Life Science Journal

Life Science Journal   2012   Volume 9, Number 4,   Part 21   ISSN:1097-8135

Marsland Press

PO Box 180432, Richmond Hill, New York 11418, USA

Website:
http://www.sciencepub.net

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Phone: (347) 321-7172

ISSN 1097-8135

9 771097 813002

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

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CONTENTS

I

Using Common Weight Of Anti Ideal Decision Making Unit In Trade Off Models Of Data Envelopment Analysis For Computing Expanded Malmquist Index

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Abstract: The Malmquist Index the prominent Index for measuring the productivity change of Decision Making Units (DMUs) in multiple time periods that use Data Envelopment Analysis (DEA) models with Variable Return to Scale (VRS) and Constant Return to Scale (CRS) technology. The Trade Offs (TO) approach is an advanced tool for the improvement of the discrimination of DEA model. In this paper, we compute the Expanded Malmquist Index based on Common weights by using anti ideal DMU evaluation in Trade Off models in DEA, and by using this method we can rank DMUs by logical criteria.

1. Introduction

Data Envelopment Analysis (DEA) is a mathematical programming technique that measures the relative efficiency of Decision Making Units (DMUs) with multiple inputs and outputs. Charnes and et al.(1978) first proposed DEA as an evaluation tool to measure and compare the relative efficiency of DMUs. Their model assumed Constant Returns to Scale (CRS, the CCR model), the model with Variable Return to Scale (VRS, the BCC model) was developed by Banker and et al. (1984).

The Malmquist Index is the most important Index for measuring the relative productivity change of DMUs in multiple time periods. For the first time, the Malmquist Index was introduced by Caves and et al. (1982); later DEA was used by Fare, Gross Kopf, Lindgren and Ross (FGLR, Fare et al, 1992), and (FGNZ, Fare etal.1994) for measuring the Malmquist Index. They used DEA model (CRS) and VRS for computing Malmquist Index.

Podinovski suggests the incorporation of production Trade Offs in to DEA models, under this circumstance (Podinovski 2004), when we use Trade Offs in our models, the original technology expands to include the new area, Podinovski and et. al (2004) show that the production possibility set (PPS), generated by the traditional DEA axioms, may not include all the producible production points, the PPS generated by the DEA models is only the subset of the PPS with Trade Offs. Podinovski also describes the theatrical development of Trade Offs and demonstrated that Trade Offs can improve the traditional meaning of efficiency as a radial impronment factor for input or outputs (Podinovski, 2007a, 2007b).

The rest of the paper is organized as follows: In sections 2 describe Data Envelopment Analysis (DEA). In section 3 we explain computing of common weight. Section 4 shows computing of efficiency by using common weight in different period. In section 5 we compute Malmquist Index based on common weight. The last section summarizes and concludes.

2. Data Envelopment Analysis (DEA)

Assuming that there are n DMUs each with m inputs and s outputs, the relative Efficiency of a particular DMUo $\left(o \in \{1,2,...,n\}\right)$ is obtained by solving the following fractional programming problem:

$$\theta_o = \max \frac{\sum_{r=1}^{s} u_r y_{ro}}{\sum_{i=1}^{m} v_i x_{io}}$$

$subject\, to$:

$$\frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \leq 1 \qquad j = 1,2,...,n \qquad (1)$$

$$u_r \geq 0 \qquad r = 1,2,....,s$$
$$v_i \geq 0 \qquad i = 1,2,....,m$$

Where j is the DMU index $j = 1,2,...,n, r$ the output index, $r = 1,2,...,s$ and i the input index $i = 1,2,...,m$, y_{ri} the value of the rth output for the jth DMU, x_{ij} the value of the i input for the jth DMU,

u_r the weight given to the *rth* output, v_i the weight given to the i input. DMU$_O$ is efficient if and only if $w_o = 1$.

DMUO selects weights that maximize its output to input ratio, subject to the constraints. A relative efficiency score of 1 indicates that the DMU under consideration is efficient, whereas a score less than 1 imply that it is inefficient. This fractional program can be converted into a linear programming problem where the optimal value of the objective function indicates the relative efficiency of DMUO. The reformulated linear programming problem, also known as the Linear CCR model, is as follows:

$\theta_0^* = w_0 = max \sum_{r=1}^{s} u_r y_{ro}$
Subject to:
$\sum_{i=1}^{m} v_i v_{io}$
$\sum_{r=1}^{s} u_r y_{ro} - \sum_{i=1}^{m} v_i v_{io} \leq 0$ j=1, 2... n
$u_r \geq 0$ r= 1, 2... s
$v_i \geq 0$ i=1, 2... m

3. Trade Offs Model in Data Envelopment Analysis

Considering the observed output vector as $Y_j \in R^s$ and the input vector as $X_j \in R^m$, we assume that the inputs and outputs are nonnegative and $X_j \neq 0$, $Y_j \neq 0$ for DMU_j, j=1,2,…,n.

A Trade Off is a judgment of possible variation in some input and or output levels, with which DMU can work without changing the other inputs and or outputs. For example, in the case of two inputs and a single output, the trade-off (P, Q) = (2,−1, 0) indicates that the DMU can work by increasing the first input by two and decreasing the second input one without changing its output (for more details, see Podinovski, 2004).

Now, suppose we have k Trade Offs. We shall represent the Trade Offs in the following form: (P_r, Q_r), where r = 1, 2 ,…, k. Also, the vector $P_r \in R^m$ and $Q_r \in R^s$ modify the inputs and outputs, respectively. For using Trade Offs in DEA models, Podinovski makes some assumptions and extends the axioms of PPS in the following manner:
Assumption:
1-All the DMUs should accept the Trade Offs.
2- Each Trade Off can be used repetitively by the DMUs.
Extended axioms:
1- (Nonempty). The observed $(X_j, Y_j) \in T$; j = 1, 2, ..., n.
2- (Proportionality). If (X,Y) ∈ T , then $(\lambda X, \lambda Y) \in T$ for all $\lambda \geq 0$.
3- (Convexity). The set T is convex.
4- (Free disposability). If (X, Y) ∈ T, $\overline{X} \geq X, \overline{Y} \geq Y$, then $(\overline{X}, \overline{Y}) \in T$.

5- (Feasibility of Trade Offs). Let (X, Y) ∈T. Then for any Trade Off r in the form of $(P_r, Q_r) \in T$ and any $\pi_r \geq 0$, the unit $(X + \pi_r P_r, Y + \pi_r Q_r) \in$ T, provided that $X + \pi_r P_r \geq 0$ and $Y + \pi_r Q_r \geq 0$.
6- (Closeness). The set T is closed.
7- (Minimum extrapolation). T is the smallest set that satisfies axiom 1-6. (Where T is, T = {(X, Y)| output vector Y≥ 0 can produced from input vector X ≥0}).
Now, the PPS can be defined on the basis of the following.
The minimal PPS (PPS_{TO}) that satisfies axioms (1) − (7) is:
$PPS_{TO} = \{(X, Y)|Y = \overline{Y}\lambda + \sum_{t=1}^{k} \pi_t Q_t - e, X = \overline{X}\lambda + \sum_{t=1}^{k} \pi_t P_t + d, \lambda \in R_+^n, \pi \in R_+^k, d \in R_+^m \ and \ e \in R_+^s\}$, (see Podinovski (2004)).
Based on PPSTO, for assessing the relative efficiency of DMUP (p = 1, 2, ..., n) that is defined from this PPS, we have the following model:
DEA model with trade-offs technology and input orientation

$Min \ \theta_p$
S.t $\overline{X}\lambda + \sum_{t=1}^{k} \pi_t P_t \leq \theta_p X_p$
$\overline{Y}\lambda + \sum_{t=1}^{k} \pi_t Q_t \geq Y_p$ (3)
$\lambda, \pi \geq 0, \theta_p \ sign \ free$

DEA model with trade-offs technology and output orientation

$Max \ \theta_p$
S.t $\overline{X}\lambda + \sum_{t=1}^{k} \pi_t P_t \leq X_p$
$\overline{Y}\lambda + \sum_{t=1}^{k} \pi_t Q_t \geq \theta_p Y_p$ (4)
$\lambda, \pi \geq 0, \theta_p \ sign \ free$

4. Common Weight in Data Envelopment Analysis

Definition 1: The virtual positive anti ideal DMU is a DMU with maximize inputs of all of DMUs as its input and minimize outputs of all DMUs as its That is if we show positive ideal DMU with $\overline{DMU} = (\overline{X}, \overline{Y})$ then $\overline{x}_i = max \{x_{ij}|j = 1,2,...,n\}, (i = 1,2,...,m)$ and $\overline{y}_r = min \{y_{rj}|j = 1,2,...,n\}, (r = 1,2,...,s)$.

Definition 2: An ideal level is one straight line that passes through the origin and positive ideal DMU with slope 1.0. In Fig.1 the vertical and horizontal axes are set to be the virtual output (weighted sum of s outputs) and the virtual input (weighted sum of m inputs), respectively and ox is an ideal line and $\overline{DMU} = (\sum_{i=1}^{m} \overline{x}_i v_i', \sum_{r=1}^{s} \overline{y}_r u_r')$ is an ideal DMU. The notation of a decision variable with superscript symbols"," represents an arbitrary

assigned value. For any DMU_N, DMU_M, if given one set of weights u'_r ($r = 1,2,\ldots,s$) and v'_i ($i = 1,2,\ldots,m$) then the coordinate of points M', N' and N0 in Fig. 1 are $(\sum_{i=1}^{m} x_{iM}v'_i, \sum_{r=1}^{s} y_{rM}u'_r)$ and $(\sum_{i=1}^{m} x_{iN}v'_i, \sum_{r=1}^{s} y_{rN}u'_r)$. The virtual gaps, between points M' and M'^p on the horizontal axes and vertical axes, are denoted as $\Delta_{M'}^I$ and $\Delta_{M'}^O$, respectively. Similarly, for points N' and N'^p, the gaps are $\Delta_{N'}^I$ and $\Delta_{N'}^O$. We observe that there exists a total virtual gap $\Delta_{M'}^I + \Delta_{M'}^O + \Delta_{N'}^O + \Delta_{N'}^O$ to the ideal line. Let the notation of a decision variable with superscript " * " represents the optimal value of the variable. We want to determine an optimal set of weights u_r^* ($r = 1,2,\ldots,s$) and v_i^* ($i = 1,2,\ldots,m$) such that both points M^* and N^* below the ideal line could be as close to their projection points, M^{*p} and N^{*p} on the ideal line, as possible. In other words, by adopting the optimal weights, the total virtual gaps $\Delta_{M^*}^I + \Delta_{M^*}^O + \Delta_{N^*}^O + \Delta_{N^*}^O$ to the ideal line is the shortest to both DMUs. As for the constraint, the numerator is the weighted sum of outputs plus the vertical gap Δ_j^O and the denominator is the weighted sum of inputs minus the horizontal virtual gap Δ_j^I. The constraint implies that the direction closest to the ideal line is upwards and leftwards at the same time. The ratio of the numerator to the denominator equals 1.0, which means that the projection point on the ideal line is reached. Therefore we have following model:

$$\Delta^* = \min \sum_{j=1}^{n} \Delta_j^I + \Delta_j^O$$

S.t $\quad \dfrac{\sum_{r=1}^{s} u_r \bar{y}_r}{\sum_{i=1}^{m} v_i \bar{x}_i} = 1$

$\dfrac{\sum_{r=1}^{s} u_r y_{rj} + \Delta_j^O}{\sum_{i=1}^{m} v_i x_{ij} - \Delta_j^I} = 1, \qquad j =$

$1,2,\ldots,n \qquad (5)$

$\Delta_j^I, \Delta_j^O \geq 0, \qquad\qquad j = 1,2,\ldots,n$
$u_r \geq \epsilon > 0, \qquad\qquad r = 1,2,\ldots,s$
$v_i \geq \epsilon > 0, \qquad\qquad i = 1,2,\ldots,m$
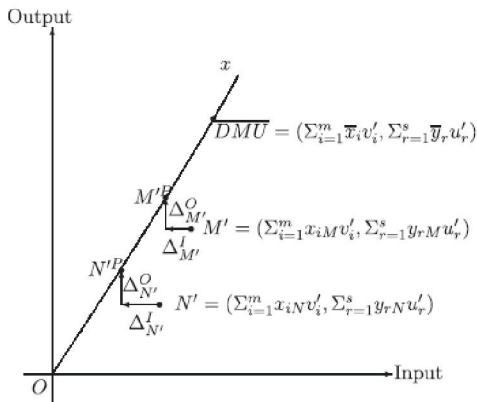
Fig. 1. Gap analysis showing DMU below the virtual ideal line.

ϵ is positive Archimedean infinitesimal constant. The ratio form of constrains (5) can be rewritten in a linear form, so we have the following model:

$$\Delta^* = \min \sum_{j=1}^{n} \Delta_j^I + \Delta_j^O$$

S.t $\sum_{r=1}^{s} u_r \bar{y}_r - \sum_{i=1}^{m} v_i \bar{x}_i = 0$
$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} + \Delta_j^I + \Delta_j^O = 0$
$j = 1,2,\ldots,n \quad (6)$
$\Delta_j^I, \Delta_j^O \geq 0, \qquad j = 1,2,\ldots,n$
$u_r \geq \epsilon > 0, \qquad r = 1,2,\ldots,s$
$v_i \geq \epsilon > 0, \qquad i = 1,2,\ldots,m$

Then, if we let $\Delta_j^I + \Delta_j^O$, be Δ_j (6) is then simplified to the following linear programming (7).

$$\Delta^* = \min \sum_{j=1}^{n} \Delta_j$$

S.t $\quad \sum_{r=1}^{s} u_r \bar{y}_r - \sum_{i=1}^{m} v_i \bar{x}_i = 0 \qquad (*)$
$\quad \sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} + \Delta_j = 0$
$j = 1,2,\ldots,n \quad (7)$
$\Delta_j \geq 0, \qquad\qquad j = 1,2,\ldots,n$
$u_r \geq \epsilon > 0, \qquad r = 1,2,\ldots,s$
$v_i \geq \epsilon > 0, \qquad i = 1,2,\ldots,m$

If a DMUj was on positive ideal then we use definition of the CWA efficiency score of DMUj that Liu and Peng (2006) was defined as following equation:

$$\theta_j^{*(CRS)} = \frac{\sum_{r=1}^{s} u_r^* y_{rj}}{\sum_{i=1}^{m} v_i^* x_{ij}} \qquad j$$
$$= 1,2,\ldots,n \qquad (8)$$

Therefore the CWA efficiency score of it is 1.0. So that constrain (*) in (7) become redundant and this model become same the CWA model in paper of Liu and Peng (2006). On the other hand, the ideal line is the benchmark line. We result CWA model is special case of (7) in this paper. Therefore DMUj is CWA efficient if $\Delta_j^* = 0$ or $\theta_j^* = 1$ otherwise, DMUj is CWA inefficient.

Definition 3: The performance of DMUj is better than DMUi if $\Delta_j < \Delta_i$. (for more information about this subject see jahanshahloo and et. al 2010).

