from this prison rather than taking refuge in it, and further healing such a pain. He is now a post postmodern man and uses the elements of the recent era to remove his pain. Somewhere else in her book, Nicoline Timmer refers to another point regarding a post postmodern man. She states that:

In *Infinite Jest* it is a psychic pain that appears to be the central existent of the novel, more so than any of the 171 individuals characters that make an appearance in this text, including Hal, although Hal does feature as an example case in point, as an empty self that supposedly has no interior feelings but is at the same time overwhelmed beyond speech by a persistent feeling of loss and loneliness. (2010, p. 332)

Again, this psychic pain is what the characters have in common, although, through the logic of what Wallace has named the solipsistic delusion, they do not know this, yet. It is what binds them. Although they apparently cannot get outside this lonely feeling, they share their loneliness and in the age of technology with the known and unknown people through the virtual world of the social networks like Face book and the likes and in our time in 2015 through the applications like What'sapp, Viber, Telegram, as well as Face book, Twitter, You Tube, LinkedIn, Instagram, the effects of them, is irrefutable. What Wallace and repeatedly puts the emphasis on is this loneliness, this painful pain.

In his novel, *The Infinite Jest*, Wallace begins:

I am seated in an office, surrounded by heads and bodies. My posture is consciously congruent to the shape of my hard chair. This is a cold room in University Administration, wood-walled, Remington-hung, double-windowed against the November heat, insulated from Administrative sounds by the reception area outside, at which Uncle Charles, Mr. deLint and I were lately received. I am in here. Three faces have resolved into place above summer-weight sportcoats and half-Windsors across a polished pine conference table shiny with the spidered light of an Arizona noon. These are three Deans — of Admissions, Academic Affairs, Athletic Affairs. I do not know which face belongs to whom. I believe I appear neutral, maybe even pleasant, though I've been coached to err on the side of neutrality and not attempt what would feel to me like a pleasant expression or smile. I have committed to crossing my legs I hope carefully, ankle on knee, hands together in the lap of my slacks. My fingers are mated into a mirrored series of what manifests, to me, as the letter X. The interview room's other personnel include: the University's Director of Composition, its varsity tennis coach, and Academy prorektor Mr. A. deLint. C.T. is beside me; the others sit, stand and stand, respectively, at the periphery of my focus. The tennis coach jingles pocket-change. There is something vaguely digestive about the room's odor. The high-traction sole of my complimentary Nike sneaker runs parallel to the wobbling loafer of my mother's half-brother, here in his capacity as Headmaster, sitting in the chair to what I hope is my immediate right, also facing Deans. The Dean at left, a lean yellowish man whose fixed smile nevertheless has the impermanent quality of something stamped into uncooperative material, is a personality-type I've come lately to appreciate, the type who delays need of any response from me by relating my side of the story for me, to me. Passed a packet of computer-sheets by the shaggy lion of a Dean at center, he is speaking more or less to these pages, smiling down. (1996, p. 162)





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As a man who has suffered a lot, Hal has many problems which are directly rooted from the situation of being alone. When he is explaining himself, the reader can feel the pain. Wallace wants to say that people are no longer interested in the world of loneliness, they are no longer alone, rather they are surrounded with heads and bodies of people with whom they have to communicate with; however they feel painful. Now what can a post postmodern man do when he is trapped and caught in the middle of solitude between the walls of a cold room, Remington-hung and double-windowed which is walled with wood and therefore, there is no possibility to even see those who are around him. There should be a way to get rid of this man-made alienation. This new established form of alienation has changed this post postmodern man's identity in a way that he believes to have been a neutral and dispassionate person with no face and thus identity of his own. He should give himself a chance to express himself which he defines as a pleasant expression or even a kind of smile, something that definitely brings him activity, passion, livelihood and therefore his wanted and desired identity, something that redeems him from the prison of being passive, crossing the legs, putting ankle on knee, hands together in the lap of slacks and simply doing nothing but suffering. He is trapped into a world of habits and ordinariness in which his activities are the same every moment and every day that changes his life to be semi-dead. He should find a path to express himself to those who are not far from him, or even far from him in other rooms, as well. However, the lights of hope for him appear when to the thanks of changing the world, he steps into a new world, a world in which the easiest thing is to communicate, the world of post postmodernism in which Hal may find a pain healer rather than only a pain killer. Considering the fact that a man like Hal is living in the age of technology, the first and the most influential tool that can assist him is computer which has the ability of personalization for man.

However, this outrage against solitude and passivity even goes beyond the horizons of a postmodern man's understanding. A postmodern man only deals with TV and TV effects but today is the day of communication through internet. Wallace makes this fact clear in his novel when from the tongue of the main character Hal states: American mass-entertainment became inherently pro-active, consumer-driven. And because advertisements were now out of the televisual question — any halfway-sensitive Power-PC's CPU could edit out anything shrill or ungratifying in the post-receipt Review Function of an entertainment-diskette — cartridge production (meaning by now both the satellitic 'spontaneous dissemination' of viewer-selected menu-programming and the factory-recording of programming on packaged 9.6 mb diskettes available cheap and playable on any CD-ROM-equipped system) yes cartridge production — though tentacularly controlled by an InterLace that had patented the digital-transmission process for moving images and held more stock than any one of the five Baby Bells involved in the InterNet fiber-optic transmission-grid bought for . 17 on the dollar from GTE after Sprint went belly-up trying to launch a primitively naked early mask- and Tableauxless form of videophony — became almost Hobbes-ianly free-market. (2006, p. 163-164) Herewith, Wallace points to the important fact that nowadays, by the emergence of new technology, the people are no more passive and they are not under the direct influence of televisual question; rather they are active and can express their own reviews and voices through Power PC computer CPUs and even edit them, which are the preliminary tools of personalization for a man to have a voice of his own. A man like Hal is living in a world that he can select the direction of his observation by means of Viewer-Selected Programs and Packages through which he can choose what kind of identity he is searching for, and what sorts of activities are suitable for him. This is called the productive power of a post postmodern man.

This is a kind of production that he has made in order to escape from the previous era solitude, to find those who are in an equal mental stage with himself. By the appearance of such a technological advancement, a post postmodern man like Hal, as mentioned directly in the passage derived from the novel, can move and share his desired images to those he likes (something like Instagram), transfer selected sorts of files (something like RapidShare), store them for ever by CD-ROM Equipped Systems, pay for the things that he wants to buy (something like eBay) in free markets and even share and contact by video (videophony: something like Skype and YouTube) with others he likes. Consequently, a post postmodern man like Hal is now equipped with the communicative tools of technology and he can create his identity, but artificially. For a man like him, communication as an artificial—meaning not through real meetings—thing has its own advantages and the most important one is to be easy and at hand. When one saves his





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time, has no limitation, uses freely and chooses on his own desire, he/she is more eager to deal with that particular thing. The e-communication for a post postmodern man has the same characteristics and this is why one could be able to express himself freely and even has a great kind of tendency toward introducing his/her own self to others and finding those who are at the same level of mentality, appreciation, desire, needs and understanding.

Wallace goes on writing:

No more Network reluctance to make a program too entertaining for fear its commercials would pale in comparison. The more pleasing a given cartridge was, the more orders there were for it from viewers; and the more orders for a given cartridge, the more InterLace kicked back to whatever production facility they'd acquired it from. Simple. Personal pleasure and gross revenue looked at last to lie along the same demand curve, at least as far as home entertainment went. And as InterLace's eventual outright purchase of the Networks' production talent and facilities, of two major home-computer conglomerates, of the cutting-edge Froxx 2100 CD-ROM licenses of Aapps Inc., of RCA's D.S.S. orbiters and hardware-patents, and of the digital-compatible patents to the still-needing-to-come-down-in-price-a-little technology of HDTV's visually enhanced color monitor with microprocessed circuitry and more lines of optical resolution — as these acquisitions allowed Noreen Lace-Forché's cartridge-dissemination network to achieve vertical integration and economies of scale, viewers' pulse-reception- and cartridge-fees went down markedly; and then the further increased revenues from consequent increases in order- and rental-volume were plowed presciently back into more fiber-optic-InterGrid-cable-laying, into outright purchase of three of the five Baby Bells InterNet'd started with, into extremely attractive rebate-offers on special new InterLace-designed R.I.S.C.-grade High-Def-screen PCs with mimetic-resolution cartridge-view motherboards (recognizably renamed by Veals's boys in Recognition 'Teleputers' or 'TPs'), into fiber-only modems, and, of course, into extremely high-quality entertainments that viewers would freely desire to choose even more. (2006, p. 165)

He makes the fact apparent that networks which are based on internet are very important because it is the desire of the users that create them; it is to say that it responds to the needs of them and it also progresses based on what the users and viewers acquire. Likewise, the direction on which these networks progress as well as their future are based on the users in a way that the users can change them in accordance with their needs, connections, and interests. Alongside, those who are connected with other in these networks have the same demands. This sort of system leads people who are the users in the network to a kind of technological and internet-based integration which is very interesting for them. When one is placed in a situation where is interesting and attractive for him/her, he/she can be creative and further he/she will be a productive agent. Therefore, the willing users, by means of HD computers, internet modems such as smartphones and other devices alike, as Wallace mentioned in the passage above, , can choose their own entertainment, subject, issue, and discussion they want freely. This is where the notion of Teleputers comes into existence; which is a telephone with the highly qualified technology only belonging to the post postmodern era by which people can connect and talk to each other and also have their video that is another way to be free from the prison of loneliness, because, thanks to the expression "seeing is believing," they have more than one sense that is involved in the process of communication and they feel emotionally closer to each other. The examples mentioned are only a few among a thousand of examples that Wallace mentioned in his novel for the clarification, explanation and representation of a post postmodern man and his most important feature, his identity. Wallace believed that man is defined through social networks and new applications by which he is able to express himself and escape from the prison of loneliness and passivity to find the way to be an active and communicative man.

CONCLUSION

Concluding, considering the two recent ideological brackets in the system of thoughts in English literature— Postmodernism and Post postmodernism—, one can undoubtedly say that the world as well as literature and specially its magnificent and the most prominent genre novel has seen a great change in all aspects. This shift is





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evident in the manifestation and representation of society, which can be considered as a well-interconnected network in which all the parts are intermingled with each other. Unlike Postmodernism, Post postmodernism has many different elements that are the influencing factors for the life of humanity, especially his identity. By the mergence and the rapid advance in technology, especially internet, man owns a new identity. Unlike a postmodern man, who was totally a marginalized, unvoiced, passive observer and one-way connector, a post postmodern man finds himself surrounded with the world of technology and communication. He is no longer imprisoned by the limitation of the previous era, rather he is himself. He can express himself, his own ideas, interests, desires, wishes and wants and in fact he does not suppress himself. Unlike the passive man of postmodernism, a post postmodern man is like an author, who creates, breaks the limitations, speaks on his behalf, and communicates with what the internet based technology bestows him. Consequently, one can comprehend that this man reaches to a kind of identity that differs from the identity of a postmodern man and undoubtedly, the role of social networks and applications such as What'sapp, Viber, Telegram, as well as Facebook, Twitter, You Tube, LinkedIn, Instagram is undeniable.

Correspondingly, when it comes to the world of literature, without any hesitation, a reader can tangibly comprehend such influence and shift. Therefore, the post postmodern author, David Foster Wallace, in his encyclopedic work under the title of *The Infinite Jest* (1996) shows that man owns a new identity, differing from a man of the previous era. This sort of identity entails a person who is active, producer, fan of communication, and the one who even can create the world of his own through social network and applications. In a similar vein, Wallace created characters (like Hal) that are directly under the influence of such a change and they are dealing with the new technological gift—e-communication. He is repeatedly in the process of communication with those who have the same desires and interests with him. Finally, one can say that it is a pain healer rather than a painkiller and it saves the man from the world of alienation and also the direct unsuitable impacts of the element of the previous era such as TV.

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Presenting New Water Cycle Algorithm for Solving Trucks Scheduling Problem in Cross Docking

Fatemehshokri Atrabi¹, Din Mohammad Imani²

¹Master of art student of Industrial Engineering, Mazandaran University of Science and Technology

²Assistant Professor, Department of Industrial Engineering, University of Science and Technology, Tehran, Iran.

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*Address for correspondence

Fatemehshokri Atrabi

Master of art student of Industrial Engineering,
Mazandaran University of Science and Technology
Iran.

Email: fatemeh.shokri@b-iust.ac.ir



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ABSTRACT

Cross docking is a logistics technique and distribution method and material transportation for direct handling of goods from the receiving location to sending location in which the main goal is eliminating additional storage and handling. Cross docking can play an important role to reduce inventory, increase operating efficiency, shorten lead times, increase customer satisfaction and accountability and tighten controls on distribution operations. In this paper, to solve the model, we used solver Lingo to achieve exact solution and given the complexity of the model to achieve the exact solution and increase the search space on the big problems, the new water cycle algorithm was used to minimize completion time in cross docking trucks operations and then has been compared with algorithm 4. Numerical Examples showed relative competency of water cycle algorithm than other algorithms.