Suppose we have l Trade Offs (P_{ih}, Q_{rh}) $h = 1,2,\ldots,l$ $i = 1,2,\ldots,m$ $r = 1,2,\ldots,s$ the linear program of DEA model for evaluating common weight:

$\Delta^* = \min \sum_{j=1}^{n} \Delta_j + \sum_{h=1}^{l} \Delta_h$

S.t
$\sum_{r=1}^{s} u_r \bar{y}_r - \sum_{i=1}^{m} v_i \bar{x}_i = 0$
$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} + \Delta_j = 0 \quad j = 1,2,\ldots,n \quad (9)$
$\sum_{r=1}^{s} u_r q_{rh} - \sum_{i=1}^{m} v_i p_{ih} + \Delta_h = 0 \quad h = 1,2,\ldots,l$
$\Delta_j \geq 0, \qquad\qquad j = 1,2,\ldots,n$
$\Delta_h \geq 0, \qquad\qquad h = 1,2,\ldots,l$
$u_r \geq \epsilon > 0, \qquad r = 1,2,\ldots,s$
$v_i \geq \epsilon > 0, \qquad i = 1,2,\ldots,m$

Let u_r^*, v_i^* weights obtaining from solving model (9), therefore efficiency of DMUj in Trade Off models of DEA by using common weight is:

$$\theta_j^{*(TO)} = \frac{\sum_{r=1}^{s} u_r^* y_{rj}}{\sum_{i=1}^{m} v_i^* x_{ij}} \qquad j = 1,2,\dots,n \quad (10)$$

5. Computing of Efficiency by using common weights in different period and different models of DEA

We can compute $\theta_{k(t)}^{*t(TO)}$ (ideal DMU and DMUs in period t, frontier period = t), Likewise Previous Section, where x_{ij}^t, y_{rj}^t are substituted x_{ij}, y_{rj}. ($\theta_{k(t+1)}^{*t+1(TO)}$ (ideal DMU and DMUs in period t+1, frontier period = t+1))

DEA model of Trade Off technology in input orientation, ideal DMU and DMUs in period t, frontier period = t+1.

Phase 1:

$$\Delta^{*(t)} = \min \sum_{j=1}^{n} \Delta_j^t + \sum_{h=1}^{l} \Delta_h^t$$

S.t

$$\sum_{r=1}^{s} u_r^{t+1} \bar{y}_r^t - \sum_{i=1}^{m} v_i^{t+1} \bar{x}_i^t = 0$$

$$\sum_{r=1}^{s} u_r^{t+1} y_{rj}^{t+1} - \sum_{i=1}^{m} v_i^{t+1} x_{ij}^{t+1} + \Delta_j^t = 0$$

$$j = 1,2,\dots,n \quad (11)$$

$$\sum_{r=1}^{s} u_r^{t+1} q_{rh}^{t+1} - \sum_{i=1}^{m} v_i^{t+1} x_{ih}^{t+1} + \Delta_h^t = 0$$

$$h = 1,2,\dots,l$$

$$\Delta_j^t \geq 0, \qquad j = 1,2,\dots,n$$

$$\Delta_h^t \geq 0, \qquad h = 1,2,\dots,l$$

$$u_r^{t+1} \geq \epsilon > 0, \qquad r = 1,2,\dots,s$$

$$v_i^{t+1} \geq \epsilon > 0, \qquad i = 1,2,\dots,m$$

Phase 2: Therefore by solving model (11) we obtain $v_i^{*(t+1)}$, $u_r^{*(t+1)}$. So efficiency by using common weight is:

$$\theta_{j(t)}^{*t+1(TO)} = \frac{\sum_{r=1}^{s} u_r^{*(t+1)} y_{rj}^t}{\sum_{i=1}^{m} v_i^{*(t+1)} x_{ij}^t} \qquad j = 1,2,\dots,n \quad (12)$$

DEA model of Trade Off technology in input orientation, ideal DMU and DMUs in period t+1, frontier period = t.

Phase 1:

$$\Delta^{*(t+1)} = \min \sum_{j=1}^{n} \Delta_j^{t+1} + \sum_{h=1}^{l} \Delta_h^{t+1}$$

S.t

$$\sum_{r=1}^{s} u_r^t \bar{y}_r^{t+1} - \sum_{i=1}^{m} v_i^t \bar{x}_i^{t+1} = 0$$

$$\sum_{r=1}^{s} u_r^t y_{rj}^t - \sum_{i=1}^{m} v_i^t x_{ij}^t + \Delta_j^{t+1} = 0$$

$$j = 1,2,\dots,n \quad (13)$$

$$\sum_{r=1}^{s} u_r^t q_{rh}^t - \sum_{i=1}^{m} v_i^t x_{ih}^t + \Delta_h^{t+1} = 0$$

$$h = 1,2,\dots,l$$

$$\Delta_j^{t+1} \geq 0, \qquad j = 1,2,\dots,n$$

$$u_r^t \geq \epsilon > 0, \qquad r = 1,2,\dots,s$$

$$v_i^t \geq \epsilon > 0, \qquad i = 1,2,\dots,m$$

Phase 2: Therefore by solving model (13) we obtain $v_i^{*(t)}$, $u_r^{*(t)}$. So efficiency by using common weight is:

$$\theta_{j(t+1)}^{*t(to)} = \frac{\sum_{r=1}^{s} u_r^{*(t)} y_{rj}^{t+1}}{\sum_{i=1}^{m} v_i^{*(t)} x_{ij}^{t+1}} \qquad j = 1,2,\dots,n \quad (14)$$

Likewise we can compute $\theta_{j(t+1)}^{*t(VRS)}$ and $\theta_{j(t)}^{*t+1(VRS)}$.

5. New Method for computing Expanded Malmquist Index based on Common Weights in different models of DEA:

According computing of $\theta_{j(t)}^{*t(VRS)}$, $\theta_{j(t)}^{*t(CRS)}$, $\theta_{j(t)}^{*t(TO)}$ .... in previous section, we know:

$$EC_{\theta^*} = \frac{\theta_{(t+1)}^{*t+1(CRS)}}{\theta_{(t)}^{*t(CRS)}} \qquad (15)$$

$$PEC_{\theta^*} = \frac{\bar{\theta}_{(t+1)}^{t+1(VRS)}}{\bar{\theta}_{(t)}^{t(VRS)}} \qquad (16)$$

$$TC_{\theta^*} = \left[\frac{\theta_{(t)}^{*t(CRS)}}{\theta_{(t)}^{*t+1(CRS)}} \times \frac{\theta_{(t+1)}^{*t(CRS)}}{\theta_{(t+1)}^{*t+1(CRS)}}\right]^{\frac{1}{2}} \quad (17)$$

$$SEC_{\theta^*} = \left[\frac{\theta_{(t)}^{*t(VRS)}}{\theta_{(t)}^{*t(CRS)}} \times \frac{\theta_{(t+1)}^{*t+1(CRS)}}{\theta_{(t+1)}^{*t+1(VRS)}}\right] \quad (18)$$

Where EC_{θ^*} is Efficiency Change based on θ^*, PEC_{θ^*} is Pure Efficiency Change based on θ^*, TC_{θ^*} is Technology Change based on θ^* and SEC_{θ^*} is Scale Efficiency Change based on θ^*. The Malmquist Index and its FGLR and FGNZ decompositions are as follows (for more details, see Fare and et al., 1992, 1994). By similar way we can compute Malmquist Index.

Malmquist Index based on θ^* $(MI_{\theta^*}) = EC_{\theta^*} \times TC_{\theta^*}$ (19)

Malmquist Index based on θ^* $(MI_{\theta^*}) = PEC_{\theta^*} \times SEC_{\theta^*} \times TC_{\theta^*}$ (20)

We define:

$$EEC_{\theta^*} = \frac{\theta_{(t+1)}^{*t+1(TO)}}{\theta_{(t)}^{*t(TO)}} \qquad (21)$$

$$ETC_{\theta^*} = \left[\frac{\theta_{(t)}^{*t(TO)}}{\theta_{(t)}^{t+1(TO)}} \times \frac{\theta_{(t+1)}^{t(TO)}}{\theta_{(t+1)}^{t+1(TO)}}\right]^{\frac{1}{2}} \qquad (22)$$

$$REC_{\theta^*} = \left[\frac{\theta_{(t)}^{t(CRS)}}{\theta_{(t)}^{t(TO)}} \times \frac{\theta_{(t+1)}^{t+1(TO)}}{\theta_{(t+1)}^{t+1(CRS)}}\right] \quad (23)$$

Where EEC_{θ^*} is Expanded Efficiency Change based on θ^*, ETC_{θ^*} is Expanded Technology Change based on θ^* and EEC_{θ^*} is Regulation Efficiency Change based on θ^*. So

Expanded Malmquist Index based on $\theta^*(EMI_{\theta^*}) = EEC_{\theta^*} \times ETC_{\theta^*}$ (24)

Or

Expanded Malmquist Index based on $\theta^*(EMI_{\theta^*}) = EC_{\theta^*} \times REC_{\theta^*} \times ETC_{\theta^*}$ (25)

If $EMI_{\theta^*} > 1$, it shows DMU had progress.
If $EMI_{\theta^*} < 1$, it shows DMU had regress.
If $EMI_{\theta^*} = 1$, it shows DMU had not changing.

We define Malmquist Index Disparity and Expanded Malmquist Index Disparity:

$$EMID = \frac{EMI_{\theta} - EMI_{\theta^*}}{EMI_{\theta}} \times 100 \qquad (26)$$

6. Conclusion

For obtaining relative Efficiency of DMUs, we use means of weights and by using this method we compute Malmquist Index. The result seems be quite satisfactoriness. By using new method (common weights in Trade Off models in DEA) we can rank DMUs by logical criteria, that you can see the result from performance this method in numerical example.

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11/8/2012

Evaluation of Genotoxic Effects of Formaldehyde in Adult Albino Rats and Its Implication In Case of Human Exposure

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Abstract: Background: Formaldehyde is a reactive chemical that is commonly used in the production of industrial, laboratory, household, and cosmetic products. Formaldehyde (FA) is a potential carcinogen and mutagen. **Objectives:** This study was designed to evaluate the systemic genotoxicity of formaldehyde in experimental animals and in subjects exposed to FA. **Material, Subjects and Methods**: The animal study included twenty one rats that were divided into Group (1): Negative control rats ,Group (2): Positive control rats: received daily intraperitoneal injected with distilled water ,Group (3): Formaldehyde group, received single intraperitoneal injection of Formaldehyde (0.2 mg/kg/day) after 4 weeks of treatment, rats were sacrificed then submitted to cytogenetic examination by detection of their chromosomal pattern and mitotic index in bone marrow cells. The human study comprised two groups: 30 individuals occupationally exposed to formaldehyde in Zagazig University (cases) and 15 unexposed individuals (controls), from whom peripheral blood were collected and used for evaluation of the chromosomal aberrations (CAs) frequency and the comet assay for detection of DNA damage.**Results:** This study revealed increased frequency of structural chromosomal aberrations and decreased mitotic index of bone marrow cells of rats exposed to FA. Individuals exposed to FA also showed high frequency of chromosomal aberrations and increased levels of DNA damage in the Comet assay in terms of tail length and tail moment in peripheral blood lymphocytes compared to controls. **Conclusion:** Exposure to formaldehyde induced Chromosomal aberrations and DNA damage in peripheral blood lymphocytes of exposed subjects and bone marrow cells of albino rats.
[Mie Sameer Gomaa; Ghada E. Elmesallamy and Maha Mohamad Sameer. **Evaluation of Genotoxic Effects of Formaldehyde in Adult Albino Rats and Its Implication In Case of Human Exposure.** *Life Sci J* 2012;9(4):3085-3093] (ISSN:1097-8135). http://www.lifesciencesite.com. 453

Keywords: Formaldehyde, Genotoxicity, chromosomal aberration, DNA damage, Comet assay.

1. Introduction

Formaldehyde (FA), a member of the aldehyde family, is a bactericidal agent and tissue preservative **(Naya and Nakanishi, 2005; Yamato *et al.*, 2005).** It is found in nature, domestic air, cigarette smoke, and the polluted atmosphere of cities **(Songur *et al.*, 2003).** It is widely used in industrial and medical settings. Employees, especially the histologist, anatomist, pathologist and medical students following dissection lectures, are the subjects most frequently exposed to FA gas. FA in excess of certain doses is accepted as being toxic, and its harmful effects increase under room temperature due to easy evaporation and also metabolism into formic acid **(Gurel *et al.*, 2005 and Yamato *et al.*, 2005).**

Physiological FA can be formed by the metabolism of L-methionine, histamine or methylamine, and can contribute to biological methylation by folic acid **(Trezl *et al.*, 1990).**

Formaldehyde (FA), being a very reactive compound, can react with different macromolecules, such as proteins and nucleic acids or with low molecular weight substances as amino acids **(Cheng *et al.*, 2003 ; Metz *et al.*, 2004).** The inhalation of FA gas can produce irritation to eyes, nose and the upper respiratory tract. Whilst occupational exposure to high FA concentrations may result in respiratory irritation and asthmatic reactions. It may also aggravate a pre-existing asthma condition. Skin reactions following exposure to FA are very common, because the chemical is both irritating and allergenic **(Pala *et al.*, 2008).** FA induces genotoxic and cytotoxic effects in bacteria and mammalian cells **(Usanmaz *et al.*, 2002)** and its carcinogenicity have been proven in experimental studies that used proliferating cultured mammalian cells and human lymphocytes. Furthermore, FA can act as a cell-proliferation retardation factor and mediates the apoptotic process **(Speit *et al.*, 2007 and Pala *et al.*, 2008).**

Tyihak *et al.*, 2001and Marcsek *et al.*, 2007 concluded that formaldehyde can act as a cell-proliferation retardation factor, and can mediate the apoptotic process. In cell cultures, **Zhang *et al.*, 2009** found that formaldehyde at concentrations around 10mM decreased apoptosis and increased cell proliferation, whereas higher doses enhanced apoptosis and decreased cell proliferation**.** At the molecular level, FA exposure may generate reactive

oxygen species (ROS) inducing the formation of DNA molecular adducts **(Bono *et al.*, 2010).**

The aim of this study was to evaluate the systemic genotoxicity of formaldehyde in experimental animals and in subjects exposed to formaldehyde.

2. Material, Subjects and Methods:
Study design and setting

The current work was composed of 2 studies. The 1st one was the experimental study which carried on 21 adult albino rats and the 2nd one was the human study which carried on 45 subjects.

I. Experimental Study:

Twenty one adult male albino rats weighing 150-200 gm were obtained from the Animal House of the Faculty of Medicine, Zagazig University. The animals were divided into 3 groups:

Group (I): Negative control rats

Group (II):Positive control rats: received daily intraperitoneal injected with distilled water (0.5 ml once/day).

Group (III): Formaldehyde group, received single intraperitoneal injection of Formaldehyde (0.2 mg/kg/day) (1/10 LD_{50}) **(Odeigah, 1997)** for 4 weeks. Twenty four hours after the last injection, the rats were sacrificed then submitted to cytogenetic examination by detection of their chromosomal pattern and mitotic index in bone marrow cells.

Cytogenetic study

Cytogenetic study was performed using a known bone marrow technique described by **Speit *et al.* (1992).** Animals were injected I.M., 2 hours before scarification with 0.25ml/ 100g B.W. 0.5% colchicines. Both femora were dissected out and cleaned of any adhering muscle. Bone-marrow cells were collected from both femora by flushing potassium chloride (KCl) (0.075M, at 37ºC), and incubated at 37ºC for 25 min. Collected cells were centrifuged at $2000 \times g$ for 10 min, and fixed in aceto-methanol (acetic acid: methanol, 1:3, v/v). Centrifugation and fixation were repeated five times at an interval of 20min. The cells were resuspended in a small volume of fixative, dropped onto chilled slides, and allowed to dry. They were stained the following day with freshly prepared 2% Giemsa stain for 3–5 min, and washed in distilled water to remove excess stain, For each animal 100 well prepared). Metaphases were analyzed and different types of chromosomal abnormalities were recorded.

Mitotic Index determination.

The mitotic index was used in order to determine the rate of cell division. In order to calculate the mitotic index the slides that were prepared for the chromosomal aberration assay were used. Random views on the slides were selected to determine the number of dividing cells (metaphase stage). At least 1000 cells were examined in each preparation. The mitotic indices were obtained by counting the number of mitotic cells in 1000 cells per animal to a total of 5000 cells per treatment and control under an Olympus microscope. The mitotic index was calculated as the ratio of the number of dividing cells to the total number of cells, multiplied by 100 **(Shukla *et al.*, 2002).**

II. Human Study:

The study population consisted of 30 Lab technicians and workers occupationally exposed to formaldehyde in Pathology, Histology and Anatomy laboratories at Zagazig University. A control group of 15 non-exposed subjects was considered. All subjects were informed about the nature of the study and written informed consents were obtained from all studied subjects. The protocol of the study was approved by the Ethical Committee for Research, Faculty of Medicine, Zagazig University. Medical history, medication and lifestyle factors for all studied individuals, as well as information related to working practices (such as years of employment) were obtained. The characteristics of both groups are described in Table (1).

Venous Blood samples (5ml) were collected into sodium-heparin tubes. Immediately after sampling the blood was put on ice and brought to the laboratory for analysis. The same blood sample was analyzed using both methods: chromosomal aberration analysis and the Comet assay.

Genotoxicity assessment:
I- Analysis of chromosomal aberrations:

Analysis of chromosomal aberrations was used to detect cytogenetic damage according to the method of **Verma (1998).** Cultures were established by adding the blood sample to a culture medium containing Roswell Park Memorial Institute (RPMI) 1640 medium (pH 6.8–7.2), 20% fetal calf serum, 6 μg/ml phytohemagglutinin L (PHA-L), 0.5 mg/ml L-glutamine, and antibiotics (100 IU/ml penicillin, 100 μg/ml streptomycin) and incubating for 72 h at 37°C. Colcemid was added 2 h before harvesting, to stop mitosis at metaphase and prevent spindle formation. After hypotonic treatment with potassium Chloride (KCl), the cells were fixed in methanol/acetic acid (3:1), spread on wet slides and chromosome slides were stained with 5% Giemsa in phosphate buffer (pH 6.8) for 10 min. On average, 50-100 metaphases were analyzed from each individual using the high power oil immersion length for the presence of chromosomal aberration.

II- Comet assay

The assay was conducted under alkaline conditions according to **Singh *et al.* (1988).** Blood samples were suspended in 0.5% low melting point agarose and sandwiched between a layer of 0.6%

normal melting point agarose and a top layer of 0.5% low melting point agarose on fully frosted slides. During polymerization of each gel layer the slides were kept on ice. After solidification of the 0.6% agarose layer the slides were immersed in lysis solution (1% sodium sarcosinate, 2.5 M NaCl, 100 mM Na_2EDTA, 10 mM Tris–HCl, 1% Triton X-100 and 10% Dimethyl sulfoxide (DMSO) at 4°C. After 1 h slides were placed in electrophoresis buffer (0.3 M NaOH, 1 mM Na_2EDTA, pH 10) for 20 min at room temperature to allow for DNA unwinding. Electrophoresis was conducted in a horizontal electrophoresis platform in fresh, chilled electrophoresis buffer for 20 min at 300 mA and 19 V. The slides were neutralized with Tris–HCl buffer, pH 7.5, three times for 5 min and stained with 10%

ethidium bromide for 10 min. Each slide was analyzed using a fluorescence microscope equipped with a 515–560 nm excitation filter. For each subject 50 cells were analyzed with an automatic digital analysis system, Comet assay II (Perceptive Instruments, Halstead, UK), determining tail length and tail moment (tail length×% tail DNA/100).

Statistical analysis*:*
SPSS Software program was used. Quantitative data were compared using student's t test, while qualitative data were compared using chi square test. Correlation coefficient (r) was used for testing the association between two continuous variables. The significance level is considered at P value < 0.05.

Table 1: demographic characteristics of the studied population(n 45) grouped according to exposure status.

	Number of subjects	Gender		Age		Years of employment	
		Males	Females	mean±SD	Range	mean±SD	Range
Exposed group	30	20	10	42.5±6.3	35-50	14.3±2.5	10-20
Control group	15	8	7	39.3±5.6	34-53	-	-

3. Results:

I. Experimental Study:
Regarding the control groups (group I and II), there was no statistically significant difference between these two groups in the frequency of chromosomal anomalies or mitotic index (Table 2 and Figs. 1,2).

The rats exposed to formaldehyde through intra peritoneal injections (group III) showed a significant increase in the total abnormal metaphases which represented by various chromosomal anomalies in the form of chromatid gap and break,

chromatid fragment, chromatid deletion, Ring chromosome, and Dicentric chromosome. All these anomalies showed a significant increased frequency as compared to the corresponding control group (Table 2 and Fig. 1).

Numerical anomalies including aneuploidy and polyploidy also noticed in this group. These numerical anomalies showed a non significant change, compared to the control group. Also mitotic index showed a significant decrease in Formaldehyde exposed rats as compared to the control values Fig. (2).

Table 2 : Statistical analysis of the chromosomal aberrations in bone marrow cells of the control rats and Formaldehyde treated rats, after 4 weeks of the study.

Chromosomal Anomalies	Group 1 (-ve Control) n= 7 (Mean ± SE)	Group II (+ve Control) n= 7 (Mean ± SE)	Group III Formaldehyde group n= 7 (Mean ± SE)
I- Structural anomalies - Chromatid gap and break - Chromatid deletion - Ring chromosome - Dicentric chromosome - Stretched chromosome -Total abnormal metaphase	9.4±0.12 8.5±0.13 6.3±0.08 3.2±0.03 6.2±0.09 33.6±0.12	8.2±0.17 7.7±0.09 7.1±0.10 2.9±0.09 5.9±0.11 31.8±0.12	17.1±0.05* 15.6±0.08* 12.6±0.09* 9.0±0.11* 10.5±0.08* 54.8±0.5*
II- Numerical anomalies - Aneuploidy - Polyploidy	00.0±0.0 0.5 ±0.02	00.0±0.0 0.3 ±0.05	1.5±0.03 3.5±0.04

Data are expressed as mean value chromosomal aberrations /100 metaphases ± SE
* Significantly different from the controls (Student's t-test; p < 0.05)
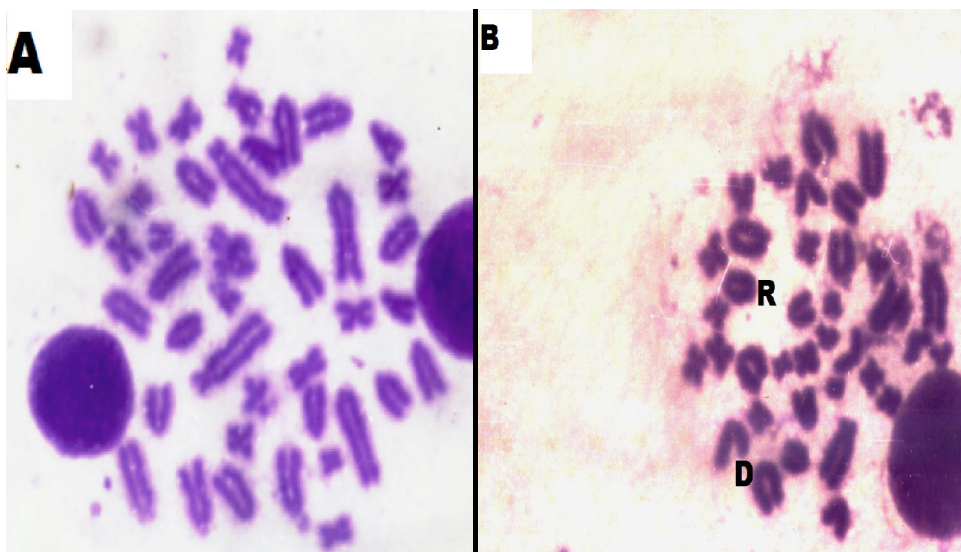
Fig 1: A photomicrograph of a metaphase spread prepared from bone marrow cell of control group (A) showing normal chromosomal structure and number and formaldehyde treated group (B) showing more than one type of chromosomal aberrations as deletion [D] and ring chromosome [R]) (Giemsa stain x 1000).
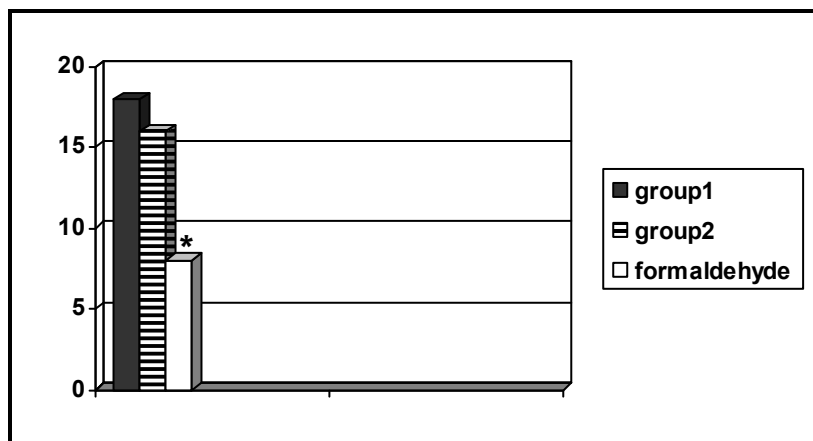
Fig 2: Bar chart shows the Mitotic index of bone marrow cells in control groups and formaldehyde treated rats (* significantly different from the control, Student's t-test, $p < 0.05$).

II. Human Study

The results of structural chromosomal aberrations analysis in human peripheral blood lymphocytes were shown in Tables 3 and 4. It was observed that formaldehyde exposure induced a statistically significant increased number of aberrant cells with chromatid gap and break, chromatid deletion, ring chromosome and dicentric chromosome as compared to the corresponding values in the control group. While numerical anomalies including aneuploidy and polyploidy showed a non significant change compared to the control group. A multivariate analysis of variance showed that gender and age did not affect the type of structural aberrations. Also, non significant differences in the numbers of aberrations with regard to subject gender were found Table (4).

The effects of Formaldehyde exposure on the extent of DNA migration (Comet assay) were presented in Tables 5, 6 Fig. 3. The exposed group peripheral blood lymphocytes showed significantly increased levels of DNA damage in terms of tail length and tail moment as compared to the corresponding values in the control group. Distribution of both Comet assay end-points appeared to be wider in Formaldehyde exposed subjects, compared to the controls. Point values of tail lengths ranged from 16 to 74 μm, whereas the values of tail moments ranged from 11 to 88 μm. The values of tail lengths distribution for the control subjects were from 7 to 14 μm and tail moments from 5 to 13. The multivariate analysis of variance showed that the gender and the age did not affect between-group variations in the Comet assay parameters Tables (6).

Table 3: Statistical analysis of chromosomal aberrations in peripheral blood lymphocytes of the control group and the Formaldehyde exposed group.

Chromosomal aberrations	Control group n= 15 (Mean ± SE)	Formaldehyde Exposed group n= 30 (Mean ± SE)
I- Structural		
- Chromatid gap & break	1.9±0.36	6.5± 0.65*
- Chromatid deletion	8.7±0.55	15.5±0.47*
- Ring chromosome	5.5±0.33	16.4±0.29*
- Dicentric chromosome	0.9±0.41	9.0±0.54*
-Total abnormal metaphase	20.0±0.27	46.4±0.35*
II- Numerical		
- Aneuploidy	0.2±0.12	0.7±0.10
- Polyploidy	0.6±0.14	0.9 ±0.09

Data are expressed as mean value chromosomal aberrations /100 metaphases ± SE
* Significantly different from the control group (Student's t-test; $p < 0.05$).

Table 4: Statistical analysis of chromosomal aberrations in peripheral blood lymphocytes of the control and the Formaldehyde exposed groups according to the gender of the subjects.

Chromosomal aberrations	Control group (Mean ± SE)		Formaldehyde Exposed group (n= 30) (Mean ± SE)	
	Male n= 8	Female n= 7	Male n= 20	Female n= 10
I- Structural				
- Chromatid gap & break	1.4±0.22	1.6±0.21	7.1± 0.44	6.4± 0.49
- Chromatid deletion	8.1±0.38	7.7±0.32	16.5±0.19	15.9±0.23
- Ring chromosome	5.0±0.37	5.8±0.32	16.9±0.38	15.6±0.32
- Dicentric chromosome	0.9±0.40	0.8±0.37	9.0±0.51	8.0±0.49
-Total abnormal metaphase	15.4±0.20	15.1±0.18	48.5±0.36	44.9±0.29
II- Numerical				
- Aneuploidy	0.2±0.11	0.2±0.13	0.7±0.2	0.8±0.10
- Polyploidy	0.6±0.09	0.7±0.14	0.9 ±0.05	0.7 ±0.09

Table 5: Statistical analysis of Comet assay end-points in peripheral blood lymphocytes of the control and the Formaldehyde exposed groups.

Groups	Tail length (μm)	Tail moment	Tail length distribution (μm)	Tail moment distribution
Control group	12.5±1.5	10.8±1.2	7.2-14.7	5.8-13.6
Formaldehyde Exposed group	47.3±8.5*	56.1±16.5*	16.5-74.2	11.4-88.1

Data are expressed as mean value of end-points /50 comets ±SE
 * Significantly different from the control group (Student's t-test; $p < 0.05$)

Table 6: Comet assay end-points in peripheral blood lymphocytes of the control and the Formaldehyde exposed groups according to the gender of the subjects.

Groups	Tail length (μm)	Tail moment
Control group		
- Male	12.2±1.8	10.5±1.2
- Female	13.1±1.2	11.7±0.9
Exposed group		
- Male	45.9±8.8	59.2±7.85
- Female	46.1±9.1	57.4±15.2

Data are expressed as mean value of end-points /50 comets ±SE

A   B
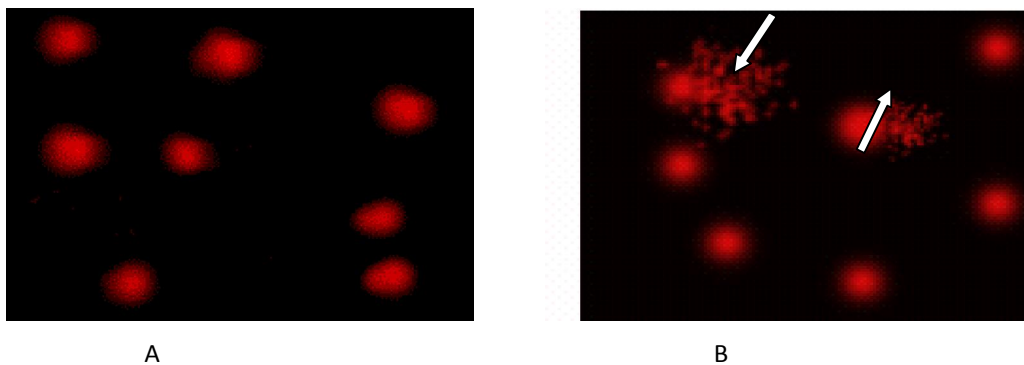
Fig 3: Comet assay in peripheral blood lymphocytes of the control group (A), showing no DNA damage and the Formaldehyde exposed group (B), showing DNA damage (⟶).