Key word: water cycle, algorithm.

INTRODUCTION

In recent years, many logistic organizations have used crossdocking to increase agility and reduce inventory levels [1]. The main idea of crossdocking is direct transfer of incoming shipments to the warehouse by outgoing vehicles without saving them. The concept of crossdocking was introduced by Wal-Mart company for the first time [3]. In the distribution system of this company, the role of warehouses was to coordinate inventory, rather than save it. In crossdocking system, good is entered to the warehouse from different manufacturers and delivered to the retailers by the vehicles in the shortest possible time. Items are generally stored in warehouses for the short time (often less than



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24 hours) [4]. Yu [2] has considered various problems of truck scheduling in his thesis. In this thesis, each scheduling problem is divided into five factors including: the number of entrances, the pattern of placing the trucks in front of entrance, the existence or lack of temporary warehouse, the number of exit doors and the pattern of placing the trucks in front of the exit door. From the author's point of view, each of these five factors has two modes in which only one of each state will be established in a truck scheduling problem. So, 2^5 or 32 types of scheduling problem can be defined. The study provided by Yu and Egbelu [7] can be called as one of the most important pioneers of trucks scheduling field in cross docking warehouses. They have developed a mathematical model to find an effective scheduling for incoming and outgoing trucks (where a door is assigned to incoming trucks and another door is assigned to outgoing trucks) in order to minimize the completion time of the last outgoing truck (C_{max}). In the provided model, it is assumed that a temporary warehouse is located next to exit door, so that products that have been brought from the truck, but the outgoing truck (which is loading) do not need them, are supplied at this warehouse to be assigned its appropriate truck, later. On the other hand, due to the complexity of large size problems, nine heuristic methods (considering three heuristic approaches to determine the sequence of incoming trucks and three heuristic methods to determine the sequence of outgoing trucks and the same number for outgoing trucks) were suggested. The authors have shown the effectiveness of proposed heuristic methods by comparing them with exact solutions obtained by the complete enumeration method.

It is worth noting that this article becomes the interested one to the researchers in later years, so that a number of subsequent works by considering this work, continue studies in this field. Given the remarkably similarity between trucks scheduling problem at cross docking warehouses to scheduling problem of activities on machines, Chen and Lee and also, Chen and Song ([3], [1]), considering the problem of cross-loading and loading in cross docking warehouses, they have defined it as a workshop scheduling problem and have studied and evaluated. In these articles, products are considered as activities and trucks as machines. In Beck elementary paper, simple workshop scheduling problem is presented, while the second paper presented the same problem with regard to parallel machines at each stage, as a combination scheduling problem. Primary article, by presenting a branch and bound algorithm, solves the presented problem accurately. Also, the second paper, after presenting a mathematical model of complex integer, 4 innovative approaches have designed for problem solving. In the same year, Miao et al. [5] investigated the problem of trucks allocation to the doors. According to the authors mention, three factors affect this problem: The time window of entering and exiting of each truck, the products transmission time in cross docking warehouse and available capacity in it. This paper presents an integer programming model to help for achieving the optimum results on a small scale. Two meta-heuristic methods including Tabu Search (TS) and Genetic algorithms (GA) are provided to solve larger problems. In the following year, Boysen [5] investigated the scheduling problems of incoming and outgoing trucks for carrying parts in prohibiting mode for each temporary storage in the desired cross docking. Author has used two dynamic programming and simulated annealing meta-heuristic method (SA) to solve mathematic problems. On the other hand, Vahdani and Zandieh [11], with regard to the assumptions of Yu and Egbelu model [12] have investigated five meta-heuristic methods to solve large scale problems in which these techniques include: GA, TS, SA, Electromagnetism-like Algorithm (EMA) and Variable Neighborhood Search (VNS). It should be noted that the authors use Response Surface Methodology technique (RSM) for robust designing of mentioned meta-heuristic algorithms. Also, Soltani and Sajjadi [13], proposing two hybrid meta-heuristic methods (combination algorithm of SA and combination algorithm of VNS) and utilizing the Taguchi method, presented new robust meta-heuristic methods to solve the scheduling problems of incoming and outgoing trucks inspired by Yu thesis [3].

Yu thesis [2] as well as was used by Vahdani et al. [14] in which by investigating a scheduling model in prohibiting mode for each temporary storage, a new study becomes available for researchers. They design related two meta-heuristic methods including GA and EMA with the help of Taguchi technique to solve problems. Among other important works in this year, we can note the paper of Forouharfard and Zandieh [15] and Bolooriarabani et al. [16] noted that the first paper used Imperialist Competitive Algorithm (ICA) to solve the trucks scheduling problem in spite of temporary storage and the second paper used Just-in-Time approach (JIT) in a multi-criteria scheduling



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problem. Boloriarabani et al. [17] provided another work using five meta-heuristic algorithms including GA, TS, Particle Swarm Optimization (PSO), Ant Colony Optimization (ACO) and Differential Evolutionary (DE) and verified the efficiency of these methods by comparing the obtained results from them with the gained results from the full counting. It should be noted that the study model is the same as Yu and Egbelu model [7]. Also Alpan et al. ([19], [18]) have studied a scheduling problem that according to the authors mention, has two important differences with the previous studies: a) the desired objective function is cost-based and the is not related with time (share) B) stop the loading operation is allowed. Among important assumptions, it can be noted that in this study, the incoming trucks are assigned to doors based on the FIFO policy and on the other hand, costs are considered independent of time. In this problem, the scheduling is studied only for outgoing truck, because the sequence of incoming trucks are pre-determined on the basis of production programs. Minimizing the total cost of inventory in temporary storage and the cost of outgoing output relocation (if a truck gives its turn to another truck to cross-load) is the above-mentioned objective problem that to achieve it, a dynamic programming is used using a limit for the optimal solution.

It is worth noting that in many industries, there is not enough information about the incoming trucks. For this reason, and in one of the most varied works provided Larbi et al. [6] studied the activities scheduling problem in cross docking warehouse, in three different modes of information availability: Full information, partial information and without information from incoming trucks. The goal of this problem is finding the best transmission practices scheduling to minimize total cost in which to reach this target, in each of the 3 modes of study, an approach is considered to numerical resolve of problems that includes: Using a solution algorithm based on the graphs rule in the case of complete information, offering an innovative method in the case of lack of information and presenting two innovative methods based on the provided approaches in the above two cases (one based on the first approach and another approach based on a combination of the above) with partial information. With respect to the vital role of resources in each industry, Shakeriet.al [20] investigated a trucks scheduling problem with resources constraint (resources considered in this article are the doors of crossdocking and lift trucks), and presented a robust two-phase heuristic algorithm to solve the problem after mathematical modeling. AlirezaAmini [21] in his master's thesis, modeled truck scheduling problems in a cross docking warehouse system with one entrance and one exit door assuming the truck failure and lead time and solved with several meta-heuristic methods. In literature, it was the subject of works that review related literature to cross docking. In the most comprehensive works to date, Van bell et al. [8] and Stephen and Boysen, [22] investigated problems in cross docking warehouse that the topic of scheduling issues is also a part of these works. Of course, previously, Boysen and Fliedner [9] review and categorize trucks scheduling problems at cross docking warehouses particularly them have crossed over. Each of these two works has classifications according to their views. Boysen and Fliedner [9] study and categorize scheduling problems from 3 directions: doors, operational specifications and objective functions. The other sections categorize as follows. In the second part, the problem characteristics and explanation of model is stated. In the third section, the proposed solution method is first expressed to calculate the objective function and then water cycle algorithm is described. In the fourth section, the numerical results obtained from different size problems are presented and analyzed. Finally, in the fifth section, conclusions and suggestions for the future research are stated.

Problem definition

Here, we propose a basic mathematical model of trucks scheduling. Egbelu and Yu in 2008[23], investigated the problem of incoming and outgoing trucks scheduling cross docking warehouses. Of course, we have the temporary storage system there. We defined the basic assumptions as follows: incoming trucks are entering distribution center and they empty the goods. Goods transported by transport inside the warehouse. In the warehouses, the products are transported by transportation devices. Output trucks take goods from the docks and go to desired destinations. This problem is not related to the processes within the warehouses and only studies the trucks scheduling. It also assumes that the goods are supplied near output trucks temporarily. In addition to the above conditions, we have also other assumptions in the problem which are as follows:





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1. All the incoming and outgoing trucks are ready for work at the moment of zero.
2. Long-term storage is prohibited.
3. The input and output goods must be equal.
4. The goods loading sequence is determined by input trucks.
5. We can only load the required number of products from the incoming truck.
6. Products are loaded as a unit.
7. Time changes of input and output trucks are identical.
8. We have one entrance and one exit.
9. A capacity for the temporary storage has been not set.
10. Moreover, the following information is already at our disposal: the types and numbers of each input truck, the types and numbers of needed products of output trucks, the loading and unloading time of goods, the time of goods transport from entrance to exit door, changing time of trucks. Signs used in this model are:

Parameters

- R: the number of incoming trucks in the system
- S: the number of outgoing trucks in the system
- N: the number of product types in the system
- R_{ik}: the number of product type k that is shipped by incoming truck i.
- S_{jk}: the number of product type k that is required for outgoing truck j.
- D: time to change the truck.
- V: product transfer time from the entrance to the exit door
- M: very large number.
- Continuous variables
- T: maximum time to complete
- C_i: when the incoming truck i reaches the entrance
- F_i: when incoming truck i leaves the entrance
- D_j: when outgoing truck j reaches the exit door.
- I_j: when outgoing truck j leaves the exit door.

Integer variable

- X_{ijk}: the number of type k units that is transmitted from incoming truck i to outgoing truck j

Variables zero and one

- U_{ij} gets 1, if we have product transfer from incoming truck i to outgoing truck j
- p_{ij} gets 1, if in the sequence, incoming truck i is after outgoing truck j (in entrance trucks sequence).
- q_{ij} gets 1, if in the sequence, outgoing truck j is after incoming truck i (In exit trucks sequence).

It is formulated as follows: $Min \quad T$

Subject to

$$T \geq L_j \quad \text{for all } j \quad 1$$

$$\sum_{j=1}^S X_{ijk} = r_{ik} \quad \text{for all } i, k \quad 2$$

$$\sum_{i=1}^R X_{ijk} = s_{jk} \quad \text{for all } j, k \quad 3$$





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- $x_{ijk} \leq MU_{ij}$ for all i, j, k 4
- $F_i \geq c_i + \sum_{i=1}^N r_{ik}$ for all i 5
- $c_j \geq F_i + D - M(1 - P_{ij})$ for all i, j and where $i \neq j$ 6
- $c_i \geq F_j + D - Mp_{ij}$ for all i, j and where $i \neq j$ 7
- $p_{ii} = 0$ for all i 8
- $L_j \geq d_j + \sum_{i=1}^N s_{jk}$ for all j 9
- $d_j \geq L_i + D - M(1 - q_{ij})$ for all i, j and where $i \neq j$ 10
- $d_i \geq L_j + D - Mq_{ij}$ 11
- $q_{jj} = 0$ for all j 12
- $L_j \geq ci + V + \sum_{i=1}^N X_{ijk} - M(1 - U_{ij})$ for all i, j 13

all variables ≥ 0

Limit 1: Maximum lead time is greater or equal to the time of the last outgoing truck that leaves the system.

Limit 2: Total products units of type k that is transferred from incoming truck i to outgoing truck j is equal to the number of product products units of type k that are taken from incoming truck i.

Limit 3: Total products units of type k that is transferred from incoming truck i to outgoing truck j is equal to the number of product products units of type k that are delivered to outgoing truck j.

Limit 4: shows the relationship between x_{ijk} and U_{ij} .

Limits 5 to 7: determine a sequence of input and output times for outgoing trucks.

Limit 8: No truck from incoming trucks is placed before itself in the sequence. (Incoming trucks cannot place after itself in the sequence)

Limits 9 to 11: do the same as limits 5 to 7 for outgoing trucks.

Limit 12: No truck from outgoing trucks is placed before itself in the sequence.

Limit 13: creates a relationship between departure times of each outgoing truck and arrival times for each incoming truck [12].

Water cycle optimization algorithm

Water cycle optimization algorithm is a meta-heuristic algorithm that was inspired by nature's water cycle. This algorithm was presented in 2012 by MortezaHosseini et al. [37]. The purpose is modelling the water cycle that same as rain, population of each generation has a good variety and distribution and also according to the simulating the process of pouring water movement toward the river, the algorithm has high convergence speed to achieve global optimized condition. In addition, with modeling saturation of pits during the raining, escape from local optimum is designed that makes that algorithm has appropriate search in the problem space and does not fall into the trap of local optimum. This algorithm includes a set of default values for each parameter of the problem. In each round of the algorithm execution, for each parameter, one value priority is selected and to forms a smaller set of values, then taking into account the competency of values, by combining the values of each parameter, several solutions for the





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problem are produced. Then every solution of the problem, using local search algorithm, is placed in its local optimum. Each local optimization will get a capacity value according to its fitness that states the persistence of that solution on the number of consecutive performances and also the possibility of being candidate for moving other answers to it. In each round of run, the problem solutions that should come out from the problem, move toward solutions with better competency and along the way, if they did not deserve better competency, reach their selected local optimum. In each round, a solution of the problem with the utmost competency remains constant and at the end of each round, the values of each parameter in the solution enter initial values. At the end of the N rounds of algorithm, the optimal solution of the N-th round, is the optimum solution in the problem. Water cycle optimization algorithm includes 6 steps (initializing, evaporation, condensation and the formation of rain, local search, the surface flow of water, entering water from the river to the ocean):

Initializing: As most of evolutionary algorithms, this algorithm also begins with a set of initial values. In the first implementation of the algorithm, the ocean is initialized by random initial values. To solve discrete problems, it is assumed that the answer is a permutation of numbers from 1 to n (for n-variable problems). It is an $n \times n$ matrix that

Oceansize

the initial value will be n , equaling with the size of the ocean. In an example with 5 variables, the ocean

$$\frac{200}{5} = 40$$

is a 5 x 5 matrix and the initial value of all elements will be 40. These numbers will change in the step of entering the river water to the ocean. In this matrix, the columns represent variable (droplet) in the problem. Rows show the possibility of placing a variable (droplet) in the positions "1" to "n".

The step of evaporation from the ocean and making droplets of the cloud

At this stage, some droplets should be selected to evaporate or form drops. That is, according to the numbers in each column, a droplet is chosen, such that as the number for a droplet is bigger, they are more likely to be selected. A simple solution could be that we sum the numbers of droplets in the first column, together and then we produce a random number between 1 and droplets numbers summation. This random number is placed in the digit range of each droplet. At the end, having n droplets, a droplet will be formed.

Local search: In local search, a drop should move to a better neighborhood. Three neighbor types should be defined for permutation problems whose includes replacing two values, reversing a range, two generated random numbers, such that the first element is converted to the second element. In the replacement of two values, two location are randomly selected and its values move with each other. Example: 1 5 4 2 3 elements and 1 and 4 are selected and the result is 4 5 1 2 3. In reversing a range, two random values are generated and the range between them is reversed. Example 1 5 4 2 3, then 1 and 4 are selected and the result is 1 2 3 4 5. When two random number are generated, such that the first element is converted to the second element, example 1 5 4 2 3 1, then 1 and 4 are selected and the result is 4 1 5 2 3 4.

Surface running water

The movement method of overflow water from source pit to destination pit is such that a permutation of numbers from 1 to n is randomly generated and according to the permutation, droplet equaled to droplet in destination on that place, is found in the pit of source and is replaced with the source pit droplet on that place. Source pit: 1 3 5 4 2 and destination pit: 5 1 2 3 4 and the generated permutation: 1 5 4 2 3 and the source pit after one step move: 1 3 2 4 5. The first number of the generated permutation is 3. The third number in the destination pit is 2 which should be placed in the source pit in its original location, it means, it should be used instead of 5.





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Entering the river water to the ocean

In each stage, the numbers within the ocean will be changed as follows.

$$s_{ij} = s_{ij} - \frac{\alpha \times s_{ij}}{\text{ocean size}} \quad 1 \leq i, j \leq n \quad 1$$

$$s_{r_i,j} = s_{r_i,j} + \alpha \quad 1 \leq i \leq n \quad 2$$

Array s are the same ocean, α is a factor that is received from input. R is also the river.

Numerical Results

Each meta-heuristic methods needs some parameters for its specific process to investigate the results of desired meta-heuristic methods. In this paper, first, the parameter adjustment is done based on the Taguchi method. It should be noted that the value of these parameters were selected after tests for each algorithm as follows. In WC algorithms, five parameters (drops =4) and (number of repetitions(Maxit) =100) and (the value of the input (a)=1), (Ocean size=100) and (capacity(const) =1000) are considered. In algorithm GA, four parameters of people number (npop = 100), the number of iterations (MaxIt = 50), cross dock rate (CrR = .85) and the mutation rate (MuR = 0.3) are considered. In SA algorithm, parameters f (T0 = 1000) and reducing temperature coefficient (alpha = 0.98), the number of iterations(MaxIt) =50), (the number of internal repetitions(MaxIt2) =5) are observed as vital parameters. In addition, for ICA algorithm, parameters of (the number of countries(ncount)=100), (the number of early colonists(nimp)=5), (beta=2), (prevolution(percentage of revolution) =0.1) , (positive number, usually between zero and one and closer to zero(zeta) =0.1) ,(maxdecade=70), are considered and for PSO algorithm, parameters of particle number (npop=50), the inertia weight w (inertia weight =0.3) ,(the number of iterations(MaxIt) =70) , (C2 =1, C1 =0.5) and positive and constant positive constants that are called hangs cognitive parameters (cognitive) and social parameters (social), respectively, are intended.

In this model, the problem objective is to find the best sequence for incoming and outgoing trucks. Using Lingo software, we solved a small scale problem and achieved the best input and output sequence the results which is shown in Table 1. Due to the increasing the scale of the problem, solving with meta-heuristic algorithms using MATLAB software is applied. The provided algorithm by 12 times, was implemented for each problem and then the average solutions, the best solutions, the time for obtained algorithms and relative percentage deviation are calculated and presented in this number of repetitions. Tables 2, 3, 4, 5 shows the results of the proposed algorithms on the problems and average solutions. Figures 2, 3, 4, 5 denote a comparison of algorithms based on the problems and mean objective function, comparing algorithms based on problems and best time to complete the operation, Comparing algorithms based on problems and solving algorithms time, comparing algorithms based on relative percentage deviation (RPD) by interval graph with 95% confidence for the completion of operations.

As can be seen in Table 4 and Figure 4, for 12 times, the time for the best obtained solutions of algorithms is related to the ICA algorithm. Genetic, simulated annealing, particle swarm and the water cycle algorithms are in the next places.

At the end of the first model comparisons in this section, the relative percentage deviation (RPD) for each algorithm in each case is calculated according to the following formula.

$$RPD = \frac{SOL_{avg} - SOL_{best}}{SOL_{best}} \times 100$$

So that, sol_{best} is the best solution of each problem and sol_{avg} is average obtained solution from the algorithm implementation and are visible in Table 5. In order to compare algorithms based on criteria RPD, graph interval at 95% confidence is shown in Figure 5.





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CONCLUSION

In fact, the truck scheduling problem can be interpreted as a problem for finding solution to the questions that "where" and "when" trucks do its duty. In other words, each truck must be allocated to one of the warehouse doors. This implies that the truck scheduling problem is the same as problem of finding the best sequence of trucks scheduling for each door. This paper investigated truck scheduling problem in a case that modern solution is provided for truck scheduling problem in one-door mode with the new water cycle algorithm and the and utilizes a comparison of several meta-heuristic algorithms to solve the desired model and comparisons show that the new water cycle algorithm outperforms the genetic, simulated annealing, particle swarm and imperialist competitive algorithms, because, for the most times in the model, this method is superior to other methods and other algorithms is in the next ranks in terms of performance. For future research, we recommend other ways to solve problems and compare them with the current solution. Investigating the problem from the perspective of queuing systems can be an interesting study for this field and designing algorithms of exact solution for single-door problems is a good idea for future researches.

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Initialize sea

While (All of conditions)
    Evaporation (Cloud initializationby Sea)
    Rain Formation (Drops Production)
    Dropshill-climbing
    Add water to boreholes
    The move overflow pits to better pits
    Pouring water of river into the sea