4. Discussion

A relevant indoor exposure to Formaldehyde (FA) is detectable in hospitals and scientific institutions where FA is used as a bactericide and tissue preservative **(Kurose *et al.,* 2004).** Histology, pathology, cadaver embalming technicians, dissection students and nurses working at dialysis units are occupationally subjected to FA exposure **(Kilburn *et al.,* 1987).**

Nevertheless, the Formaldehyde genotoxic potential in occupationally exposed individuals is conflicting. Chromosomal damage is considered to detect early effects of xenobiotic insult and evaluation of the frequency of chromosomal aberrations, as being a sensitive cytogenetic assay for detecting exposure to mutagens and carcinogens **(Bonassi *et al.,* 1995).**

The results of this study demonstrated that Formaldehyde injections in rats induced a significant increase in the total abnormal metaphases which showed various chromosomal anomalies in the form of chromatid gap and break, chromatid fragment, deletion, ring chromosome and dicentric chromosome which showed a significantly increased frequency as compared to the control group. Also mitotic index showed a significant decrease in Formaldehyde exposed rats as compared to the control group values.

These results coincided with those of **IARC, (2006)** who reported that long-term exposures to high concentrations of Formaldehyde appear to have a potential for inducing DNA damage. These effects were well demonstrated in experimental studies with animals, in which local genotoxic effects following FA exposure were observed, i.e. DNA–protein cross-links and chromosome damage.

Also **Cao *et al.*(2009)** observed in their study a significant increase in the micronucleus rate and chromosome aberration (mainly for chromosome breakage, polyploid) in liver of embryos after maternal exposure to formaldehyde.

The mitotic index is one of the standard indices commonly used for measuring cytotoxicity. A significant decrease in mitotic index was observed in rats treated with formaldehyde. This significant inhibition of mitotic activity of bone marrow cells observed in this study may be correlated with DNA damage or apoptosis induced by formaldehyde (**Tyihak *et al.,* 2001 and Costa *et al.,* 2008).**

On studying the results of the clinical part of present research work, it showed that the peripheral blood lymphocytes of the Formaldehyde exposed subjects had a statistically significant increase in the number of aberrant cells with chromatid gap and break, chromatid deletion, ring and dicentric chromosomes. These results suggest that long-term exposure to Formaldehyde induced a significant increase in the number of both chromatid and chromosomal types of aberrations. This finding is supported by the appearance of dicentric and ring chromosomes as complex aberrations that were not of statistical significance in the control subjects. Formaldehyde induced chromosomal aberrations (CAs) could be attributed to disrepair of lesions in the G_0 stage of circulating lymphocytes as suggested by **Carrano and Natarajan (1988).** The chromosome types of aberrations could also arise due to increase in DNA lesions or interference with their repair **(IAEA, 1986).**

These results agree with those presented by **Schmid *et al.* (1986)** who described a significant increase of the chromatid type CA and sister chromatid exchange (SCE) in human lymphocytes treated with FA in vitro while, **Shaham *et al.* (2002)** reported an increased level of DNA-protein crosslinks and SCE in industry workers exposed to FA. Also **He *et al.* (1998)** observed a significant increase in MN, CA and SCE in PBL of FA-exposed anatomy students.

Jakab *et al.* (2010) demonstrated that exposure to formaldehyde induces apoptosis and

CAs, indicating an excess cancer risk among subjects occupationally exposed to formaldehyde. At this concern, in some biomonitoring studies, cytogenetic effects, such as increased sister chromatide exchanges (SCE), chromosomal aberrations (CAs), and micro nucleated cells (MNC), were described **(Shaham et al., 1997; Burgaz et al., 2001 and Ye et al., 2005),** while in other reports, these evidences were lacking **(Thomson et al., 1984).**

Chromosome damage and effects on lymphocytes arise because FA escapes from sites of direct contact, such as the mouth, causing nuclear alterations in the lymphocytes of those exposed **(He, et al., 1998 ; Orsière et al., 2006 and Zhang et al., 2009).**

Our results thus corroborate previous reports **(Viegas et al., 2010 and Ladeiraa et al., 2011)** that lymphocytes can be damaged by long-term FA exposure. Moreover, the changes in peripheral lymphocytes indicate that the cytogenetic effects triggered by FA can reach tissues far away from the site of initial contact **(Suruda et al., 1993).).** In general the genotoxic effects of FA exposure on first contact tissues such as the nose and the respiratory tract have been increasingly convincing. A relationship between FA exposure and micronuclei (MN) frequencies in both buccal smears and nasal mucosa of workers in anatomy and pathology laboratories was demonstrated by **Burgaz et al. (2001)** and by **Costa et al. (2008).**

Only in the last few years the Comet assay has being introduced as a useful technique in human biomonitoring studies allowing the evaluation of DNA damage at the single cell level. Therefore, few are the studies published on FA occupational exposure in which this biomarker is used. However, there are already some in vitro studies in cellular lines and in animal and human leukocytes culture cells in which the Comet assay proved to be a sensitive biological indicator in the evaluation of the genotoxic effect of FA **(Frenzilli et al., 2000; Liu et al., 2006 and Sul et al., 2007).**

The current study showed that the levels of DNA damage, measured as tail length (TL), were significantly increased in the Formaldehyde exposed group compared with the control group. This result agrees with those presented by **Yu et al.(2005)** who reported a significantly increase of TL and olive tail moment in peripheral blood lymphocyte of 151 workers from two plywood factories. DNA damage detected in the present study and measured as Comet assay end-points could possibly originate from DNA single-strand breaks, repair of DNA double-strand breaks, DNA adduct formation or DNA–DNA and DNA–protein cross links **(King et al., 1993 ; et al., 1995 and Shah et al., 1997).**

5. Conclusion:

The current work demonstrated that exposure to Formaldehyde induced chromosomal aberrations and DNA damage in the peripheral blood lymphocytes of exposed subjects and bone marrow cells of albino rats.

6. Recommendations:

The results presented in this study emphasize the importance of personal protection at work places, with possible occupational exposure to Formaldehyde. The results also stress the necessity of a further more detailed testing of genotoxicity in subjects occupationally exposed to Formaldehyde, in order to detect early cytogenetic biomarkers of exposure and to prevent further induction of DNA lesions which could induce neoplastic growth of damaged somatic cells.

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10/10/2012

Formal Analysis of Arrival Procedure of Air Traffic Control System

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Abstract: The air traffic control (ATC) is safety, monetary and environmental critical system. Its failure may cause the loss of human life, severe injuries, loss of money and environmental issues. The complexity of such systems requires formal modeling and step by step design processes. In this paper we investigate the use of formal method VDM++ to specify and verify the arrival procedure of aircrafts. The control along arrival procedure changes from the ramp to the gate controller to make possible the safe arrival. For the specification the bottom up approach is used to model the system. Initially, aircraft, ramp and gate controller are specified, then all are combine for their synchronize approach. The specification and syntactical verification are performed by VDM++ which is an object oriented model based formal approach.
[Yousaf S, Khan SA, Zafar NA and Farooq A and Khan MA. **Formal Analysis of Arrival Procedure of Air Traffic Control System.** *Life Sci J* 2012;9(4):3094-3098] (ISSN:1097-8135). http://www.lifesciencesite.com. 454
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Keywords: VDM++; air traffic control system; formal specification; formal method.

1. Introduction

The major concern of air traffic control system is to ensure the safe operation of private and commercial aircrafts [5]. ATC is heavily dependent upon the capabilities of human operator; some accidents in ATC were documented by "human error" with the causal factor involving the perception, memory, decision making, communication and resource management [4]. Therefore formal analysis is very essential for proving safety properties of ATC system. Formal methods are used to remove the ambiguities in specification of system and have been applied to specify and verify the complex systems. The above mentioned reason motivated us to use formal methods to design ATC system. The work of S. Ahmad and V. Saxena [1] used the Sami formal notation UML which cannot be verified systematically to ensure a specification's accuracy [9]. VDM++ has the following advantages to design air traffic control system.

1). This specification technique is more comprehensive form than other methods. 2) It gives a precise definition of what is going to build. 3) In our research, VDM++ helped to clarify the key ideas of ATC system. 4) It provided a precise way of defining the data and underlying functions of the ATC system. 5) It also provided us a way to specify the interface between components of the entire system under development in a precise manner.

For the safe arrival process aircrafts communicate with the air traffic controllers. In this arrival procedure initially, the aircraft is under the control of ramp controller all the activities during arrival process of aircraft are controlled by this controller. Initially the aircraft will send request to the ramp controller for the entrance of ramp area and on this request the ramp controller grant the permission to aircraft then after this aircraft enter into ramp area. The gate controller arranged all the aircraft in sequence at ramp and then control is transfer to gate controller. Just likewise the ramp controller, gate controller controls the activities of aircraft. In this paper, we have used the extend version of Vienna Development Method (VDM) that is VDM++ to formalize the arrival procedure of aircraft. The organization of this paper is as fallow. In section 2, an introduction to formal methods is presented. Formal modeling of the arrival procedure is given using VDM++ in section 3. Finally, conclusion and future works is discussed in section 4.

2. Formal Methods

Formal methods [13-15] consist of the set of techniques and tools based on mathematical modeling and formal logic that are used to specify and verify requirements and designs for computer systems and software as presented in various application [16-26]

2.1 Classification of Formal Methods

Formal methods are used for both software and hardware designing or software- hardware co-designing [6, 10]. Classification of formal methods with respect to the use of it, is given below as discussed in [10].

Writing Formal Specification:

Formal methods are used to reason about mathematical objects. However, hardware circuits are not mathematical objects, they are real world physical objects. Therefore, it is necessary to develop

mathematical model of system and also describe the properties of that system [7]. The formal specification of a system is written in term of mathematical notation which is precise and unambiguous.

Proving Properties about the Specification: The requirement specification normally given in informal languages when we write it in formal specification language then this is an error-prone. This formal specification is used for proving the properties of the system.

Deriving Implementation from a given Specification:

Once the specification is written then it is helpful to design models which automatically derives the implementation of system with the full requirements. This idea actually belongs to the fifth generation of the programming language, i.e., PROLOG [8], where the implementation phase and system specification is very closely related to each other.

However, specifications are often given in a declarative manner and not in constructive manner. This means that these specifications only describe what the system should do but not how this function can be achieved. It is certainly impossible to derive correct program from declarative specification since these problems are inherently undecidable thus the machine can never solve them. Therefore, the construction of appropriate implementation always remains a creative task for human being [7].

Verifying a specification w.r.t. a given implementation:

It is possible that the description of the system which is automatically derived may be less detailed. However, the design steps that are used to refine the description of the system must not effect the validity of the system specification. However, it must be checked that the abstract implementations satisfy the original specification. This is a formal verification process. The formal verification can be applied in two different ways. One method is based on the automated theorem proving for the certain formal language. In 1980 another technique was developed which is called model checking. In model checking the description of the system is not given in the logic. The procedure of model checking is task to evaluate the specification in interpretation.

2.2 Application of Formal Methods

Formal specification techniques are applicable in many real time systems but are most applicable in the development of critical systems and standards [9].

2.2.1   Security Critical Systems

Security critical system involves authorize use of system. For the verification of network protocol, formal methods are used [9]. The network security is essential for every organization either it is private or government sector because intruder effect the networks which can cause for loss of precious information and resource, therefore the use of formal methods for writing specification of protocol are helpful to achieve security goals of protocols. Some security models are formalized and the verified by using formal automated tools [11].

2.2.2   Complex Systems

Formal approach is used to develop the complex systems [2]. This is the only technique, which gives us precisely specifying models of system for the complex software systems [3].

2.2.3   Safety Critical Systems

Safety critical systems are also called life critical systems because in the safety critical systems failure of the system or software might be dangerous for life. Criticality is often expressed in terms of:

- Reliability
- Availability
- Maintainability
- Safety
- Security

Critical systems make expensive methods worthwhile and needs experience. The most common Examples of safety-critical systems are given below.

Medicine: The medicine is critical area where we cannot afford the failure of the system because the failure of the system means failure of the life or some bad effect on the life. Following are the some machine and system used in medicine.

- Heart-lung machines
- Mechanical ventilation systems
- Infusion pumps and Insulin pumps
- Radiation therapy machines
- Robotic surgery machines
- Defibrillator machines

Nuclear Engineering: Nuclear reactor control system has a close relationship with safety critical systems. Even the miner mistake can cause the inerrable lose of life.

Transport: The transportation system is implemented almost in every country of the world. The railway signaling and control system belongs to safety critical systems. If the problem occurs in this system, the lives would be in danger zone.

Aviation: Aviation includes all those activities that are manmade flying devices like aircraft and fighter jet. Following are the some systems related to it.

- Air traffic control systems
- Avionics, particularly fly-by-wire systems
- Radio navigation RAIM
- Aircrew life support systems

- Flight planning to determine fuel requirements for a flight

3. Formal Modeling Using VDM++

Formal modeling is being increasing mentioned in some safety-related standards as a possible method of improving dependability. The formal specification of the air traffic control system is defined as: Three main entities, aircraft, gate controller and ramp controller are defined.

3.1 Aircraft

Types and definition are same as for the departure procedure the class is defined with name *AirCraft.*

```
class AirCraft
types
public string = seq of char;
public Aircraft: ACid:string
callsign:string
```

3.2 Instance Variables

The instance variables used in the specification are given below. *RC,* and *GC* are respectively objects of ramp and gate controller, which allow accessing all the instance variables of these controllers in the class.

```
instance variables
public Aircrafts:set of Aircraft;
Public NIL:string;
public RTTaxiWayQ:seq of string;
TaxiWayQ:seq of string;
public RTRampQ:seq of string;
public RTTaxiclcQ:seq of string;
public Assignedgate:map string to string;
public RequestGate:seq of string;
RTPgateQ: seq of string;
Reached: seq of string;
pGateQ: seq of string;
RC:Rampcontroller;
GC:GateController;
```

3.3 Possible Operations

The following operations are modeled to perform certain task for the arrival procedure.

Request to Enter Ramp:

The operation denoted by *Request To EnterRamp (craftin:string)* is defined, where aircraft sends request to enter in the ramp area. The pre-condition of this operation ensures that the aircraft must be a registered aircraft, it does not belong to those aircrafts which have sent request to enter ramp. It must reside on taxiway. The post-condition includes it to those aircraft which have sends request for enter ramp area.

```
RequestToEnterRamp(craftin:string)
ext wr RTRampQ:seq of string
   rd Aircrafts:set of Aircraft
   wr TaxiWayQ:seq of string
pre exists a in set Aircrafts & a.ACid = craftin
```

```
   and craftin not in set elems RTRampQ
   and craftin in set elems TaxiWayQ
post RTRampQ =RTRampQ~ ^ [craftin]
   and TaxiWayQ=tl TaxiWayQ~;
```

Enter in Ramp Area:

The operation denoted by *Enter Ramp (craftin:string)* is defined where aircraft can enter into the ramp area. The pre-condition ensures that only that aircraft can enter into ramp area which is registered and have clearance to enter ramp area. In the post condition aircraft enter into ramp area and its permission to enter ramp is discarded.

```
EnterRamp(craftin:string)
ext wr Ramp:string
   wr RC:Rampcontroller
   rd NIL:string
pre exists a in set Aircrafts & a.ACid = craftin
   and craftin in set elems RC.GClcrampQ
   and Ramp=NIL
post Ramp=craftin
   and RC.GClcrampQ=tl RC.GClcrampQ~;
```

Request to Assign Gate:

The operation denoted by *Request Assigngate (craftin:string)* is defined in the specification where aircraft sends requests to gate controller for the assigning of gate. The pre-condition shows that there are three invariants on this operation first one is that the aircraft which sent a request to assign the gate should not be part of those aircrafts which have already requested to assign gate and second is that it does not have already assigned gate, third is that this aircraft also be a valid aircraft, i.e., it belongs to those aircrafts which are registered and last is that aircraft belong to those aircrafts which are in ramp queue. In the post-condition request of aircraft is confirmed.

```
RequestAssigngate(craftin:string)
ext  wr RequestGate:seq of string
   --rd Assignedgate:map string to string
   wr RC:Rampcontroller
   -- wr GC:GateController
   rd Aircrafts:set of Aircraft
pre  craftin not in set elems RequestGate
   -- and craftin not in set dom GC.Assignedgate
   and exists a in set Aircrafts & a.ACid = craftin
   and craftin  in set elems RC.RampQ
post RequestGate=RequestGate~ ^ [craftin];
```

Request to Pass from Gate:

The operation denoted by *RequesttoPassGate (craftin:string)* is defined where aircraft send request to pass from the gate.

```
RequesttoPassGate (craftin:string)
ext wr RTPgateQ: seq of string
   wr GC:GateController
   rd Aircrafts:set of Aircraft
pre  exists a in set Aircrafts & a.ACid = craftin
```

and craftin not in set elems RTPgateQ
and craftin in set dom GC.Assignedgate
post RTPgateQ= RTPgateQ~ ^ [craftin];

Pass from Gate:

To pass from the gate the aircraft must have permission to pass from the gate, it is also registered aircraft then the aircraft can pass from the gate.