End
    
```

Figure 1: Pseudo-code Algorithm of water cycle

Table (1): The small size problem with Lingo

output sequence	input sequence	Product number	objective function	Product Type	number of outgoing trucks	Number of incoming truck
[1,2]	[1,2]	30	51	2	2	2





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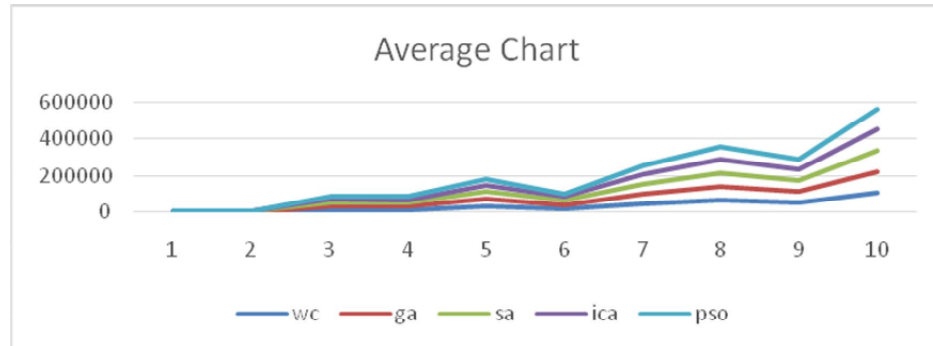


Figure 2: Comparison of average solutions from five Algorithm

Table 2: Average answer from five Algorithm

Average response					total number Product	Product Type	number of outgoing trucks	number of incomin g truck	Problem set
PSO	ICA	SA	GA	Wc					
914.3846	890.0769	899.1538	881.5833	898.3846	726	11	11	11	1
1169.308	1167.833	1141	1143.917	1143.167	936	12	12	12	2
17882.75	17761	17727.75	17593.83	17659.42	14528	11	13	13	3
17091.92	17044.92	16978.83	16924.73	16976.67	14048	13	14	14	4
37051.42	36983.58	36696.92	36606.18	36664.67	30237	14	15	15	5
20773.83	20790.92	20581.92	20549.17	20517.42	17135	11	16	16	6
51809.33	51840.17	51588.25	51371.58	51392.92	43092	12	17	17	7
73073.25	72802.14	72365.33	72346.25	72174.92	61209	13	19	19	8
58231.75	58373.08	58126.5	58066.33	57875.93	49610	12	20	20	9
113518.9	114135.5	113182.2	113261.1	110296	99299	15	30	30	10





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Table 3: The best results of the five Algorithm

Best sequence		Best Answer					Problem set
output	input	PSO	ICA	SA	GA	Wc	
[2 1 7 10 11 6 5 3 4 9 8]	[4 7 2 5 11 3 10 1 6 8 9]	878	782	862	797	873	1
[12 3 6 11 9 4 8 5 1 10 7 2]	[11 2 9 3 12 6 7 1 8 10 5 4]	1150	1151	1016	1012	1005	2
[7 2 4 3 8 12 6 10 5 11 1 13 9]	[7 8 4 11 10 3 6 12 1 5 2 9 13]	17165	17427	17462	17269	16922	3
[14 11 13 1 2 3 7 5 12 9 6 8 10 4]	[8 7 13 5 3 6 2 4 9 11 10 14 1 12]	16437	16794	16914	16763	16864	4
[4 13 9 6 7 12 10 14 3 2 11 1 8 15 5]	[13 8 9 3 14 7 12 15 5 10 2 4 1 11 6]	36075	36379	35939	36084	36395	5
[13 2 6 8 1 3 12 9 16 10 15 4 11 14 7 5]	[8 1 13 2 16 5 4 14 3 12 11 7 15 6 10 9]	20478	20401	20305	20230	20302	6
[17 3 1 9 6 15 5 4 8 7 10 12 16 13 2 11 14]	[8 6 11 12 5 16 17 13 10 4 1 14 2 7 15 3 9]	50909	51183	50986	50929	50901	7
[7 9 1 19 8 4 11 15 6 2 16 18 12 10 3 14 17 5 13]	[2 19 5 8 3 11 14 16 7 9 15 17 4 13 10 12 6 1 18]	71853	71415	71429	71678	71429	8
[5 17 15 14 18 11 7 13 1 12 2 10 9 8 6 3 4 19 20 16]	[3 8 17 14 7 1 2 19 13 11 15 12 16 4 20 10 6 18 9 5]	59227	58991	59267	57068	58510	9
[20 21 27 10 11 22 6 17 2 23 7 24 19 30 1 14 18 25 26 3 9 12 16 5 28 13 4 29 8 15]	[21 29 14 4 6 22 27 17 20 10 26 15 3 2 30 19 12 25 28 7 9 13 8 18 5 23 11 16 1 24]	112343	113193	111203	112748	109059	10

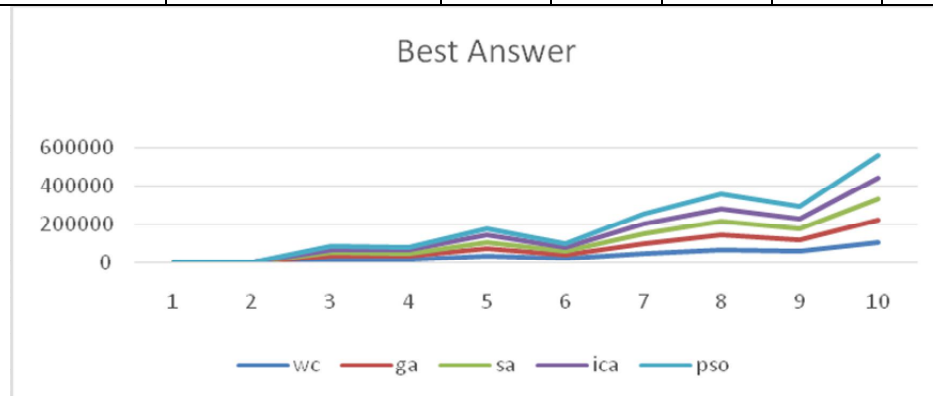


Figure 3: Compare the best results of five algorithms





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Table 4: Time taken to solve the best questions related to algorithms

Best Answer Time					Problem set
TimeICA	TimePSO	Time SA	TimeGA	WF Time	
0.024717	3.5852	862	2.7945	4.9352	1
0.011909	4.8128	0.023711	3.5265	7.0953	2
0.18127	41.6739	0.23108	64.7842	108.5839	3
0.16973	40.8022	0.22627	59.1447	105.8559	4
0.27441	138.1071	0.71205	50.069	242.0494	5
0.14911	73.8604	0.38288	28.0219	158.931	6
0.9103	132.5504	0.67315	70.9924	381.4099	7
0.25676	267.1869	1.3021	66.4215	1.3827	8
0.57064	137.6754	0.71824	53.4105	788.1646	9
2.0505	409.123	2.1355	100.2769	2190.0158	10

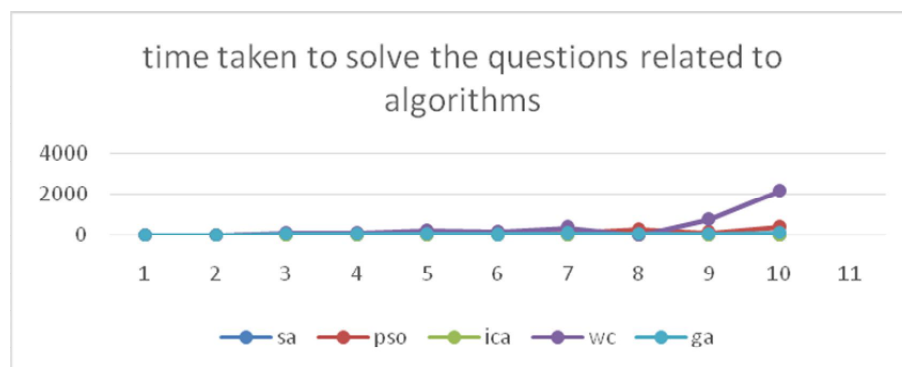


Figure 4: Compare the the best results from five Algorithm





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Table 5: Best and Average Answer five algorithms

Average response					Best Answer					Problem set
PSO	ICA	SA	GA	WF	PSO	ICA	SA	GA	WF	
914.3846	890.0769	899.1538	881.5833	898.3846	878	782	862	797	873	1
1169.308	1167.833	1141	1143.917	1143.167	1150	1151	1016	1012	1005	2
17882.75	17761	17727.75	17593.83	17659.42	17165	17427	17462	17269	16922	3
17091.92	17044.92	16978.83	16924.73	16976.67	16437	16794	16914	16763	16864	4
37051.42	36983.58	36696.92	36606.18	36664.67	36075	36379	35939	36084	36395	5
51809.33	51840.17	51588.25	51371.58	51392.92	50909	51183	50986	50929	50901	7
73073.25	72802.14	72365.33	72346.25	72174.92	71853	71415	71429	71678	71429	8
58231.75	58373.08	58126.5	58066.33	57875.93	59227	58991	59267	57068	58510	9
113518.9	114135.5	113182.2	113261.1	110296	112343	113193	111203	112748	109059	10

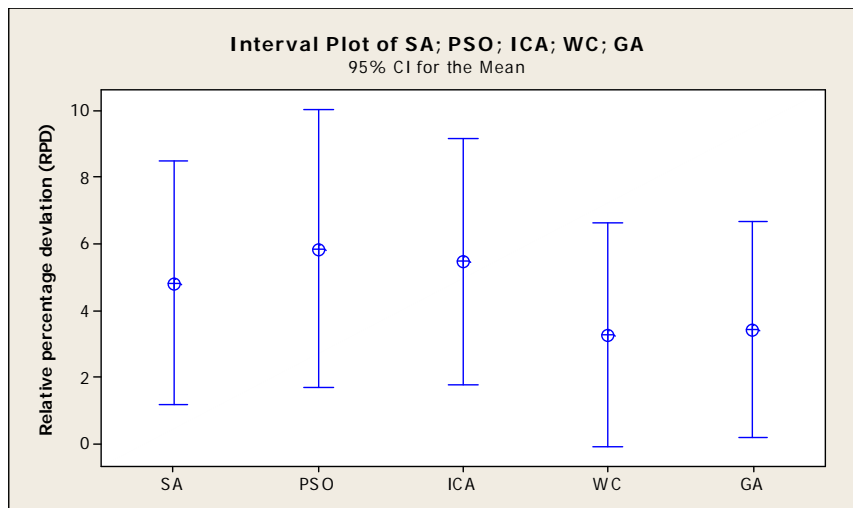


Figure 5: Comparison of algorithms based on the criteria RPD





A study on Professional Satisfaction among Subject Matter Specialists of Krishi Vigyan Kendras

Bimal.P. Bashir^{1*}, N. Narmatha² and K.M.Sakthivel²

¹SRF in Malabari goat improvement Programme, University Sheep and Goat Farm, Mannuthy, Thrissur-680651, Kerala, India.

²Department of Veterinary and Animal Husbandry Extension, Veterinary College and Research Institute, Namakkal-637 002, Tamil Nadu, India.

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*Address for correspondence

Bimal.P. Bashir

SRF in Malabari Goat Improvement Programme,

University Sheep and Goat Farm,

Mannuthy, Thrissur- 680651, Kerala, India.

Email: bimalpbashirdrvet@gmail.com



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ABSTRACT

The study was conducted during the year 2013 by covering 12 Krishi Vigyan Kendra's subject matter specialists, located at various districts of Tamil Nadu and Kerala. The study revealed that majority of the respondents (84.62 per cent) were satisfied with job component like professional social prestige followed by salary (67.69 per cent), job authority (63.08 per cent) and leave facility (61.54 per cent) provided by Krishi Vigyan Kendra. The study also showed that majority of the subject matter specialists were satisfied with various sub-components of team work such as confidence in delegated authority (75.38 per cent), appreciative attitude of colleagues (66.15 per cent) and mutual desire to give and take (63.08 per cent). The respondents were satisfied with sub-components of peoples participation such as effort in implementation of extension programme (72.31 per cent), interest in extension work (66.15 per cent) and acceptance of technology and local response (64.62 per cent). The study also indicated that more than 44.62 per of the subject matter specialists studied were not satisfied with the promotion opportunities in Krishi Vigyan Kendras.

Key words: - Subject matter specialists, Team work, Job satisfaction, Krishi Vigyan Kendra



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INTRODUCTION

The concept of conducive professional satisfaction through an open organisational climate, has emerged as a successful way of studying the inter group dynamics of organisational behaviour pattern and structure of the organisation. Organisational behaviour studies mainly aim at integrating the individual with the organisation. The organisation's responsibility is to provide a congenial climate and satisfying environment, in which people can gain overall satisfaction in their quality of work life and help organisation to attain its objectives. Devadass (2011) reported that job characteristics, management practices, employee characteristics and broader environmental factors are the key variables influence employees' motivation in organisation. If employee has a positive perception of quality of work life in the organisation, he or she will strive to further improve the working conditions and increasing productivity. This is more so, and very much applicable, to an organisation like Farm Science Centre' popularly known as Krishi Vigyan Kendra (KVK) established by Indian Council of Agricultural Research (ICAR).The professional satisfaction of subject matter specialists in Krishi Vigyan Kendra is pivotal to make themselves fit into the system which generates motivation commitment and dedication to transfer the technological information and skill to the farmers through training. Ralea (2011) opined that team work can enable higher level of success to individuals in an organisation and also stressed the need of good leadership to enhance good team work. The study also revealed that job satisfaction is of great significance in the functioning of any organisation. Hence, the assessment of satisfaction of subject matter specialists in the Krishi Vigyan Kendras will therefore, indicate the type of improvement needed in the Krishi Vigyan Kendras. Keeping the central themes of professional satisfaction of the organisation, the present study was undertaken to find out the perception of subject matter specialists of Krishi Vigyan Kendra, working under state University and non-government organisations about their professional satisfaction relating to their degree of satisfaction in people's participation, team work, and job.

METHODOLOGY

The study was carried out during the year 2013, in 12 Krishi Vigyan Kendras, located at various districts of Tamil Nadu and Kerala, under zone VIII. Subject matter specialists (SMS) constituted the sample for the study. The respondents also belonged to different educational qualifications and disciplines. Three important components of satisfaction viz., people's participation, team work and job were chosen for the present study. Using these items , the interview schedule was prepared using the parameters used by Hanumanaikar *et al.* (2011) and the 65 respondents were interviewed. Three point scale was used against each of the components with satisfied, some extent satisfied and not satisfied.

RESULT AND DISCUSSION

The findings of the present study have been presented under following heads:

Satisfaction with people's participation

The data presented in Table 1 reveal that 60.00 per cent of the subject matter specialists were some extent satisfied with financial and other help, followed by 47.69 per cent with voluntary participation. However, 72.31 per cent of the participants were satisfied with sub components like effort in implementation of extension programme followed by 66.15 per cent interest in extension work, 64.62 per cent each in acceptance of technology and local response. A closer look at the data in the table 1 indicated that most of the subject matter specialists were satisfied and some extent satisfied to all the six components of people's participation in the Krishi Vigyan Kendras work. This definitely shows that the subject matter specialists of Krishi Vigyan Kendras have better working environment and satisfaction for discharging their day to day responsibilities, so far as people's participation is concerned.



**Bimal.P. Bashir et al.****Satisfaction with team work**

The degree of satisfaction with teamwork by the subject matter specialists was also studied and is presented in Table 2. It shows that majority of subject matter specialists were satisfied with various sub-components of team work in the Krishi Vigyan Kendras, like 75.38 per cent with confidence in delegated authority, 66.15 per cent with appreciative attitude of colleagues, 63.08 per cent with mutual desire to give and take and 56.92 per cent with procedural design to work together. Most of the SMS were satisfied with the sub-components of team work indicates that they have a team spirit, we feeling and they interact openly, honestly and spontaneously would improve the appreciative attitude of SMS to fulfill the mandate of KVK (Jyothi, 2006). The mutual desire to give and take along with delegated authority helps to accomplish the given task and responsibility. This clearly indicates that most of the subject matter specialists in the Krishi Vigyan Kendras were content with mutual support and help in teamwork to accomplish their tasks and responsibilities. The positive and significant characteristics of the team work of the Krishi Vigyan Kendras are to be exploited more efficiently to make Krishi Vigyan Kendras training programme activities meaningful, purposeful and result oriented.

Satisfaction with job

The degree of satisfaction with the job by the subject matter specialists was also studied and presented in Table 3. The table shows that almost all the 11 sub-components of job satisfaction, the subject matter specialists had perceived that they were satisfied. It was found that Majority (84.62 per cent) of the respondents were satisfied with professional social prestige followed by 67.69 per cent with salary, 63.08 per cent with job authority, 61.54 per cent with leave facility, 58.46 per cent with facilities provided by KVK. The table also indicates that 44.62 per cent and 38.46 per cent of the respondents were not satisfied with the promotion as well as incentive and rewards respectively. Similarly, in case of work distribution 43.08 per cent of the respondents perceived it as somewhat satisfied, whereas, 38.46 per cent and 24.62 per cent of respondents were somewhat satisfied with service rules and allowance like PF, Pension etc. However, analysing overall satisfaction of the subject matter specialists, it is to be stated that almost all the respondents were content with various subcomponents of job presently they are performing in Krishi Vigyan Kendra excepting promotion, incentive and reward and allowance like PF and pension etc. this findings highlights the good work environment in Krishi Vigyan Kendra as well as professional satisfaction among the subject matter specialists and may be utilised to improve the efficiency of subject matter specialists for their discharge of duties. Since job satisfaction certainly affects the productivity in the long run, measures need to be taken for suitable rewards and better promotion opportunities and would ultimately help the SMS to discharge their duties with highest job satisfaction (Meena and Singh, 2012).