PassFromGate(craftin:string)
ext wr pGateQ:seq of string
   wr GC:GateController
   rd Aircrafts:set of Aircraft
pre exists a in set Aircrafts & a.ACid = craftin
   and craftin not in set elems pGateQ
   and craftin in set elems GC.PFclearence
post pGateQ=pGateQ~ ^ [craftin]
   and GC.PFclearence= tl GC.PFclearence~;

Final Arrived:

This operation keep the record of those aircrafts which are arrived.

arrived(craftin:string)
ext wr Reached:set of string
   wr pGateQ:seq of string
   rd Aircrafts:set of Aircraft
pre exists a in set Aircrafts & a.ACid = craftin
   and craftin in set elems pGateQ
   and craftin not in set Reached
post Reached= Reached~ union {craftin}
   and pGateQ=tl pGateQ~;
end AirCraft

3.4 Ramp Controller

The ramp controller defined as class *RampController* and the type used in this class is string.

class Rampcontroller
types
public string = seq of char;

The instance variable used in this specification given below. "AC" is the object of the Aircraft which allow accessing all the instance variables of the Aircraft and "GC" is the object of the ground controller for accessing the all variables of the ground controller.

instance variables
AC:AirCraft;
public RampQ:seq of string;
GClcrampQ: seq of string;

Grant Clearance to Enter Ramp: The operation denoted by *GrantClearanceTo EnterRamp (craftin:string)* is defined so that permission for enter ramp is granted to aircraft. The pre-condition of this operation ensures that the aircraft must be registered before enter in the ramp area, it does not belong to those aircraft which already have clearance to enter ramp and this aircraft have sent request for entering ramp. In the post-condition clearance is granted to aircraft and its request is discarded which it has send for enter ramp.

operations
GrantClearanceToEnterRamp(craftin:string)
ext wr AC:AirCraft
   wr GClcrampQ: seq of string
pre exists a in set AC.Aircrafts & a.ACid = craftin
   and craftin in set elems AC.RTRampQ
   and craftin not in set elems GClcrampQ
post GClcrampQ = GClcrampQ~ ^ [craftin]
   and AC.RTRampQ= tl AC.RTRampQ~;

Sequencing at Ramp: For the arrangement of aircraft at ramp, the operation denoted by *SequenceATRamp (craftin:string)* is defined. Pre-condition ensures that there must be an aircraft in the ramp variable, this aircraft must not be in the ramp queue and it also be a registered aircraft. Post-condition promoted it to the ramp queue and variable ramp become free.

SequenceATRamp(craftin:string)
ext wr RampQ:seq of string
   wr GClcrampQ: seq of string
   wr AC:AirCraft
pre   exists a in set AC.Aircrafts & a.ACid = craftin
   and craftin not in set elems RampQ
post RampQ= RampQ~ ^ [craftin]
   and AC.Ramp=AC.NIL;
end Rampcontroller

3.5 Gate Controller

The gate controller is responsible to assign the gate to aircraft without assigning the gate the craft cannot proceed for the departure. It is defined as class 'GateController'.

The types which are used are "string" and "Gate" the Gate is a composite type which has gate id "Gid" and status of gate "status '".

class GateController
types
public string = seq of char;
Gstatus = <FREE>|<BUSY>;
Gate:: Gid:string
        status:Gstatus;

The instance variables used in the specification are given below. "AC" is the object of the Aircraft, which allows accessing all the instance variables of the Aircraft.

 instance variables
AC:AirCraft;
Gates:seq of Gate;
public Assignedgate:map string to string;
public PFclearence:seq of string;

Functions: *Isavailable* function is modeled formally, which returns the position of that gate whose status is free.

functions
isavailable(gateidin:seq of Gate)pos:nat
pre true

```
post gateidin(pos).status = <FREE> and forall i in set
{1,...,pos-1} & gateidin(i).status <> <FREE>;
```

Assign Gate: The gate assigning process is catered in the following operation. Here first it is checked that the aircraft which has sent request for gate assignment that should not be assigned the gate, then the gate will assign to aircraft if the gate status is free otherwise the gate will not be assigned to the aircraft.

```
operations
AssignGate()
ext wr AC:AirCraft
    wr Assignedgate:map string to string
    wr Gates:seq of Gate
pre let pos = isavailable(Gates)
    in pos <> 0
post let pos = isavailable(Gates)
     in Assignedgate = Assignedgate~ munion {hd
(AC.RequestGate) |-> Gates(pos).Gid};
```

Clearance to pass from the Gate: This operation is defined in which aircraft is allowed to pass from the gate.

```
ClearancetoPasFromGate(craftin:string)
ext wr PFclearence:seq of string
    wr AC:AirCraft
pre craftin not in set elems PFclearence
    and craftin in set dom Assignedgate
    and exists a in set AC.Aircrafts & a.ACid = craftin
post PFclearence=PFclearence~ ^ [craftin]
    and AC.RTPushBack= tl AC.RTPushBack~
end GateController.
```

4. Conclusion

From the model of aircraft control system along the arrival, we revealed that the use of formal method for such system is necessary. The formalized structure gave the primary and fundamental basis for safety critical systems. It also provided necessary and excellent basis for fault tolerance and reliable structure of the system. The method ensured the consistency, reliability and safety of the model. All the above properties can reduce the failure ratio of air traffic control system. In the development the bottom up approach is used i.e., initially the basic components like aircraft; ramp and ground controller are specified. Further, for synchronized affect they all are composed.

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11/9/2012

Cognitive Social Knowledge Grid Infrastructure for Collaborative Environments

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Abstract: Collaborative environments are virtual workplaces where agents can communicate, interact and collaborate. We introduce a model to compare different social structures and make a comparison between famous network structure and our goal infrastructure. Based on the differences, the main reasons to present our proposed model are described. Therefore we introduce an infrastructure to support optimized interoperability and propose a novel architecture, called Cognitive Social Knowledge Grid architecture, as a solution to perform information and knowledge operations through interaction and collaboration of humans and machines. CSKG services and mechanisms have been described and relationship models of CSKG components and services have been presented using UML. Utilizing capabilities of social network services, user profiles information, social culture and operational environment, CSKG collaboration management services form a community to perform an activity. Ultimately, CSKG performance and execution capabilities in large-scale collaboration networks have been evaluated. Furthermore, community formation based on user profiles similarities and social culture like trust and commitment is argued using weighted cosine similarity function.
[Saberil S, N.Fesharaki M. **Cognitive Social Knowledge Grid Infrastructure for Collaborative Environments**. *Life Sci J* 2012;9(4):3099-] (ISSN:1097-8135). http://www.lifesciencesite.com.

Keywords: knowledge grid; collaborative environments; social network; service-oriented architecture; trust; commitment

1. Introduction

Increasing development of distributed data, information and knowledge resources in geographical spaces lead the need of implementing distributed and decentralized systems. In decentralized environments, design and implementation of such programs needs several mechanisms and services to perform different operations on information and computing resources. Organizations have been come out of traditional forms and converted to open enterprises systems. In addition to services interactions, interactions between human and machines also play an effective role in such systems.

We introduce an infrastructure to implement an environment to perform optimized interaction and collaboration. We discuss about the environment that this infrastructure is defined for. Social structures and the main factors of social and network structures are introduced and some existing network structures that are relevant to our structure are compared with each other. In fact, it is the main reason that why we propose our infrastructure. Therefore, we propose a model and a novel architecture, called Cognitive Social Knowledge Grid Architecture (CSKGA) to execute in the proposed infrastructure. It is introduced as a solution to perform information and knowledge operations, and collaboration of agents. CSKG utilizes capabilities of social network and semantic overlay network (SON) approaches 1, and

service-oriented architecture. It has to be noticed that in this research, using word of Grid does not necessarily mean using grid infrastructure but it means a management and communication network among nodes operating in the environment. This architecture includes three groups of social network services, application services, and management services. Social network services supply a communication environment for users; application services present single and distributed services; and management services are used for total system management, security, discovery, monitoring and service improvement, and collaboration management. We describe CSKG services and mechanisms and model the relationships among its services and components using UML.

In this research, we have focused on social and semantic aspects of collaboration in an environment. Therefore, to utilize social preferences, social network has been proposed in order to come over limitations caused by information flows in collaborative environments. Using capabilities of social network services, agents' information, and cognitive and social characteristics (like trust and commitment), CSKG collaboration management services form a community to perform an activity.

Eventually, CSKG performance and execution capabilities in large-scale collaborative environments have been evaluated. Then community formation

based on user profiles similarities, and cognitive and social parameters like trust and commitment will be argued. We use weighted cosine similarity function to find one or more right partner, collaboration, and operation common performance.

The remainder of this paper is organized as follows. Section 2 deals with related works. In section 3 we outline social structures and its important factors. Section 4 describes definition and characteristics of CSKG. We present the Cognitive Social Knowledge Grid architecture, its services, and relationships among services in Section 5. We discuss collaboration and simulation of community formation in collaborative environments in Section 6. Finally section 7 concludes the paper.

2. Related Works

The concept of virtual communities is increasingly used to enable the collaboration between geographically distributed members belonging to various organizational units. Studies on distributed teams focus on human performance and interactions 5. Service-oriented architectures (SOA) have emerged as the defacto standard to design and implement open enterprise systems. Web service technology 6 enables cross-organizational interactions in collaborative networks 23. The grid is a set of computer resources spread all over the world, belonging to any organization (private or public) that are shared by a user community under specific constraints 7. Grid computing involves an evolving set of open standards for Web services and interfaces that make services, or computing resources, available over the Internet 8. Cloud computing is the next stage in evolution of the Internet. The cloud in cloud computing provides the means through which everything - from computing power to computing infrastructure, applications, business processes to personal collaboration - can be delivered to you as a service wherever and whenever you need 910.

In addition, Social networks have received tremendous attention recently from both research and academia. It becomes essential to adapt and influence the information exchange in an automated manner 11. Social networks become more and more interlinked with enterprises and collaborative platforms 5. Collaboration networks are among the most extensive databases of SNs considered to date. In particular, Newman 12 has shown that scientific collaboration networks have all the general ingredients of small-world and scale-free networks, while Barabasi et al. 4 have followed a complementary approach more focused on the dynamical processes determining the network evolution.

F. Berman proposed the concept of knowledge grid in 2001 which supports the synthesis of knowledge from data 13. Cannataro and Talia designed a reference software architecture, which they called the knowledge grid (KG), for implementation of parallel and distributed knowledge discovery systems on top of grid toolkits such as Globus 14,15. We developed an extended architecture for the KG 16 using Social Network and Semantic Overlay Network approaches 1. 17 introduced an Intelligent Service-Oriented Architecture for Distributed Data and Knowledge Management which utilizes some features of data, semantic, and knowledge grid architectures to provide more advantages. Zhuge proposed the principles and methodology of establishing knowledge grid as a human-machine interconnection environment 18,19.

A virtual organization is a temporary connection between organizations to share their skills, capabilities, and resources to respond better to business opportunities. Collaboration in such organizations supports by computer networks 20. Nowadays, SOA concepts, like WSDL, support virtual organizations. Human can participate in such networks and provide services in a uniform way using Human-Provided Services framework 21, 22. Social trust in service-oriented systems has become a very important research area. Depending on the environment, trust may rely on the outcome of previous interactions 23,24 and skills and interests similarity 25. Application of trust relations in virtual organizations and team formation have been investigated in 26,24. In our approach, metrics like trust and commitment express social behavior influenced by the context in which collaborations take place. Commitment 27 is a concept describing contracts, tasks, and promises that are aligned between couple of agents.

3. Social Structures

A social structure is a structure which has several independent agents to decide and act.

3.1. A Global Model for a Social Structure

From a systematic view, components of a social structure can model up to six key components, shown in figure 1. In this model, Meaning is the most important functional component. It is also considered as the goal that social structure is made to fulfil. *Meaning* can be realized in two ways. *Shared awareness* is perception of each society members about current situation of their social structure. Agents of a society interact together based on *communication* component. *Organizational Culture* is the component defining nature of existing concepts

in the network. Next parameter mentioned as a result of organizational culture is the *roles* that determine which *resources* have to be in the organization and which do not. In this paper, Meaning is considered to define different evolution levels of an organization and Resources are noticed as the main modelling component in adaptation level. Organization is also a learning level while defining its executing procedures based on roles. Finally an organization is considered as an evolution level when modelling is to be based on culture.
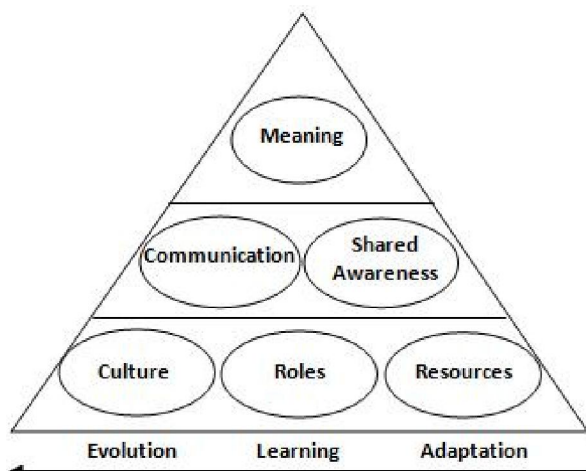
Figure 1. Key components model of social structures
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3.2. Important Factors in Network Structures

Here some important parameters in a collaborative network are going to be studied. A network structure is a set of information and processing resources which communicate together as a common structure in order to fulfil different system requirements. These parameters are:

Network structure: The structure corresponding to the topology which network members are connected together by means of that. It also can be *open* or *close*. Open structure is the one allowed to change according to necessities during runtime, while no change can be observed in close structure or they are so rare.

Commitment rate: Agents in a processing network might have different levels of commitment to collaborate in a network process. The presence of agents can be voluntary or mandatory. If mandatory in a common situation, agents have to share their resources in a network if needed so that they can utilize interaction advantages instead. Otherwise, they may share their resources and services in the network voluntary.

Interaction Content: Depending on the environment, content interacting in the network might be data, information, or knowledge.

Meaning of relationship: In a social network, Relationships have two important specifications: content and meaning. According to what two sides of a relationship need, different meanings are going to be applied to that. Consequently, the communication network becomes a special semantic network.

Network management: There are four resource management categories in network structures. The first one is *centralized* in which a central manager accesses to all resources and manages them based on the network demands. The second category is *distributed*, which has a distributed management structure that accesses to different resources and manages them. In the third one, *semantic* management, there is not any central or distributed management, but a global meaning and logic, manages resources based on users' demands. In the last category, there is no resource management in the network at all.