CONCLUSION

It is concluded from the above findings that out of 22 sub-components pertaining to professional satisfaction of subject matter specialists in relation to people's participation, team work and job satisfaction, more than 61 per cent of the respondents were satisfied with 11 sub-components. The respondents were not satisfied with the components, namely, financial and other help, proper incentive for teamwork and feedback facilities available in the organisation, less chances for promotion and allowance like PF, pension etc. Looking to the perception of respondents in the non-satisfied items, it is suggested that Krishi Vigyan Kendra staff should be treated at par with government employees and more funds are to be provided for strengthening the infrastructural facilities and various demonstration units for effective conduct of vocational programmes etc. Efforts must be taken for better to improve the quality of work life of subject matter specialists in Krishi Vigyan Kendras.





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Table 1 Satisfaction in Peoples Participation

N=65

Sl.No.	Category	Satisfied		Somewhat satisfied		Not satisfied	
		F	%	F	%	F	%
1	Effort in implementation of extension programme	47	72.31	18	27.69	0	0.00
2	Interest in extension work	43	66.15	22	33.85	0	0.00
3	Acceptance of technology	42	64.62	22	33.85	1	1.54
4	Local response	42	64.62	22	33.85	1	1.54
5	Voluntary participation	29	44.62	31	47.69	5	7.69
6	Financial and other help	18	27.69	39	60.00	8	12.31

Table 2 Satisfaction with Team Work

N=65

Sl.No.	Category	Satisfied		Somewhat satisfied		Not satisfied	
		F	%	F	%	F	%
1	Confidence in delegated authority	49	75.38	15	23.08	1	1.54
2	Mutual desire to give and take	41	63.08	24	36.92	0	0.00
3	Appreciative attitude of colleagues	43	66.15	18	27.69	4	6.15
4	Procedural design to work together	37	56.92	27	41.54	1	1.54
5	Proper incentive for team work	26	40.00	27	41.54	12	18.46





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Table 3 Satisfaction with Job

N=65

SI.No.	Category	Satisfied		Somewhat satisfied		Not satisfied	
		F	%	F	%	F	%
1	Professional social prestige	55	84.62	9	13.85	1	1.54
2	Promotion	21	32.31	15	23.08	29	44.62
3.	Salary	44	67.69	19	29.23	2	3.08
4	Incentives and rewards	26	40.00	14	21.54	25	38.46
5	Facilities provided by KVK	38	58.46	21	32.31	6	9.23
6	Job authority	41	63.08	19	29.23	5	7.69
7	Service security	35	53.85	20	30.77	10	15.38
8	Work distribution	33	50.77	28	43.08	4	6.15
9	Service rules	32	49.23	25	38.46	8	12.31
10	Allowance like PF, Pension etc.	35	53.85	16	24.62	14	21.54
11	Leave facility	40	61.54	16	24.62	9	13.85





RESEARCH ARTICLE

Impact of Vehicular Emission on Leaf Stomatal Studies of Some Common Plants in NH-210 Road Side and Agricultural Side Plants

R.Packiyaraj¹, M.Senthil kumar¹, T.Nagarajan, S.Subbaiya and S.Alagumaian*

¹Ph.D Research scholar, and Research Department of Botany, H.H.The Rajah's college, Pudukkottai, Tamil Nadu, India.

²Assit. Prof. and Guide Supervisor PG and Research Department of Botany, H.H.The Rajah's college, Pudukkottai, Tamil Nadu, India.

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*Address for correspondence

Dr.S.Alagumaian
Assitant Professor and Guide Supervisor,
PG and Research Department of Botany,
H.H.The Rajah's college, Pudukkottai,
Tamil Nadu, India.



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ABSTRACT

The present investigation was conducted from 2013-2014 on the plant growing specific area of NH-210 road site designated as polluted site and along agricultural field, designated as control site. The present investigation sought to ascertain plant responses to vehicular emission in terms of gross leaf anatomical structural changes 14 most common road and agricultural site. Plants indicating the presence of vehicular air pollutants in the environment the floristic survey of 75km of busy road sides of a biodiversity rich tropical zone Trichy- Pudukkottai road way Tamil Nadu south India showed species the results revealed that leaf gross anatomical changes particularly stomata size, number and index was significantly affected by the stress of auto mobile exhaust emission with high traffic density in urban areas these modification can be considered as indicators of environmental stress.

Key words: vehicular emission, air pollution, leaf anatomy, stomata, road site plants.

INTRODUCTION

Air pollution in form of particulate matter is a serious problem affecting developed and developing countries. In many developing countries including India, the levels of air pollutants are increasing rapidly in urban and per-urban areas. The increasing number of industries and automobile vehicles are continuously adding toxic gases and other substances to the environment the booming vehicular population has completely transformed the socio-economic

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scenario in urban areas of India. Automobile is the main source of pollutants in air. Exhaust emissions from the diesel-powered vehicles have low carbon monoxide (CO) and un-burnt hydrocarbons, while nitrogen oxide (NO) is present in high concentration than petrol powered vehicles. The number of vehicles in India has 19th century reached over 26.5 million (Pundir, 1994). Automobile is the main source of pollutants in air. Pollutants nitrogen and sulphur, hydrocarbon, ozone, particulate matters, hydrogen, fluoride, peroxyacyl nitrates (PAN) etc. The automobile pollutants have long term effects on plants by influencing CO₂ contents, light intensity, temperature and precipitation.

Plants are also helpful in cleaning the environment leaf is the plant part, which is most sensitive to pollution. Physiological activity of leaf like stomata opening can also affected by air pollution. Particularly growing in plants urban areas are affected greatly due to varieties of pollutants and their survival is correlated with structural and metabolic adaptations to the air polluted environmental conditions Wuytack *et al.*, (2010). Stomata (stoma, a mouth) are very minute openings formed in the epidermal layer of green aerial parts of the plant, particularly in the leaves. Each stoma is surrounded by the semi lunar cells known as the guard cells. The term 'stoma' is often applied to the stomatal opening and the guard cells Aggarwal (2000 b). Stomata begin to develop in a leaf shortly before the main period of meristematic activity in the epidermis is completed and continue to arise through a considerable part of the late extension of the leaf by cell enlargement. In leaves parallel venation, as in most monocotyledons and with the stomata arranged in longitudinal rows, the formation of stomata begins at the apices of the leaves and progresses in the downward direction. In the netted veined leaves, as in most dicotyledons, differential stages are mixed in a mosaic fashion. The air pollution constants a isotopic fractionation due to diffusion through the plant's stomata. The carbon isotope composition of plant tissue and CO₂ in the atmosphere, respectively. Due to the combined action of both diffusion and fixation, the intracellular concentration of CO₂ is less than the atmospheric concentration of CO₂. Because a land plant's main mechanism of responding to environmental conditions is by closing or opening stomata, variation in often interpreted as a change in CO₂ caused by a change in stomatal conductance. Indeed, many environmental characteristics known to directly affect stomatal aperture have been shown to be correlated with air pollutants (Martin *et al.*, 1988; Savard, 2010).

MATERIALS AND METHODS

Preliminary survey of the area showed that above plants have highest frequency and density along the NH- 210 roadway. Hence, these were selected for the studies.

Microscopy

Leaf surface characteristics were studied with light and scanning electron microscopes. For light microscopic study (LMS), leaf samples collected from control and polluted sites were thoroughly washed with tap water followed by de-ionized water to eliminate all loose dust particles from the leaf surface. Cuticles were separated from leaves by scraping with a safety.

Stomatal types

Using the field of view at objective magnification of 40x as a quadrature, the frequency of each stomatal type was expressed. Terminologies used with respect to stomatal types follows those of Dilcher (1974) and Metcalfe and Chalk (1988).

Epidermal studies

Mature leaves of the plants from polluted area as well as agriculture land plants are control were plucked and washed. For stomatal studies, cuticles were separated from leaves by scraping with a safety. The epidermal peels of mature leaves were taken out by the direct peel method (Epidermal peel of the leaf was peel out with help of forceps



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and celotape). The epidermal peels were stained 1% aqueous solution of safranin and mounted in glycerin. The leaf characters that were observed under LMS were size and frequency of epidermal cells, stomata, length and width of trichomes (non glandular and glandular). The microscope study (Phillips XL-20, the Netherlands) the image was taken at the magnification range of 200-1, 1,000x for observing stomatal structural details. Stomata and epidermal cells frequencies per mm² of leaf area were counted with help of camera lucida drawings. Stomatal index was calculated as defined by Salisbury (1927, 1932) viz.

Stomatal index = $100 / E + S$

Where E = is the number of epidermal cells.

S = is the number of stomatal cells per unit area.

RESULTS

The leaf epidermal features of top 14 species investigated were stomatal category and type of very common NH- 210 roadside flora and Agricultural field grown flora summarized in Table 1. Stomatal index of very common plant species of NH-210 roadside flora and Agricultural land flora present in Table 2.

DISCUSSION

Monitoring of air pollutants effects on vegetation is very important for the awareness their possible damages to the natural vegetation and crop plants and also to raise the alarm for possible risks to man and animals from air pollutants to which, plants leaf are more sensitive. The leaf epidermal cells of 14 species varied in shape from pentagonal, rectangular to hexagonal and irregular shape. Two types of stomatal category viz., amphistomatic and hypostomatic were observed. In road side plants, 11 species belongs to amphistomatic and 3 plants (*Acalypha indica*, *Datura metal* and *Wattakaka volubilis*) belongs to hypostomatic whereas in the case of agricultural field grown plants, all species (13) belongs to amphistomatic category except *Wattakaka volubilis*. This investigation find significant decrease in the size of epidermal cells Kulshrestha (1994b), stomata size and numbers per unit area in auto exhaust polluted population of 14 plants species collected from 210 NH roadside. The similar result was find on Kulshreshtha *et al.*, (1994) their investigation on the same trees in *Calotropis procera* L. and *Nerium indicum* plants, Kaur (2004) in *Citrus medica*. The variation of the stomatal index for the 14 species range from 9.61 % - 61.75 %. The stomatal frequency varied in the epidermis of all taxa indicating 61.75 in abaxial surface of *Leucas aspera* and 59.5 % in adaxial surface of *Tephrosia purpurea* in control Gostin (2009). The stomata are present on both surface of leaf but are usually more on the lower epidermis in species of *Amaranthus* and *Vigna* respectively. Similarly observed that result by Mbagwu and Edeoga (2006) in *Vigna spp.*

CONCLUSION

The observations recorded in the present study clearly indicated that pollutants emitted from the automobile exhaust exercised a decisive influence on plant anatomy. Leaf surface characters, including changes in stomatal numbers and index as response linked to air pollutant particles. Plants growing along roadsides are significantly modified due to the stress of automobile exhaust emission with high traffic density in urban areas. These changes can be considered as indicators of environmental stress. Among the plant species studied these with rough leaf surfaces (Road site) are most effective to capture particles in comparison to the smooth surface (Agricultural site) ones. However, the changes in the stomatal aperture (length and width of guard cell and stoma) did not show a clear pattern in response to the pollutant particles and these pollutant particles are change the plant leaf structure and characters.





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Table 1: Stomatal category and type of very common NH 210 roadside plant and Agricultural field grown plant

S. No.	Taxa	Stomatal category and type of Roadside plant			Stomatal category and type of Agricultural field grown plant		
		Category	Abaxial	Adaxial	Category	Abaxial	Adaxial
1	<i>Acalypha indica</i>	Hypostomatic	Anomocytic	-	Amphistomatic	Paracytic	Paracytic
2	<i>Boerhavia diffusa</i>	Amphistomatic	Anisocytic	Anisocytic	Amphistomatic	Anomocytic	Anomocytic