These parameters can develop based on future needs. To a better understanding of differences between the CSKG and other network structures, the CSKG is compared with some other network structures relevant to the meaning of that. This comparison has been illustrated in table 1 so that the border between the CSKG and other similar systems can be illuminated.

4. Cognitive Social Knowledge Grid (CSKG)
4.1. Definition of CSKG

Table 1. Description of network structure using the mentioned parameters

Network Structure	Network Structure	Commitment Rate	Interaction Content	Interaction meaning	Network Management
Grid Computing	open	mandatory	data	no	centralized
Cluster Computing	close	mandatory	data	no	centralized
Web	open	voluntary	data	no	no
Semantic Web	open	voluntary	information	no	distributed
Knowledge Grid	open	voluntary	knowledge	no	distributed
Cloud Computing	open	voluntary	data	no	distributed
Social Networks	open	voluntary	data	has (trust)	no
CSKG	open	voluntary	knowledge	has (trust)	semantic

The CSKG is a social network composed of data, information and knowledge producers and consumers. Since all facilities are provided in form of services, users can present their facilities in form of services to the others too. Therefore, the CSKG supports interactions among different services. Besides, Users in the CSKG can be human agents or computer programs. As a consequent, the CSKG can be considered as the facilitator of information and knowledge services, while in several cases it may be actor and provide the required services. The CSKG is a proper infrastructure for interaction and also collaboration of processing components. So that, it has three main tasks: 1) data, information and knowledge storage and processing tasks; 2) interoperability tasks; 3) collaboration tasks. The CSKG is an infrastructure used by an organization just for its data and information middleware facilities, or for its social grid too.

CSKG has been analyzed due to two approaches in this paper. First, we consider it as a multiagent environment in which each user is a member of agents' network collaborating to reach a special purpose. This approach is used to answer how CSKG works, how the processing algorithms are, and also how it is guaranteed that CSKG realizes its defined meaning. Second approach shows that CSKG can be considered as a distributed system in which different system complexities are to be analyzed. This approach addresses in which infrastructure CSKG uses, what its existing technologies are, and how these technologies provide services to the first approach's algorithms. The main reasons of this classification are two main problems in CSKG. First one is self-management problem that can be solved using MAS approach. The second is that CSKG is an environment which human and machines interact in. Therefore, we use intelligent environments advances in addition to MAS approach.

4.2. CSKG Model

CSKG can be considered from three different views. In the first one, we model CSKG as a multiagent system in which CSKG users are autonomous agents. CSKG services are to be in these agents' service to realize a special purpose. This purpose is equivalent to the meaning of social structure realizing defined culture. In another view, which is perpendicular to the first one, we consider CSKG as an IT system. CSKG software components are introduced in this view corresponding to the second layer of the social structure model (figure 1), communication and shared awareness. In another word, social structure members communicate to reach shared awareness using communication structure, processing tools, and information and

knowledge storage. Finally, the third view is a physical view in which three components of the last layer in the social structure model (i.e. organizational culture, roles, and resources) can be observed. This view shows how the components communicate. Relation between these three views has been shown in figure 2.

4.3. CSKG as a MultiAgent System

Through this approach, CSKG components are autonomous software agents which provide some services. We use this approach to solve self-management problem. Since CSKG has a distributed management, there is no central manager in it.

We coordinate and manage CSKG by developing a social network through social culture development approach. It means social components are put together by social culture. Basis of defining relations are not individual experiences, but different agents have a scale to show their commitment rate to social culture. Besides, social culture helps agents to trust new ones without necessity of experiences. Therefore, it allows forming larger societies. In fact, individual elements of a society would find the importance of trust, reputation, and commitment as time passes. Set of these cognitive parameters forms the social culture. Through this approach, social network get its social infrastructure from past experiences.
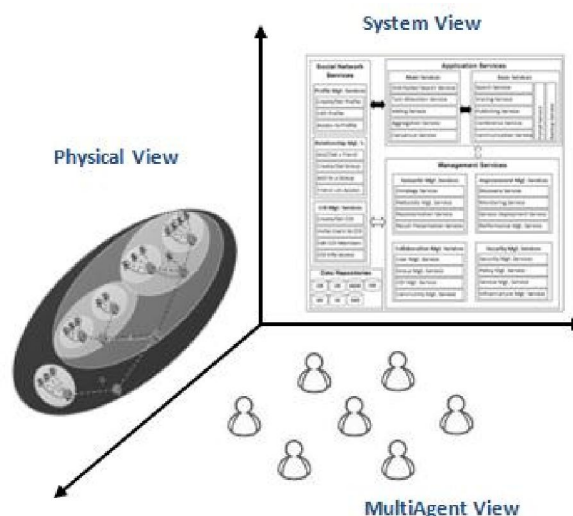
Figure 2. CSKG from different views

4.4. Requirements of CSKG

The environment, that the CSKG is used in, has some characteristics that have a direct effect on CSKG architecture. These characteristics include answering time, scalability, accuracy and quality, and reconstruction ability.
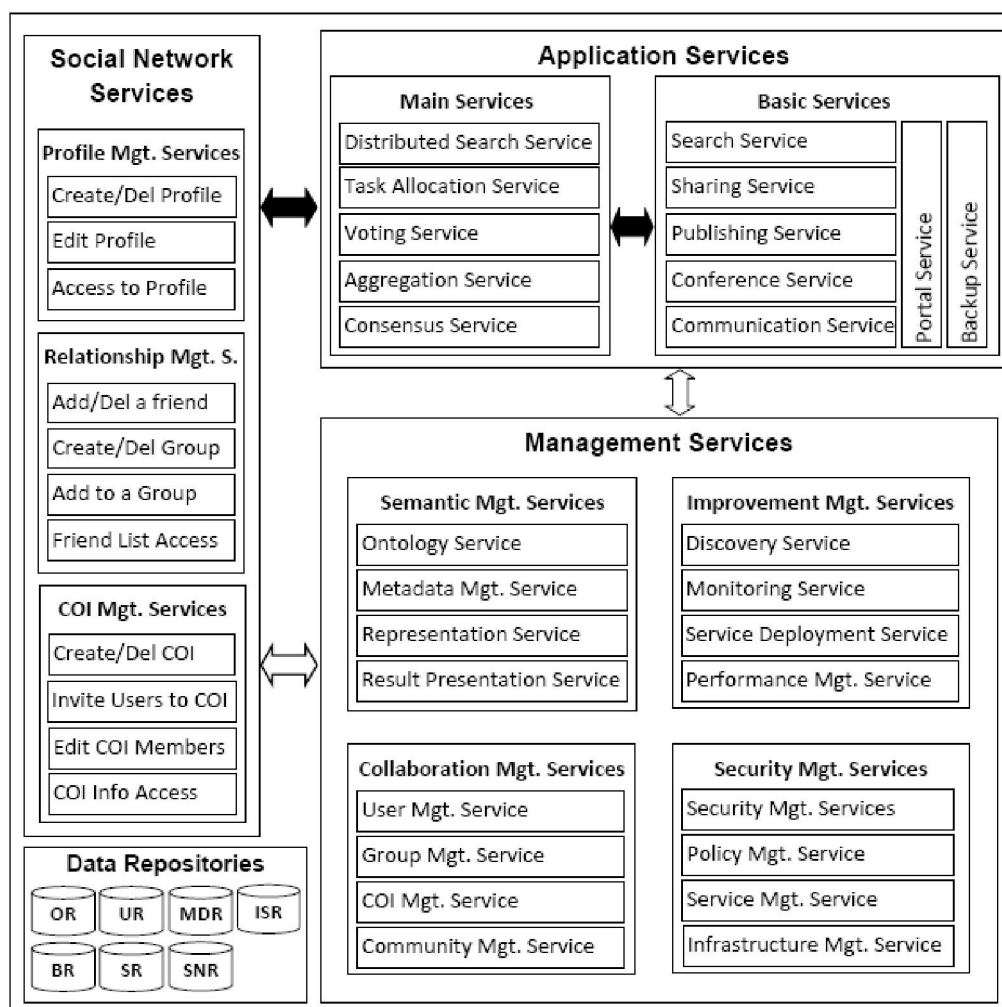
Figure 3. CSKG Architecture

5. CSKG Proposed Architecture

CSKG is a system which helps users to interact in various collaborative environments and to collaborate with each other in order to reach their goal. CSKG architecture has been illustrated in figure 3. All interactions in CSKG happen in a service-oriented context. CSKG services are divided into three groups which can be invoked directly through API or GUI and respond the requests. These three services are: Social Network Services, Application Services, and Management Services. In figure 3, there are two types of arrows. The filled arrows show orthogonal relations between services and blank arrows point to normal relations between them. The latter part means that it is just possible for some services of that group to interact with services of another one and use them.

5.1. Social Network Services

We use the concept of social networks for collaboration infrastructure and communication between users to perform various operations in decentralized environments. This mechanism provides the possibility of information and knowledge flow between users and forming communities in order to execute the requested operations in dynamic networks. Social network services respond to social network requests submitted by other services or agents which are arranged in a social network to interact. Connections in social network are established using system primary ontology.

All relevant information about social network members, profiles, friend lists, groups, COIs and defined accesses in social network level are stored in a data repository called social network repository (SNR). As illustrated in figure 3 social network

services are divided into three main groups: Profile Management Services, to create, delete, edit and access to a user profile; Relationship Management Services, to manage users' connections and groups, friendship relations between users; Community of Interest (COI) Management Services, to manage COIs, which classify people with common characteristics.

5.2. Application Services

Application services are the most important services in CSKG to be. These are set of services which perform various operations to reach information and knowledge and also individual or community goals. This should be considered that these services are semantic application services.

Main Application Services: These are the most important CSKG services, which are presented in distributed environment with the various agents' collaboration. Main application services include Distributed Search Service, Task Allocation Service, Voting Service, Aggregation Service, and Consensus Service. The main application services are not limited to the mentioned services and developers can develop and add new ones if necessary.

Basic Application Services: Main application services, end user, and application programs use these services. The basic application services contain Search Service, Sharing Service, Publishing Service, Conference Service, Portal Service, Backup Service, and Communication Service.

5.3. Management Services

These services supply the possibility to control other services. Application services and social network services are under control of these ones. User, group and COI management, security, semantic, and infrastructure management services, creating new services and applying changes in services, are all to be done by management services. In addition, these services can make CSKG policies and security considerations change. Besides, they consider and monitor tasks and services and propose suggestions to improve other services quality.

Collaboration management services: These services manage users, groups, and communities of interest. Moreover, collaboration management services are used for cooperation management, and make communities of users to perform different activities. Differences between group, COI and communities are one of the key points of CSKG. Users in groups may know each other through a special place, like university or work place, or be in a family relationship, while COI users just are interested or expert in a determined issue, and may not meet o know each other before. A community is

defined based on a special mission and performing a special activity. In communities, each agent chooses one or a number of tasks and performs it to reach the determined goal. To perform, main application services use community management service.

Security management services: These services manage security of users and services. They manage other services and control security in every components of system. Policy management service manages public and privacy policies which should be applied on CSKG. All services should follow policies applied by system manager. Also this service helps CSKG managers to control security and management policies. Besides, security services like authentication, authorization, access control, and encryption are provided.

Semantic management services: These are services which apply semantic to the system entities. Creating and editing ontology, their storage and management, and the possibility of definition, storage and management of metadata in CSKG, are all to be done by these services. Ontology management service makes creation and editing ontology possible. Also this service can receive a defined ontology by managers, store, maintain and manage it. Indeed, storing all system metadata is to be done by metadata management service. Any kind of data which is used in any service should register its metadata in this service.

Improvement management services: These services improve system's quality and efficiency, supervise the other services and monitor them. They propose new suggestions to the other services through performing data mining and reasoning and make services' development possible. Data and information determined by development standards (i.e. usage data) have to be sent to monitoring service by CSKG services. It sends registered data to discovery service, which is used by system developers, not normal users, to improve services. Data discovery services receive registered data from monitoring services and system policy from policy management service. Discovery services extract useful data and send it to monitoring service. Moreover, discovery services send some suggestions to the other services including management and application services to improve their functionality.

5.4. Architecture Services Relationship

Relationships between four groups of CSKG management services, social services and application services, and also system users have been shown in figure 4. Avoiding figure's complexity, details of services and relationships have not been demonstrated. Security management services are in a Request/Response relationship with all users and

other services in order to provide security for them, inform other services about system policies, manage other services, and interact with system managers to manage the system. Improvement management services monitor other services performance. They

6. Collaboration in CSKG

The idea to design CSKG is to decrease manager role and seek self-management in collaborative scenarios. We ask agents to work
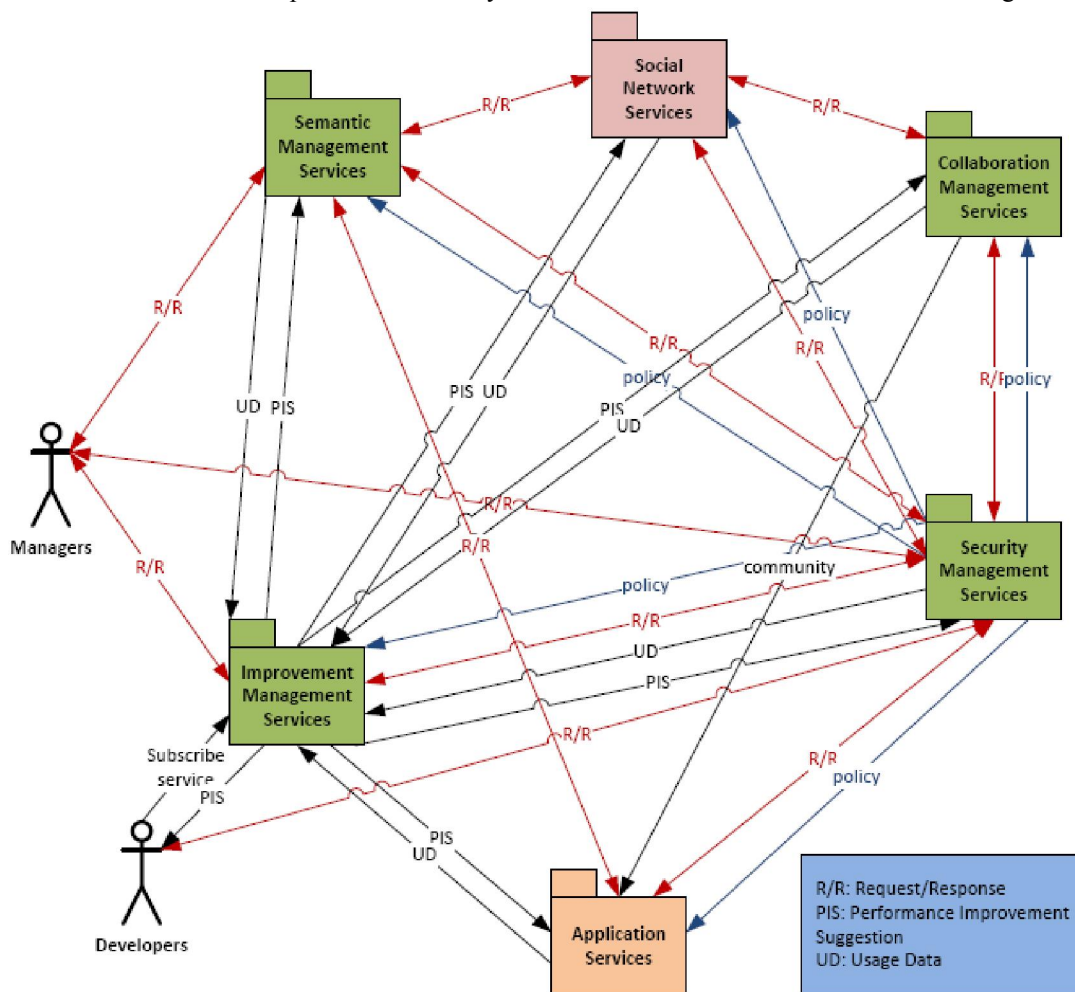
Figure 4. ER diagram of CSKG management services with other services

send some suggestions to management and application services in order to improve functionality of services (i.e. performance improvement suggestion, PIS). Service deployment service is in communication with system developers and adds and deploys new services to application and semantic services if needed. Semantic management services perform creation, editing, receiving, storage, and management for system ontology and metadata and it provides ontology and metadata for other services. Collaboration management services manage users, groups, and COIs. Social network services are in interaction with application services to receive services from them. Basic application services are invoked by main application services and other services.

autonomously in environment. While agents are interacting and collaborating with each other, global awareness and eventually their awareness grow during time. Therefore, they can innately work in the system and know to whom collaborate. Considering semantic and social characteristics of agents and environment, like trust, commitment, reputation and etc, help them to increase their awareness and collaborate accurately and consciously.