3	<i>Calotropis gigantea</i>	Amphistomatic	Paracytic	Paracytic	Amphistomatic	Paracytic	Paracytic
4	<i>Cleome viscosa</i>	Hypostomatic	Paracytic	-	Amphistomatic	Paracytic	Paracytic
5	<i>Croton sparsiflorus</i>	Amphistomatic	Paracytic	Paracytic	Amphistomatic	Paracytic	Paracytic





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6	<i>Datura metel</i>	Hypostomatic	Anisocytic	Anisocytic/ Anomocytic	Amphistomatic	Anomocytic	Anomocytic
7	<i>Heliotropium indicum</i>	Amphistomatic	Anomocytic	Anomocytic	Amphistomatic	Anomocytic	Anomocytic
8	<i>Leucas aspera</i>	Amphistomatic	Diacytic	Diacytic	Amphistomatic	Diacytic	Diacytic
9	<i>Ocimum sanctum</i>	Amphistomatic	Diacytic	Diacytic	Amphistomatic	Diacytic	Diacytic
10	<i>Parthenium hysterophorus</i>	Amphistomatic	Anomocytic	Anomocytic	Amphistomatic	Anomocytic	Anomocytic
11	<i>Pergularia daemia</i>	Amphistomatic	Paracytic	Paracytic	Amphistomatic	Paracytic	Paracytic
12	<i>Tephrosia purpurea</i>	Amphistomatic	Paracytic	Paracytic	Amphistomatic	Paracytic	Paracytic
13	<i>Tridax procumbens</i>	Amphistomatic	Anomocytic	Anomocytic	Amphistomatic	Anisocytic	Anisocytic
14	<i>Wattakaka volubilis</i>	Hypostomatic	Paracytic	-	Hypostomatic	Paracytic	-

Table 2: Stomatal index of very common NH 210 roadside and Agricultural field grown plants

S.No	Taxa	Type of Flora	No. of Stomata		No. of Epidermal cell		Stomatal Index	
			Abaxial	Adaxial	Abaxial	Adaxial	Abaxial	Adaxial
1	<i>A.indica</i>	Road side	216 ± 5.46	-	432 ± 5.86	240 ± 2.42	33.3 ± 3.33	-
		Agri - field	285 ± 5.92	143 ± 2.33	466 ± 6.32	324 ± 2.81	38.0 ± 1.65	30.6 ± 2.15
2	<i>B. diffusa</i>	Road side	96 ± 3.53	88 ± 1.56	864 ± 10.55	264 ± 2.04	10.0 ± 1.77	25.0 ± 1.85
		Agri - field	140 ± 8.46	129 ± 3.54	725 ± 9.62	227 ± 2.52	16.0 ± 1.65	36.2 ± 1.24
3	<i>C.gigantea</i>	Road side	344 ± 9.12	216 ± 4.21	2408 ± 20.41	1944 ± 21.15	13.0 ± 1.26	10.0 ± 1.55
		Agri - field	456 ± 10.35	254 ± 4.38	2021 ± 19.87	1812 ± 18.36	18.0 ± 1.84	12.2 ± 1.39
4	<i>C.sparsiflorus</i>	Road side	240 ± 8.44	104 ± 2.89	720 ± 9.52	416 ± 3.44	25.0 ± 2.41	20.0 ± 1.27
		Agri - field	315 ± 7.52	146 ± 2.45	648 ± 8.33	386 ± 2.89	32.7 ± 2.16	37.8 ± 2.09
5	<i>C.viscosa</i>	Road side	40 ± 1.72	0	352 ± 3.70	-	10.2 ± 1.22	0
		Agri - field	62 ± 2.25	37 ± 1.27	297 ± 2.92	385 ± 2.35	17.2 ± 2.72	9.6 ± 0.26
6	<i>D. metel</i>	Road side	200 ± 4.56	240 ± 4.55	600 ± 4.03	720 ± 7.45	25.0 ± 2.61	25 ± 1.52
		Agri - field	278 ± 7.49	293 ± 5.65	520 ± 4.26	645 ± 6.42	34.8 ± 2.89	31.2 ± 2.67
7	<i>H.indicum</i>	Road side	176 ± 5.54	140 ± 2.11	864 ± 8.29	800 ± 9.34	16.9 ± 2.05	14.8 ± 1.25
		Agri - field	240 ± 5.22	187 ± 2.89	786 ± 7.54	740 ± 4.16	23.3 ± 2.11	20.1 ± 1.75
8	<i>L. aspera</i>	Road side	288 ± 6.48	80 ± 1.34	256 ± 2.99	528 ± 4.38	52.9 ± 4.92	13.1 ± 1.36
		Agri - field	318 ± 6.78	99 ± 1.56	197 ± 2.07	481 ± 4.81	61.7 ± 5.22	17.0 ± 1.57
9	<i>O. sanctum</i>	Road side	128 ± 2.35	176 ± 3.22	480 ± 4.16	240 ± 2.18	21.0 ± 1.25	42.3 ± 1.21
		Agri - field	156 ± 2.33	187 ± 2.85	356 ± 3.91	217 ± 2.34	30.4 ± 3.17	46.2 ± 1.39
10	<i>P. daemia</i>	Road side	96 ± 1.90	80 ± 1.30	400 ± 4.17	192 ± 1.08	19.3 ± 2.55	29.4 ± 2.91
		Agri - field	120 ± 1.87	105 ± 3.77	384 ± 3.27	328 ± 2.26	23.8 ± 2.11	24.2 ± 2.25
11	<i>P.hysterophos</i>	Road side	80 ± 1.25	176 ± 3.69	240 ± 2.62	528 ± 3.77	25.0 ± 2.71	25.0 ± 2.11
		Agri - field	142 ± 3.67	233 ± 3.17	210 ± 2.12	465 ± 4.56	40.3 ± 2.14	50.1 ± 4.26
12	<i>T. procumbens</i>	Road side	120 ± 5.66	80 ± 1.33	240 ± 2.31	160 ± 2.14	33.3 ± 2.13	33.3 ± 2.33
		Agri - field	180 ± 4.71	100 ± 1.66	156 ± 1.92	137 ± 2.40	53.5 ± 3.37	42.19 ± 3.15
13	<i>T.purpurea</i>	Road side	480 ± 8.22	136 ± 2.42	960 ± 11.22	408 ± 4.07	37.5 ± 2.54	33.3 ± 2.36
		Agri - field	540 ± 10.57	213 ± 4.22	870 ± 10.42	358 ± 3.83	38.3 ± 3.26	59.5 ± 3.42
14	<i>W.volubilis</i>	Road side	88 ± 1.38	0	264 ± 2.46	-	25.0 ± 1.55	0
		Agri - field	130 ± 2.36	0	384 ± 3.45	-	25.2 ± 1.59	0





Locating the Most Suitable Industrial Estate for Relocation and Transfer of Casting Small Industries in Tehran by using ANP

Amir Mohammad Ramedani* and Kambiz Shahroodi

Industrial Engineering, Islamic Azad University, Bandar e Anzali International Branch, Iran.

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*Address for correspondence

Amir Mohammad Ramedani

Industrial Engineering,

Islamic Azad University, Bandar e Anzali International Branch, Iran.

Email: Sweetpeak2002@yahoo.com



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ABSTRACT

The development of the world economy, industrial activities and the population increase in big cities, especially in developing countries, has produced some environmental problems. According to the urgency of environmental protection, industrial units must not be established in places where the environmental systems are disturbed. To protect the environment, industrial estates are constructed for the industrial development of the country, accumulation of small industries from any province, establishment of various industries and transfer of polluting industries from cities to these places. One of the important industries of the country is the casting industry that has a lot of environmental pollutants. Using Analytic Network Process (ANP) that is the most efficient decision making technique, the present article has located the most suitable industrial estate to relocate units of small casting industries in Tehran to industrial estates.

Keywords: Location, Industrial Estate, Relocation, Small Industries, Casting Industry, ANP

INTRODUCTION

The development of the world economy, industrial activities and the population increase in big cities, especially in developing countries, has produced some environmental problems. According to the urgency of environmental protection, industrial units must not be established in places where the environmental systems are disturbed. For this reason, industrial estates are a suitable place for establishment of new industrial units or relocation of polluting and disturbing industries. Tehran Industrial Estates Company was established in Tehran to construct industrial estates around the province and supply their infrastructural facilities. The main aim of the company was to establish





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different industries and relocate polluting and disturbing industries in Tehran to suitable places to protect the environment. Therefore, industrial units with different pollutants must be identified and relocated to industrial estates. Since casting industries are one of the important industries of the country, the present article has examined the location of the most suitable industrial estate to relocate units of small casting industries in Tehran using Analytic Network Process (ANP) that is the most efficient decision making technique. This article also was sponsored by Iran Small Industries and Industrial Parks Organization.

Location decisions are one of the branches of operations research and management science that locate or position a new facility among various facilities to optimize (maximize or minimize) at least an objective function (cost, utility, revenue, distance, service and market share functions) (Zanjirani Farahani, 2010). The concept of location decision making was first introduced by Weber (1929). Beckmann (1986) states that an early normal step for analysis of location is the question that where is suitable for doing a private business. This problem has been a universal study in literature in these years. Since location decisions are strategic decisions of organizations and play an important role in their development, decision makers have examined mainly economic aspects of factors related to location in location problems. But today according to environmental effects due to the measures of countries to achieve development goals, countries have held various conferences to deal with environmental crises, including Stockholm Conference in 1972 and Rio Conference in 1992 and Earth Summit +5 in 1997. These concerns and conferences for supporting the environment led to the introduction of a new concept in recent decades in social-economical view, i.e. environmental issues, that is one of the basic prerequisites to achieve economical development. According to the definition of sustainable development by Terouhid et al. (2012) as "a development meeting the present needs without endangering abilities of future generation to meet their needs" (WCED, 1987), at present, we must exploit the development of different sectors of the industry and also make it possible for future generations to exploit these facilities. MacCarthy and Atthirawong (2003) presented a comprehensive review of factors and sub-factors affecting international location decisions in their article. According to the definition by Onat and Souner (2008), although different multiple-criteria decision making techniques are used for location problems, most of them are mathematical and internal characteristics of any individual and qualitative criteria are ignored. According to Torfi et al. (2010), multiple-criteria decision making is a qualitative approach due to internal criteria. Sometimes, location decision problems don't deal with mathematical formulae and numbers and are related to human judgment. In these situations, multiple-criteria decision making approach is an important part of location decision making. Eslamipour and Sepehriar (2014) were introduced a relocation of an enterprise as a potential solution to improving the environment.

Shafae et al. (1392) in a study as evaluation parameters based on the principles of sustainable development location using Analytical Hierarchy Process Fuzzy Delphi influential in the decision to review the criteria for the evaluation of different places for construction of industrial units. Recently, Rezaei et al. (2015) presented a framework for location of polluting facilities. In this framework, several general important criteria and sub-criteria were presented for location of facilities. Among multiple-criteria decision making techniques, ANP technique is introduced as the most perfect technique that is able to consider interrelationships. This technique is used frequently in articles. In this article, industrial estates are located to relocate casting industries as the polluting industries. ANP technique is used for ranking the estates (Zebardast, 1389).

The status of casting industry in Tehran

According to the statistics of Iranian Small Industries and Industrial Estates Organization, the number of industrial units operating in industrial estates and areas in Tehran is 4368 units until the end of 2014 that are presented in table 1 in terms of the type of industry. Casting industry is a subset of the metal industry. Casting industry is the technique of forming metals and alloys through melting and casting melts in a cavity called cold mold and then, cooling and freezing it according to the shape of the mold cavity. This is the most traditional process known for obtaining the desirable shape of metals. The first casting furnace was made of clay and layers of copper and wood were put in it alternately. Casting industries pollutants





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- Solid wastes: the main wastes of the industry are related to scrap metals and equipments being used (crucible, mold, etc) and the first class (scrap metals) can be used in the production process and as the raw material.
- Effluent: due to the type of the process being used for producing products, such these units normally produce low volume of effluents with severe contamination of heavy metals accompanied by high opacity and oily substances.
- Air pollution: air pollution due to the activity of casting industrial units can be viewed in two perspectives:
 - a. Pollutions due to fossil fuel consumption (gas, gas oil, fuel oil, etc) to supply the thermal energy required for melting metals. Due to the consumption of such these fossil fuels, many pollutants are released to the surrounding environment including oxides, soot and also unburned hydrocarbons.
 - b. Release of different fumes to the surrounding space due to the process of melting metals.

According to the pollution of these units, using refineries is inevitable. So they must be located. The climate of the region is also important to reduce environmental pollutions, that is included as one of the environmental factors in the research. Construction of new factories and workshops and development and relocation or establishment of new line of factories and workshops require the compliance of rules and criteria of the environmental protection agency. If the reduction or removal of pollution due to the activity of factories or workshops is not possible except for relocating them to other places, or the activity of the factories and workshops in residential areas endangers the health of their residents, cooperating with ministries and other governmental bodies, the environmental protection agency prepares the plan of relocation of factories and workshops to suitable places (preferably, industrial estates) and presents it to the council of ministers.

Case study

Features of the industrial estates in Tehran are presented in table 2 based on the authorized industries to be established.