Helped by social network services and other parameters like user profile information, social characteristics, and performance environment, CSKG collaboration management services create a community to perform an application service or a submitted activity by a user or an application program. In such community, not only people attend

and supply some services, but also autonomous software agents and semantic services, which are able to do complex reasoning, play role.

Considering trust in relationships to choose people, services, and needed resources results in more efficient collaboration and combination of software and human services. We do not look at trust from security aspects, but focus on it with a social approach. The other parameter considered to form a community is commitment. Commitment is a concept extracting meaning of a couple of agents (neighbour agents) in their relationships. This concept has been set up to express promises, contracts, and tasks between two agents. We consider the concepts of trust and commitment for agents in order to have successful collaborations in a community. Agents have been described by their profiles. Each agent is in a friendship relation with one or more other agents. Groups and COIs have been composed of agents and also are able to have common members which means that each agent can be member of more than one group or COI. Different agents perform submitted activities by means of collaboration. Each agent plays a special role in this performance. To perform an activity, agents form a community based on their characteristics, relationship properties, activity's characteristics and parameters determined weight in that activity.

In addition to characteristics like age, sex, place, skills and education, each agent utilizes individual characteristics like motivation and self-accuracy, and social characteristics like trust and commitment. This should be mentioned that the two first groups of characteristics are totally individual while social characteristics are signified in agent relationships with its neighbour agent.

Profile vector Pu_i of agent u_i in Eq.1 shows the characteristics values of agent u_i which have been considered above. The att_k is the kth agent characteristic and m shows number of agents characteristic.

$$Pu_i= \{Patt_{i,k} \mid k=1..m\} \qquad (1)$$

Social network of agents has been shown by an undirected graph in which every agent is connected to a number of agents through an edge as a relation. Connection between two agents of u_i and u_j has been illustrated by edges e_{ji} or e_{ij}. Characteristics like trust and commitment can be defined on a directed graph mapped to the main graph. We use a matrix of n*n to show trust, and one for commitment, to provide measure of trust and commitment between two related agents in network. Parameter n is considered as number of agents. Besides, activity A_i has an activity vector AV_i, which determines its characteristics. The activity vector characteristics are corresponding to characteristics of agent profile

vector, but with different values. Moreover activity A_i has a weight vector WAV_i, which shows importance of any characteristic in the corresponding activity. These vectors have been illustrated in Eq.2 and Eq.3:

$$AV_i= \{Aatt_{i,k} \mid k=1..m\} \qquad (2)$$
$$WAV_i= \{w_{i,k} \mid k=1..m\} \qquad (3)$$

When an activity is submitted to CSKG, the similarity between Pu of initiator agent's neighbors with AV is calculated by means of weighting cosine similarity (WCS) function (Eq.4) and regarding to WAV. Then if the calculated amount exceeds a determined threshold, considered agent will be chosen for collaboration, and similarity function for that agent's neighbors will be calculated too. This process will be continued to a determined number of hops, and collaboration agents will be selected to perform that activity.

To measure collaboration among agents, using Eq.5, the average similarity of final agents chosen for the formed community with submitted activity has been calculated. In fact, this amount shows the level of agents' collaboration performing an activity. Also in this formula, *na* represents the number of agents participate to perform the activity.

$$WCS_m (Pu_i , AV_j)= \qquad (4)$$

$$\frac{\sum_m^{k=1} WAV[k]*AV[k]*Pu[k]}{\sqrt{\sum_m^{k=1} WAV[k]*AV[k]^2}*\sqrt{\sum_m^{k=1} WAV[k]}}$$

$$Co = \frac{\sum_{i=1}^{n} WCS_m (Pu_i , AV_j)}{na} \qquad (5)$$

To simulate agent-based complex systems, each agent has been defined by a set of important and effective parameters. Simulation softwares for multi-agent system emphasize on agent aspects and forming social patterns. We use Netlogo to simulate our collaborative environment. Netlogo 2 is a programmable modeling environment to simulate social and natural phenomenon and also social behavior analysis. This tool is appropriate for modeling complex systems variable during time. Besides, an instruction can be defined for many agents working independently. Agents, their characteristics, relationships, and community formation to perform different activities have been simulated in this environment.

In this simulation, first a social network gets form of agents. Each agent enjoys characteristics which their values are determined in time of their creation. After forming network and determining value for agents characteristics, groups and COIs are created. Agents become members in groups like

family, colleague, and coworker groups. In addition, agents can become member of COIs according to their interests. Each agent can be member in a number of groups and COIs, which means that groups and COIs may have common members. We evaluate collaboration accuracy and quality, answering time, and number of collaborative agents. Besides, effect of using social and cognitive measures like trust and commitment to perform activities have been evaluated. The results of agents' collaboration showed that trust and commitment cause the more qualified cooperation to execute activities. The similarity of agents who participate in the formed communities, help to find more similar agents who understand each other much better. This eases the process of executing an activity like making a decision through consensus service. Therefore we provide an architecture which agents can interact and collaborate in a qualified, fast, and accurate manner to execute activities.

7. Conclusion

This paper has presented an infrastructure for agents' collaboration and interaction in social and collaborative environment. A model for comparison of different social and network structures has been presented and different network structures have been compared based on. Besides, we present a novel architecture for collaborative environments which agents, services and applications can interact through a standard GUI or API. We utilize SOA technologies for interaction of services, and use social network approach to communicate and collaborate human agents. SON has been used to semantically enrich CSKG architecture and update it. CSKG architecture consists of three types of services. Social network services to provide human interactions and collaborations; application services to perform the activities; and management services to manage and monitor the services, perform security and policy services, and deploy and improve services.

We investigated CSKG performance in collaborative environments. The community formation based on user profiles similarities and social parameters like trust and commitment will be argued. We proposed a method to find partner for agents. We assumed a vector for any agent, consists of its personal, cognitive and social characteristics. Besides, we introduced an activity vector and a weight vector for any activity. Then the weighted cosine similarity function has been used to compare agent vectors and activity vectors to find the right partners for any submitted activity. We simulated our approach for collaboration and showed that using social preferences like trust and commitment enhance the community formation in collaborative

environments. The similarity of these agents helped to find more similar agents who understand each other much better. This eased the process of executing an activity like a consensus decision-making. Hence, we provided an architecture which agents can interact and collaborate in a qualified, fast, and accurate manner to execute activities.

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11/11/2012

Effect of educational program on performance of Intensive Care Nurses to Decrement the low Back pain

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Abstract: Musculoskeletal disorders are an important public health problem. Among them are back conditions, Low back pain has been found to be the most prevailing musculoskeletal condition as well as a common cause of disability in high and low income countries, with 85% prevalence. Nurses have been reported to have one of the highest levels of back work-related injuries in all occupational groups. The great amount of physical work such as patient handling and transfers as well as psychological stress related to their type of work, are said to increase the prevalence of low back pain among nurses. **Aim:** To evaluate the effect of educational program on performance of Intensive Care Unit nurses to decrement the low back pain. **Subjects and Methods**: **Design:** A quasi experimental design was used. **Setting:** This study was conducted at intensive care units affiliated to Eldemerdash and Ain Shams University Hospitals. **Sample:** A purposive sample included 35 intensive care nurses. **Tools for data collection:** Self Administered back pain structured Questionnaire, body mechanics observation checklists, Oswestry low back pain and neck Disability Questionnaire. **Results:** there were statistically significant differences between pre and post intervention as regards their knowledge and practices regarding back pain and body mechanics. As well, there was no significant difference in intensity of back pain and disability between pre & post intervention. There were a statistically positive correlation between intensity of low back pain and age, years of experience, number of children and body mass index. While there were no statistically significant relations between intensity of low back pain and gender and marital status. **Conclusions:** The educational program was helpful on the improvement knowledge and practices of the nurses with back pain, while it wasn't leading to decreasing intensity of back pain and disability. **Recommendations:** The study should be replicated on large sample and different hospitals setting in order to generalize the results, developing a simplified and comprehensive booklet including guidelines about correct lifting and handling techniques and further study is recommended to evaluate the association between low back pain and its associated factors.

Key words: low back pain, performance.

1. Introduction

Today, the musculoskeletal disorders are one of the most frequent health problems related directly to working conditions **(Naidoo & Coopoo, 2007)**. Low back pain is not only considered to be the most common reason for functional disability worldwide, but also estimated to affect almost 90% of the universal population **(Brennan *et al.,* 2007).** Moreover, low back pain is said to be among the leading musculoskeletal disorders that predominantly affect the working population in developed as well as in developing countries **(Roffey *et al.,* 2010a; Cilliers, 2007; Burdorf & Jansen, 2006; Sanya & Ogwumike, 2005).** Furthermore, low back pain has been found to be a global health dilemma affecting the global economic, societal, and public health sectors, thus increasing and incurring billions of dollars in medical expenditures each year **(Louw *et al.,* 2007)**. Moreover, low back pain is said to be the most prevalent musculoskeletal occupational hazard with a life time prevalence of about 90% according to

Roffey *et al.,* 2010a and 60-85% according to **Burdorf & Jansen, 2006.**

Nurses have been reported to have one of the highest levels of back work-related injuries in all occupational groups. The great amount of physical work such as patient handling and transfers as well as psychological stress related to their type of work, are said to increase the prevalence of low back pain among nurses **(Vieira *et al.,* 2006).** Likewise, of all the health related occupations the nursing staffs were indicated as the most workers that are highly exposed to back disorders due to the manual handling involved in their profession such as lifting and transferring of patients. Consequently, biomechanical investigations reported that such movements result into high spinal stresses **(Roupa *et al.,* 2008; Jones & Macfarlane, 2005).**

Definition of back pain:

Back pain is defined as any discomfort or pain at the back in the past 12 months. (Kaila-Kangas *et al.,* 2004). Also, low back pain is defined as pain and discomfort, localized below the costal margin and

above the inferior gluteus folds, with or without leg pain. Back pain can be divided anatomically: neck pain, middle back pain and lower back pain. By its duration: acute (less than 6 weeks), sub acute (6 – 12 weeks), chronic (greater than 12 weeks). By its cause: nonspecific back pain, back pain with radiculopathy or spinal stenosis, and back pain associated with another specific cause (such as infection or cancer) **(Vanwye, 2010).** Non specific pain indicates that the cause is not known precisely. but is believed to be due from the soft tissues such as muscles, fascia, and ligaments. Back pain is classified according to etiology in mechanical or nonspecific back pain and secondary back pain. Approximately 98% of back pain patients are diagnosed with nonspecific acute back pain which has no serious underlying pathology. However, secondary back pain which is caused by an underlying condition accounts for nearly 2% of the cases. Underlying pathology in these cases may include metastatic cancer, spinal osteomyelitis and epidural abscess which account for 1% of the patients. Also, herniated disc is the most common neurologic impairment which is associated with this condition, from which 95% of disc herniations occur at the lowest two lumbar intervertebral levels **(Slipman, 2008)**. While this categorization is convenient for clinical purposes, it is less helpful when considering the matter of prevention, where back pain and its consequences tend to occur in an episodic manner (De Vet *et al.,* 2002)

Etiology and factors leading to back pain:

Despite this high prevalence of low back pain among nurses, the etiology and the nature of back pain are not yet well understood. Many studies have been performed in various occupational settings, indicating a strong association between musculoskeletal disorders and work related factors. This was also found among nurses. The contribution of psychosocial factors and work pressure was also evident, but not as clear as has been shown for the physical factors (Eriksen *et al.,* 2004). Work settings that are associated with increased work-related pressures among health workers have been attributed to the development of lumbar pains as well as other muscular pains in the body, fatigue as well as disrupted sleeping patterns to the employees (Roupa *et al.,* 2008). Bejia *et al.,* 2005 found that 69.9% of nurses who suffered low back pain were exposed to heavy manual workloads. While, Mwilila, 2008 stated that, among the perceived causes of low back pain reported by nurses was the working environment where by nurses mentioned that they are expected to do more work when the patients are many.

Moreover, a number of scholars have concluded that the definite causes of low back pain may not be well known or rather have not been well documented.

However, there are some frequently reported risk factors which are related to both working and non-working individuals. These factors include: type of work such as heavy manual work, repetitive bending, twisting, lifting, pulling & pushing, forceful movements, static postures like prolonged sitting and awkward postures (Roffey, *et al.,* 2010b; Sikiru & Hanifa, 2010; Vuuren *et al.,* 2007; Kwon *et al.,* 2006). on the other hand Yip, 2004, added that being new on the ward was a strong risk factor of nurses suffering low back pain due to the increased physical work load encountered.

Risk indicator for back pain includes sex, age, weight, height, number of children, smoking habits, regular physical exercise, driving time, job, duration of work time, work time a week, manual lifting of weights heavier than 10kg, and uncomfortable working positions. In summary, risk factors of back pain can be divided into 3 groups which are socio demographic factors (Age, gender, education level, smoking, body mass index, number of children), physical and work factors (Static and awkward body position, heavy physical work, night shifts, lifting, bending, twisting, pulling, and pushing) and psychosocial factors (Perceived high pressure on time and workload, low job control, job dissatisfaction, monotonous work, and low support from co-workers and management) (Latza, 2000). Meanwhile, Alexandrea *et al.,* 2001 stated that, Risk factors for back pain can be either of individual origin or related to the workplace. The main occupational risk factors are: lifting and handling of patients, uncomfortable and immobile postures, inadequate equipment, improper workplace design, heavy physical work, and inadequate work organization

However, Waddell & Burton, 2001 suggest that back pain could be more linked to normal every day activities than to occupational activities alone, meaning that the activities of daily living of individuals might be the major predisposing factors of low back pain. Similarly, Yip, 2002 reports a 30-50% of self-reported low back pain among nurses in Hong Kong that was associated with housework and this consequently led to daily activity limitation, sleeping and walking interruptions included. Roffey *et al.,* 2010b suggested that low back pain could be due to injury of the neuro-musculo-skeletal system of the lumbar spine such as muscles, ligaments, nerves, discs as well as the vertebrae. Bejia *et al.,* 2005 in their study also add that advanced age was a risk factor of low back pain occurrence due to the possibility of degenerative processes in the spine that accompany old age. Further literature findings suggests that a number of diseases develop as a result of old age thus making the elder employees less

productive as far as physically demanding work is concerned(Aittomaki et al., *et al.,* 2005).