According to the table above, casting industries can be established in the industrial estates including Paytakht, Shamsabad, Abasabad, Nasirabad, Firouzkouh, Kharazmi, Pishva, Salariyeh and Gharchak. The situation of the lands of Tehran industrial estates is presented in table 3. In this article, Shamsabad, Abasabad, Nasirabad, Firouzkouh and Pishva industrial estates were considered as alternatives.

Factors affecting the location of an industrial unit

Many studies are conducted to construct an industrial estate. The studies are conducted in different fields and based on the description of the services provided by Iranian Small Industries and Industrial Estates Organization. The description of the services and factors is presented to all subsidiaries in the province. According to the description of the services mentioned above and studies conducted on location and opinions of experts in the industry, factors affecting the location of an industrial unit for relocation to industrial estates are categorized into 5 primary criteria including social factors, economical factors, environmental factors, infrastructural factors and development potential factors, and any primary criterion is categorized into sub-criteria as in table 4.

Numerical results

In this section, inputs of the problem are evaluated that are extracted from the questionnaire's results. Questions of the questionnaire are designed based on pairwise comparisons of the criteria with the objective, sub-criteria with the related criterion, alternatives with any sub-criterion and interrelationships between criteria and sub-criteria. Multiple-criteria decision making techniques are effective tools for using quantitative and qualitative variables. Variables and qualitative and quantitative factors are used for evaluation in this research. Opinions of experts are used for comparing qualitative factors that must be converted to numbers to be able to evaluate both qualitative and



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quantitative variables simultaneously in a problem. The scale in table 5 is used to extract the opinions of experts and convert linguistic variables into numbers that is the most common scale in multiple-criteria decision making process. Numbers in table 5 range from 1 to 11 that show the relative importance. For example, the number 5 shows the relative priority 5 for comparing i with j . The network structure of the problem is drawn using Super Decisions Software and taking the interrelationships into account. The software arranges the factors based on alphabetical order in super matrix. For ordering the results, any cluster is named by a numerical suffix. In figure 1, the problem's network diagram is presented.

The network structure of the model was first drawn to solve the problem using the Super Decisions Software. Next, data of the problem are entered. The software is used in all steps of solution. After getting the input, the software calculates the weight of any pairwise comparison matrix and finally, the weights are arranged in a 31×31 matrix named as "unweighted super matrix". The unweighted super matrix is converted into a weighted super matrix in the next step. For obtaining the final weights of the alternatives, two consecutive odd powers of the super matrix must be equal and the Super Decisions Software also works based on this logic. For evaluating and comparing the criteria, sub-criteria and alternatives better, the related weights are presented in the following tables. In table 6, the weights of the criteria with and without considering the failure feedback (interrelationship) are presented.

In the above table, weights of criteria without considering the interrelationship are different from those with considering the interrelationship. When taking the interrelationship into account, weights of social and economical factors increased significantly that produced higher difference between three criteria including social, economical and environmental factors than two other criteria, i.e. infrastructural and development potential factors. This increase in difference led to a zero weight for these two criteria. In table 7, weights of sub-criteria are presented when considering the interrelationship.

In the final step, weights of alternatives were obtained to be evaluated. Odd powers of the super matrix are calculated to obtain the weights of alternatives. When two odd powers of the weighted super matrix are equal, numbers of any alternative show the alternative's final weights. The final results for evaluation and comparison of the alternatives are presented in table 8. The results of the table show that the alternative "Abasabad Industrial Estate" is the first priority, followed by Shamsabad, Nasirabad and Pishva Industrial Estates, respectively. And among the alternatives, Firouzkouh Industrial Estate is the last priority.

CONCLUSIONS

According to the results, it was known that Abasabad Industrial Estate is the most suitable industrial estate for relocation of small casting industrial units in Tehran, followed by Shamsabad, Nasirabad, Pishva and Firouzkouh Industrial Estates, respectively. The climate of the region, access to the factory's raw materials, access to market and suitable wastewater treatment plant are the most important location factors for relocation of small casting industrial units in Tehran that must be taken into account when making decisions and the industrial units must be relocated to the industrial estates based on them. According to the pollutions of such these industries, it is possible to relocate them to Abasabad and Shamsabad Industrial Estates that are equipped with advanced wastewater treatment plants and decrease environmental pollutions and can significantly help the environment, and the climate of the industrial estates improves the environment.

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Table 1. The number of industrial units operating in Tehran until the end of 2014

The number of units operating in industrial estates and areas									
Province	Food& beverage	Textile	cellulose	Chemical	Non-metallic mineral	metal	Electronics	service	Total
Tehran	608	222	135	666	354	2075	145	163	4368

Table 2. Features of the industrial estates in Tehran based on the authorized industries to be established

Sl.No.	Industrial estate	Authorized industries to be established
1	Charmshahr	Leather making and leather-based industries, soap making industries
2	Paytakht (Aliabad)	Metal, nonmetallic mineral, food, electronics, textile and clothing, chemical and cellulose industries
3	Shamsabad	Metal and casting, nonmetallic mineral, food, electronics, textile and clothing, chemical and cellulose industries
4	Abasabad	Metal and casting, nonmetallic mineral, food, electronics, textile and clothing, chemical and cellulose industries
5	Nasirabad	Food&beverage, chemical& plastics, metal and automotive, electronics, textile and clothing, cellulose, nonmetallic mineral and service industries
6	Firouzkouh	Metal, nonmetallic mineral, food and pharmaceutical, electronics, textile and clothing, chemical, cellulose and agricultural industries
7	Kharazmi	Metal, food, electronics, textile and clothing, chemical and cellulose industries
8	Parand	Automotive parts manufacturing, electronics and metal industries except casting industries





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9	Pishva	Metal, nonmetallic, cellulose, textile, chemical, electronics and food industries
10	Salariyeh	Metal, nonmetallic mineral, food, electronics, textile and clothing, chemical, cellulose, service and carpet cleaning industries
11	Gharchak	Metal, nonmetallic, cellulose, textile, chemical, electronics and food industries
12	Damavand	Metal except casting and plating, non-water pharmaceutical and food, nonpolluting cellulose and chemical, nonmetallic mineral, and electronics industries

Table 3. The situation of the lands of Tehran industrial estates

Sl.No.	Industrial estate	Area (ha)	Industrial lands (ha)	Transferred lands (ha)	Transferrable lands (ha)
1	Charmshahr	200	140	111	29
2	Paytakht (Aliabad)	669	262	218	44
3	Shamsabad	2891	1461	1249	212
4	Abasabad	1030	690	674	16
5	Nasirabad	274	150	132	18
6	Firouzkouh	203	83	72	11
7	Kharazmi	324	138	105	33
8	Parand	358	272	260	12
9	Pishva	1454	273	24	249
10	Salariyeh	504	360	178	182
11	Gharchak	755	60	9	51
12	Damavand	213	92	4.8	87.2





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Table 4. Location criteria and sub-criteria for relocation of industrial units

Criterion	Sub-criterion
Social factors	Access to workforce
	Access to educational centers
	Access to residence
	Access to medical services
Economical factors	Access to market
	Proximity to homogenous industries
	Land price
	Access to the factory's raw materials
	Access to raw material wastes
Environmental factors	Suitable wastewater treatment plant
	Access to specialized laboratory
	Climate
Infrastructural factors	Access to road transportation network
	Access to railroad transportation network
	Access to air transportation network
	Access to electronic and internet services
	Access to support centers
	Access to required energy
Development potential factors	Potential of industrial estate development
	Clustering realization

Table 5. Pairwise comparison scale

Numerical variable	Linguistic variable
1	Equal priority
3	Very low priority
5	Low priority
7	Medium priority
9	High priority
11	Very high priority





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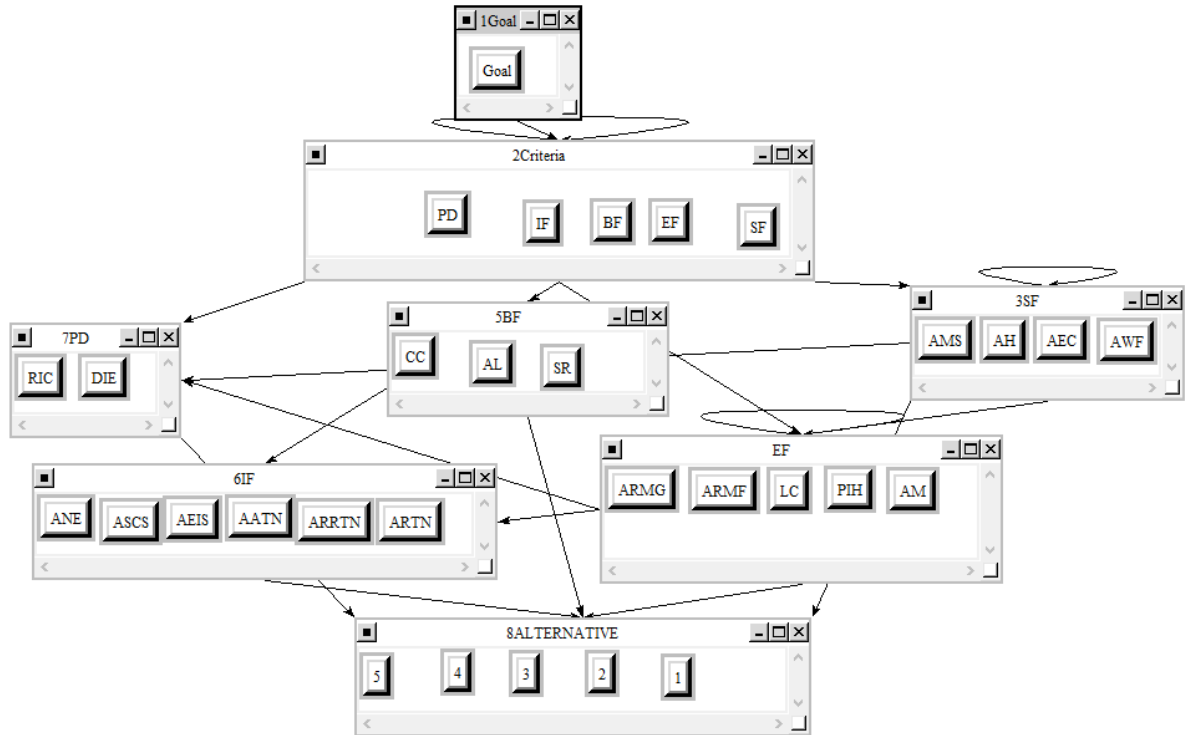


Figure 1. The problem's network diagram

Table 6. Weights of criteria with and without considering the interrelationship

Criteria	Without considering the interrelationship	With considering the interrelationship
Social factors	0.0278	0.1007
Economical factors	0.2459	0.4325
Environmental factors	0.5406	0.4666
Infrastructural factors	0.1372	0
Development potential factors	0.0483	0





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Table 7. Weights of sub-criteria

Sub-criteria	Weight of sub-criteria	Sub-criteria	Weights of sub-criteria
Access to specialized laboratory	0.0185	Access to workforce	0.511
Suitable wastewater treatment plant	0.0897	Access to educational centers	0.0848
Access to road transportation network	0	Access to residence	0.328
Access to railroad transportation network	0	Access to medical services	0.0546
Access to air transportation network	0	Access to market	0.1083
Access to electronic and internet services	0.01	Proximity to homogenous industries	0.0413
Access to support centers	0	Land price	0.0266
Access to required energy	0	Access to the factory's raw materials	0.1931
Potential of industrial estate development	0	Access to raw material wastes	0.0372
Clustering realization	0.01	Climate	0.2413

Table 8. Evaluation and comparison of alternatives

Alternative	Weight
Shamsabad Industrial Estate	0.2913
Abasabad Industrial Estate	0.4027
Nasirabad Industrial Estate	0.1618
Firouzkouh Industrial Estate	0.0635
Pishva Industrial Estate	0.0805





RESEARCH ARTICLE

Selection of Proper Raw Materials of Paper Industries in the Country Using SWOT Analysis and ANP

Amir Ali Ramedani^{*} and Kambiz Shahroodi

Islamic Azad University, Bandar e Anzali International Branch, Iran.

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***Address for correspondence**

Amir Ali Ramedani
Islamic Azad University,
Bandar e Anzali International Branch, Iran.
Email: amirali_ramedani@yahoo.com



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ABSTRACT

Today, wood is known as a vital material and a necessary item of life in different countries, especially in those with negligible forest vegetation. Population growth, promotion of education and the increase of paper consumption as a strategic basic commodity have caused paper industries to determine the consumption preferences to supply their future raw materials. The present research examines the most suitable raw material of paper industry using SWOT analysis and ANP. SWOT analysis is performed based on opinions of experts of paper industry in the country that led to the identification of criteria and sub-criteria to be used in ANP. After identifying criteria and sub-criteria, the relationships and their weights are determined and data are analyzed using Super Decisions Software and the most suitable alternative is identified and other alternatives are also prioritized respectively. The results show that the alternative "waste paper" is the first priority of the suitable raw material for paper industry, followed by wood, bagasse and finally, agricultural wastes, respectively.

Keywords: Paper, Paper Industries, Selection of Raw Materials, ANP, SWOT

INTRODUCTION

Certainly, the global population growth, advancement of technology, educational promotion and increase of paper consumption as a strategic basic commodity that determines the educational level of any country on one hand and the excessive consumption and reduction of cellulose raw materials on the other hand have resulted in an imbalance. According to the available information, the need of the country for paper is 2.5 million tons each year, from which 700,000 tons are produced in the country. The average global paper consumption is 55 kg. This statistic is 150 kg in some European developed countries and in the US. Since the level of paper consumption is one of development indices, our country is very far from the average global paper consumption and the average paper consumption is

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less that the global consumption in the country. So, the development index must be increased to an acceptable level using effective planning and culture making. Forest resources are continually decreasing and being destroyed due to the excessive consumption and absence of restoration, so that today, all industries using wooden materials are looking for supplying alternative raw materials in future.

The final aim is to be able to produce paper in the country according to the available statistics on paper import, and one of the key points of the plan is the type of basic raw material for paper production, because due to resource constraints, the raw material of the industry must be evaluated and among available raw materials for paper production, the best alternative must be chosen in terms of availability. The study of wood alternative selection is not very much conducted in literature and studies in this field are rare. Pack et al. (2000) studied the role of European forest resources as raw material of industries. They claimed that wood will be produced extensively due to the importance of wood products and services. As a result, restoration and protection of a healthy forest industry are a key element to achieve economic, social and environmental stability of forest in Europe. Bistrem and Longsted (1997) calculated the optimal combination for energy recovery and recovery of paper wastes to produce paper and paperboard. In this study, Environmental Load Unit (ELU) is estimated that shows environmental effects. The unit is related to environmental load value of nonrenewable resources. Their study in Scandinavian forests showed that there was no significant difference between economic and environmental optimization. In this study, paper raw material is evaluated and ranked. Raw materials include wood, waste paper, bagasse and agricultural wastes in this research. ANP is used for ranking them. ANP is a strong tool for ranking factors with quantitative, qualitative or quantitative and qualitative multiple criteria (Rezaei et al., 2015). The technique is frequently used in articles and can include interrelationships between factors.

Introduction of raw materials of paper industries in Iran

Paper and pulp production industry is essentially based on two important raw materials in the country: wood and bagasse. "Mazandaran Wood and Paper" and "Iran Wood and Paper (Choka)" factories design and act using wooden raw materials and Pars Paper factory also uses bagasse raw materials. Two wood consumption units have shifted to using waste paper due to the constraint of using forests, destruction and severe erosion of environment. Therefore, the supply and availability of suitable raw materials are one of the most important factors of production in this industry that plays an important role in formulating strategies of this chain. In the following, four raw materials of paper production are presented.

Wood

Protection of natural resources that are a valuable heritage for future generations has been always noted economically, socially, culturally and politically. Selection of wood as raw material has a high quality index. But it is environmentally limited.

Bagasse

Paper production using bagasse started in 1930s in Philippines, Japan, Peru, England, Argentina and Hawaii, and in 1950, about 5 to 6 pulp manufacturing companies acted with the capacity 1000 tons per year. Research shows that considerable progresses and successes in these countries resulted in the increase of paper production capacity using bagasse to 2.5 million tons. According to the physical conditions of bagasse in terms of weight, volume due to sugar, fermentation and production of gas, and also employment, it is necessary to grow and develop sugarcane farms and finally produce bagasse.





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Waste paper

Due to the lack of wooden raw material in the country, one of the best techniques of the supply of raw materials required by paper industry is to restore paper. Annually, billion dollars are spent on paper production and subordinate industries. On the other hand, billion dollars are also spent on collecting and removing them. However, suitable investment in its restoration not only prevents from destruction and damage to the environment, but harvest of forest resources is decreased and their survival is ensured for future generation.

Agricultural wastes

In addition to meeting food needs of human societies, harvest of wheat, barley, rice, etc gives another valuable byproduct known as straw. For centuries, straw is used as the raw material for paper production (especially in China). At present, straw is an important raw material in paper industry in regions such as Eastern Europe, Southern America, Middle East and Asia. The second main reason of the persistence of straw application to paper making is its easy access as the waste of food production. The main problem in paper production using agricultural wastes is the existence of a lot of environmental pollutions due to the application of chemicals in pulp production process. In addition, problems related to labor costs of collection, storage and transfer have limited its application more to countries with cheap workforce.

Problem description

For obtaining proper criteria for Analytic Network Process (ANP), environmental conditions of paper are identified and analyzed in this section. In table 1.1, strategies extracted from the analysis are presented. SWOT analysis is used for identifying criteria and since calculation of the weights of four criteria increases the volume of calculations according to SWOT sub-criteria, the analysis is used only to identify the criteria, not to rank them. Four primary criteria are included in this research for raw material selection of paper industry that are as follows:

- a) Environmental E
- b) Economical ECO
- c) Technical TC
- d) Development EC

The criterion "Environmental" is one of the most important criteria for this product, because the effluent entered from paper industries into the environment largely damages it. About the criterion "Economical", it must be said that selection of any raw material is accompanied by different issues including amount of investment, availability of raw material, price of raw material and also product finished price. Since any raw material has its specifications and technology of production, the criterion "Technical" must be taken into account. Since there has been always concern for supporting and planning raw material in paper industry, the criterion "Development" is examined.

Sub-criteria

According to the available information and research, the following sub-criteria are taken into account for the four primary criteria:

Environmental

Environmental pollution P

A sub-criterion "Environmental pollution" is taken into account for the criterion "Environmental". The sub-criterion is chosen due to the effluents of paper industries. Since the effluents of these industries largely endanger the environment, special attention must be paid to the criterion.





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Economical

- 1.1 Price of Raw Material PRM
- 1.2 Amount of Investment AE
- 1.3 Availability of Raw Material A
- 1.4 Product Finished Price PFP

Four sub-criteria are taken into account for the criterion "Economical". The sub-criterion "Price of Raw Material" is chosen because the price of raw materials studied is different. Amount of investment is estimated due to the difference of investment volume. Availability of raw material means how much raw material is available in the country and can be utilized. Product finished price also strongly affects the raw material selection.

Technical

- 1.1 Machinery and Technology MT
- 1.2 Human Resources HR
- 1.3 Final Product Quality FPQ

About the sub-criterion "Machinery and Technology", it must be mentioned that any raw material has its own machinery. Since the raw materials examined in the plan need different human resources, the sub-criterion "Human Resources" is taken into account. Final product quality also changes with the type of raw materials.

Development

- 1.1 Development Program of Raw Material Supply in Macro Policies DP
- 1.2 Potential of Development of Raw Material PDRM

Development program of raw material supply in macro policies is in fact the plans that organizations want to implement to develop some raw materials. Some raw materials have the potential of development automatically that is their difference with each other. The network structure of the model is shown in the following figure.

Numerical results

As it was mentioned above, data of the problem are extracted based on the answers of the questionnaire. Answers of the questionnaire are presented based on opinions of experts. Weight of any factor shows its importance and value compared to other factors in the operation of location. Therefore, informed selection of weights largely helps the determination of the intended objective. Among different techniques, relative weight of geometrical mean is the most suitable mathematical rule for combination of judgments in this technique, because it preserves the reversibility property of pairwise comparisons matrix. Therefore, pairwise comparison between criteria is presented in table 3.4. In tables 4.4, 5.4 and 4.6, pairwise comparisons of sub-criteria of any criterion with the related criterion are presented. These tables are presented for the sub-criteria of the criteria including Economical, Technical and Development, respectively. The criterion "Environmental" also has a sub-criterion and it is concluded that its weight is 1 among the sub-criteria. After comparing the criteria with the objective and comparing the sub-criteria with any criterion, alternatives are compared with any sub-criterion. Until now, factors were compared like AHP. In the next step, pairwise comparison of factors with interrelationships is performed. After solving the model, final results of the weights of the alternatives were obtained as follows.

CONCLUSIONS

The contrast between environmental restrictions and the increase in the need for paper created the need for wood alternative raw materials. The most common wood alternatives include waste paper, bagasse and agricultural wastes. Like wood, the alternative raw materials also enjoy other different quantitative and qualitative constraints. The results





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show that the alternative "waste paper" is the first priority of the suitable raw material for paper industry, followed by wood, bagasse and finally, agricultural wastes, respectively. In this research, ANP technique was used for modeling the problem as the most comprehensive multiple criteria decision making technique. In this technique, quantitative and qualitative factors affecting the selection of raw material were used. The results showed that waste paper is the first priority of raw material for paper production with a significant difference. Wood and bagasse are the second and third priorities with a very low difference. Agricultural wastes are also the last priority of the selection of raw material. The present research can be considered as a comprehensive framework for the selection of raw material for paper production at any paper industry, in which all potential factors and relations are extracted based on the opinions of experts.

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Table 1.1 Strategies extracted from SWOT Analysis

Strategies	
Environmental protection: weaknesses	Economical: strengths
Accessibility of technical factors: threats	Development: opportunities

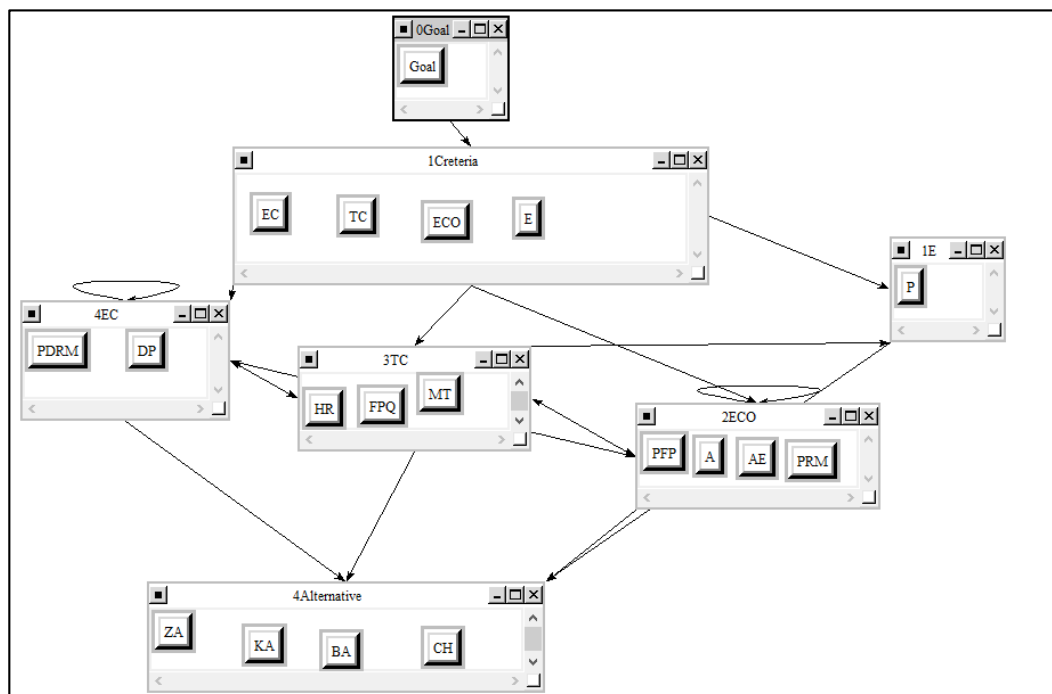


Figure 1.4 Network structure of the proble





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Table 2.1 Pairwise comparison between criteria

	Environmental	Economical	Technical	Development
Environmental	1	9	9	11
Economical	1.9	1	7	9
Technical	1.9	1.7	1	9
Development	1.11	1.9	9	1

Table 3.1 Pairwise comparison of "Economical" sub-criteria

	Price of Raw Material	Amount of Investment	Availability of Raw Material	Product Finished Price
Price of Raw Material	1	9	9	5
Amount of Investment	1.9	1	1.9	5
Availability of Raw Material	1.9	9	1	11
Product Finished Price	1.5	1.5	1.11	1

Table 1.4 Pairwise comparisons of "Economical" sub-criteria

	Machinery and Technology	Human Resources	Final Product Quality
Machinery and Technology	1	9	1.9
Human Resources	1.9	1	1.9
Final Product Quality	9	9	1





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Table 1.5 Pairwise comparisons of "Development" sub-criteria

	Development Program of Raw Material Supply in Macro Policies	Potential of Development of Raw Material
Development Program of Raw Material Supply in Macro Policies	1	1.5
Potential of Development of Raw Material	5	1

Table 6.1.Weights of the Alternatives

Alternative	Weight
Wood	0.2351
Bagasse	0.2236
Waste paper	0.4510
Agricultural wastes	0.0901