On the other hand, Silveri & Spinasanta, 2003 reported that poor muscle strength and flexibility can lead to poor posture, which may further lead to dysfunction of the respective muscles and joints in the back resulting into back pain. In addition, studies have suggested other common low back pain causes that are physiological and are associated with various factors. They include soft tissue injury in the spine such as; sprain or strain on the muscles due to overload, ligaments and joints due to poor postures of the spine and prolapsed disc due to improper lifting as well as poor postures of the back. In addition, injury to the above mentioned structures may further cause pressure on the spinal nerves which innervate the legs and spine thus causing low back pain. Besides, low back pain may also be caused by fractures of the vertebral bodies that occur as a result of weakening of the bones due to osteoporosis, rheumatoid arthritis and osteoarthritis which is sometimes also secondary to kidney disease (Vitente, 2010; Light, 2009).

The management goals when treating back pain are to achieve maximal reduction in pain intensity as rapidly as possible; to restore the individual's ability to function in everyday activities; to help the patient cope with residual pain; to assess for side-effects of therapy; and to facilitate the patient's passage through the legal and socioeconomic impediments to recovery. For many, the goal is to keep the pain to a manageable level to progress with rehabilitation, which then can lead to long term pain relief. Also, for some people the goal is to use non-surgical therapies to manage the pain and avoid major surgery, while for others surgery may be the quickest way to feel better. Not all treatments work for all conditions or for all individuals with the same condition, and many find that they need to try several treatment options to determine what works best for them. The present stage of the condition (<u>acute</u> or <u>chronic</u>) is also a determining factor in the choice of treatment. Only a minority of back pain patients (most estimates are 1% - 10%) require surgery (**Dahm *et al.,* 2010)**.

Training seems to play an important role in reducing the incidence of injury, as shown by the fact that about 80% of injuries occur among nursing aides, orderlies, and attendants compared with 20% occurring among registered nurses. Research has shown that training programs can be effective. Patient transfer involves adjusting the patient in bed, transferring a patient from bed or chair to toilet. These maneuvers have consistently been related to low back injuries in nurses, and are perceived to be the most stressful tasks performed by these occupations. Not surprisingly, efforts have been made to prevent low back injuries following patient handling, including education in lifting techniques, ergonomic interventions and mechanical equipment and individually designed physical training programs. Nurses can be advised to do regular exercise to strengthen their back muscles, employer to ensure ergonomic adjustment to reduce risk of back pain such as manual handling, awkward body position at work and monotonous work posture management (*Rahmah et al., 2008*).

There are several ways that hospitals, care facilities and nursing professionals can reduce injury risks. These include: using lifting assistance devices, using appropriate equipment, use appropriate beds, use back belts, implement regular equipment maintenance procedures, ergonomic design of workplaces, providing better training, provide adequate staffing and systematic record-keeping (Hedge, 2012).

Justification of the problem

The safety of nurses from low back pain (LBP) is remains challenge and important to nurses themselves as well as to the patients they serve. The presence of healthy and well-rested nurses is critical to provide vigilant monitoring, empathic patient care and vigorous advocacy. In hospital, most nurses are not aware of consequences of bad body mechanics. Nurses have attributed the onset of LBP to their patient handling activities. About 40% of all back pain episodes and 75% of compensable back injuries appear to be related to lifting, transfer or movement of patients (Tinubu *et al.,* 2010).

This problem occurs in practice and nurses receive little or no training in this specific area of patients' care. From here, the education program will improve nurses' awareness toward safety procedure as how to doing lifting, transfer or movement of patients (Schneider *et al.,* 2005).

Aim of the study

To evaluate the effect of educational program on performance of Intensive Care Unit nurses to decrement the low back pain.

This has been achieved through the following specific objectives:

1. Assess the nurses' knowledge regarding low back pain and body mechanics.
2. Assess the nurses' practice regarding body mechanics during practice of general physical tasks and during patients handling.
3. Identify the factors leading to low back pain among nurses.
4. Design, implement and disseminate the educational program for nurses to decrement the low back pain based on nurses' actual needs assessment.
5. Evaluating the effect of educational program on performance of Intensive Care Unit

nurses to decrement the low back pain and disability level.

Hypothesis:

The present study hypothesized that:

1- Nurses will show an improvement in their knowledge and practices to decrement the low back pain post-program program implementation.

2- The low back pain intensity and disability level will be reduced post-program program implementation.

3- There are factors contributing to low back pain.

2. Subjects and Methods

Research design

A quasi experimental study design was utilized to accomplish this study.

Settings

The study was conducted in Cardio-thoracic Intensive Care Unit and Emergency Unit at Ain Shams University Hospital and Neurosurgery Intensive Care Unit at Eldemerdash Hospital.

Subjects

A purposive sample of nurses was taken from the previously mentioned study settings**.** The total number was 35 nurses were included in the study, whereas 20 nurses from cardiothoracic Intensive Care Unit, 7 nurses from Emergency Unit and 8 nurses from Neuro-surgy Intensive Care Unit. Nurses were included in this study were from both gender, with different age, educational levels and years of experience and who had suffered episodes of back pain for at least six months and willing to participate in the study. Criteria for exclusion were the nurses suffering from constant or persisting severe pain judged on clinical grounds to be due to irritation of nerve root, inflammatory arthritis and major surgeries in past one

Tools for data collection

Four different tools were used to collect data pertinent for this study. They included A Self Administered back pain structured Questionnaire, A body mechanics observational checklists, Oswestry low back pain and neck disability questionnaire and Work related risk factors assessment sheet.

1. A Self Administered back pain structured Questionnaire:

It was written in a simple Arabic language and comprises four parts. **The first part** was concerned with sociodemographic characteristics of studied nurses such as age, gender, qualification, years of experience, marital status, number of children, height, weight, body mass index and attendance of related training courses. **The second part: it was adopted from Rotorua Pain Specialists 2008**. It was used to assess nurses' history regarding back pain and description of pain characteristics (when pain start, quality, location, onset, frequency, duration, time of

worse pain, difference in intensity with time, rhythmcity, tolerance, factors aggravating pain, pain management strategies). As regard intensity of back pain was assessed by using Pain Assessment with the "0—10 Numeric" (Pain Intensity Scale). This scale is often displayed as a line numbered from zero to ten asking the person in pain to assign a number, from zero to ten, and it was adopted from **Marco *et al.,* 2006** and **McCaffery** & **Pasero, 1999. The third part**: It was developed by the researchers based on the related literature (**Christensen & Kockrow, 2011; Monahan *et al.,* 2011; Lewis *et al.,* 2011; Daniels *et al.,* 2010; Ignatavicius & Workman, 2010; Taylor *et al.,* 2009**) to assess nurses' knowledge regarding back pain and body mechanics. Knowledge regarding back pain included seven items related to function of spinal cord, factors leading to back pain, how to diagnose, how to prevent, when to call doctor and common measures to overcome. While, knowledge regarding body mechanics included six items related to definition, aim, general principles, correct body alignment, principles with doing general physical task as lifting and pushing or pulling objects, principles during helping patient's positioning and patient's transfer.

Scoring systems

1. Pain Assessment with the "0—10 Numeric" (Pain Intensity Scale). The values on the pain scale correspond to pain levels as follows: 1 – 3 = mild pain, 4 – 6 = moderate pain and 7 – 10 = severe pain.

2. Nurses' body mass indexes (BMI) were estimated pre guidelines intervention. BMI = weight (Kg) / height (m)2. It was considered that underweight if BMI < 18.5, normal weight if BMI 18.5 – 24.9, over weight if BMI 25 – 29.9 and obese if BMI > 30. *(*Gupta *et al.,* 2007*)*.

3. The total score of knowledge was 100 degree. The Score one was given for each correct answer and zero for incorrect answer. For each area of knowledge, the scores of the items were summed-up and the total score divided by the number of the items. These scores were converted into a percent score. The total nurses' knowledge was considered satisfactory if the percent score was 60% or more, and unsatisfactory if less than 60%.

2 – A body mechanics observational checklists:

The observational checklists were developed and constructed by the researchers based on the related literature *(*Potter *et al.,* 2011; Taylor *et al.,* 2011; Netina, 2010;Perry & Potter, 2010;Taylor *et al.,* 2009*)* and validated by the seven experts in medical surgical nursing department. An observational checklists were designed to assess nurses' practices regarding proper body mechanics during the actual nursing care. It included two parts.

The first part was used to assess the nurses' practice regarding body mechanics during practice of general physical tasks (including maintain proper body ligament, reaching, pivoting, pushing, pulling and lifting).The second part was used to assess nurses' practice regarding body mechanics during patients handling (including positioning and moving patient in bed, transfer patient from bed to wheelchair,transfer patient from bed to trolley and vice versa).

The scoring system

The total score of practice was 100 degree. The item observed to be done correctly were scored "1" and the items not done or incorrectly done was scored"0". For each procedure, the scores of the items were summed - up and the total divided by the number of the items. These scores were converted into a percent score. The practice was considered satisfactory if the percent score was 60% or more of the sum of the total practice score, and unsatisfactory if less than 60 %.

3- Oswestry low back pain and neck disability questionnaire:

This questionnaire was filled by the researcher to measure functional disability and to assess how the back pain affected on the ability to manage in everyday life. It was included 10 sections namely: pain intensity, personal care (dressing, bathing, etc.), lifting, walking, sitting, standing, sleeping, sex life, social life and traveling. Every section included 6 box and mark in each section only one box which applies. It was adopted from Fairbank and Pynsent, 2000. It was written in Arabic language. Back translation was done to ensure the correct translation.

Scoring systems

Simply count up the points and plug the total in below: For each question there is a possible of 5 points: 0 for the first question, 1 for the second question, 2 for the third question etc. The score 0-4 considered there was no disability, the score 5-14 considered there was mild disability, the score 15-24 considered there was moderate.disability, the score 25-34 considered there was sever disability and the score 35-50 considered there was completely disabled.

4- Work related risk factors assessment sheet:

It was adopted from (Feletto and Graze (1997). It was used to assess work related risk factors facing the nurses during their work. It was cover the following: The working environmental factors, Presence of lift devices factors, duration, frequency and job design factors and finally the load factors. The nurses' answers are often displayed as a found or not found and yes or not.

Educational Program:

Educational Program was designed by the researchers to improve the nurses' performance regarding back pain and body mechanics during caring for the patients based on the related literature (Lewis *et al.,* 2011; Daniels *et al.,* 2010; Netina, 2010; Perry & Potter, 2010; Smeltzer *et al.,* 2010; Dewit, 2009*).* It was written in Arabic language. Knowledge about back pain included basic anatomy and physiology of the spinal column, causes and risk factors, signs and symptoms, diagnostic measures, pharmacological and non pharmacological management and when to call doctor. Knowledge about body mechanics included definitions, purpose, correct body alignment, principles during doing general physical tasks and principles during caring for patients. The booklet was revised by a group of seven expertise in Medical Surgical Nursing at faculty of Nursing, at Ain Shams University for the content validity.

Pilot study:

The pilot study commenced once ethical approval had been obtained. The pilot study was conducted on 5 nurses who were excluded from the study sample. In order to test the clarity, feasibility and applicability of the study tools. Based on the result of the pilot study, modifications and omissions of some details were done and then the final forms were developed.

Procedures of the study:

This study was conducted through four consecutive phases: assessment, planning, implementation and evaluation. Data collection was done pre, post implementation. October 2011 to February 2012.

- **Assessment phase:** This phase aimed to identify the studied nurses' characteristics and back pain characteristics; to assess nurse's knowledge and practice regarding back pain and body mechanics identify degree of disabilities and to identify work related factors.

- Planning and preparatory phase: based on the assessment phase, the program content and media (in the form of the program booklet and visual materials) were prepared by the researchers. A pilot study was conducted on 5 nurses who were excluded from the study sample. Based on the opinion of a panel of expertise in the research field and the result of the pilot study, modifications and omissions of some details were done, and then the final forms were developed. Based on the opinion of a panel of expertise some modifications were done, and then the final forms were developed.

- Implementation phase: The observation checklists were filled out by the researchers who were available 2 days per week alternatively at morning or afternoon shifts in different study settings while the nurses were involved in

patient care. The questionnaire format was filled in the clinical area by the studied nurses in the presence of the researchers. The total numbers of nurses were 35, divided into seven main groups according to study settings, and then implementation of the program was carried out at the previously mentioned study settings for each group separately based on their needs. The duration of each session took approximately 1 to 1.5 hours, sessions started according to nurses' spare time. Arabic language was used to suit the nurses' level of understanding. Methods of teaching used were real situations, modified lectures, group discussion and demonstration. An instructional media was used; it included program booklet and audiovisual materials. Most of the studied nurses in all study settings were cooperative with the researchers. They were interested in the topic and they asked to repeat such this program for nurses in different health care settings.

- Evaluation phase: the evaluation phase was emphasized on estimating the effect of educational program on nurses 'knowledge and practice regarding low back pain and body mechanics post-program implementation to determine the level of improvement in nurses' knowledge and practices.. Also, the evaluation phase was emphasized on estimating the effect of the educational program on disability level and intensity of low back pain for nurses.

Administrative design and ethical consideration:

An official permission was obtained from the Director of Ain Shams University Hospital and the heads of the departments in which the study was conducted. Meeting and discussions were held between the researchers and nursing administrative personnel to make them aware about the aims and objectives, as well as to get better cooperation during the implementation phase. It was important to have their full support, especially to find out some sort of motivation to stimulate nurses to participate positively in the study. The aim of the research was explained to the participants. Verbal consent was obtained from each nurse to participate in the study, after clarifying the procedures of the study. Participants were informed about their right to refuse participation and to withdraw at any time without any consequences. Confidentiality of data was ensured.

Statistical design: data entry and analysis were done using the Statistical Package for Social Science (SPSS) version 10. Data were presented in the tables and charts using actual numbers and percentages. Appropriate statistical methods were applied (percentage, chi-square ($X2$), correlation coefficient (r) and Fisher-exact probability test. Regarding P

value, it was considered that: non-significant (NS) if $P> 0.05$, Significant (S) if $P< 0.05$, Highly Significant (HS) if $P< 0.01$.

Table (1) shows that characteristics of the studied nurses. About two thirds (68.57%) of them were more than 35 years old and the majority (80 %) of them were female. Regarding qualification and years of experience, (47.14% & 62.86%) were diploma nurses and more than 15 years of experience. Concerning marital status, (51.43%) were married whose more than half (55.56%) of them had one to three child. Also, (51.43%) of the studied nurses were overweight and none of them attended training course about body mechanics.

Table (1): Percentage distribution of socio demographic characteristics of the studied nurses.

Socio demographic characteristics	Total (35)	
	No.	%
Age (years):		
20-35	11	31.43
> 35	24	68.57
Gender:		
Male	7	20
Female	28	80
Qualification		
Diploma nurse	20	47.14
Technician	7	20
Bachelor	8	22.86
Years of experience		
< 5	5	14.29
5-10	6	17.14
10-15	2	5.71
>15	22	62.86
Marital status		
Single	17	48.57
Married	18	51.43
Number Of children		
None	3	16.67
1-3	10	55.56
>3	5	27.77
BMI		
Ideal	5	14.29
Overweight	18	51.43
Obese	12	34.29
Training course about body mechanics	0	0

Table (2) illustrates past history of the studied nurses. About one third (34.29%, 31.43% & 37.15%) of them had diabetes, recent fever and urinary problems respectively. Also about half (51.43%) of them had a twisting injuries and the minority (14.29%) of them suffering numbness. None of them was hospitalized and made a surgery associated with back pain. Also, only (5.71%) of them were smoker.

Regarding non pharmacological back pain management, all of them rest in bed, the majority (94.29%) of them do relaxation and near half (45.71%) of them do hot compresses. While the

minority (20% & 17.14%) of them wear binder and do physiotherapy respectively. Concerning pharmacological back pain management, the majority (80%) of them take analgesic. While one fifth (20%) of them didn't take medication for relieve of back pain.

Table (2): Medical Past history and low back pain management strategies among the studied nurses.

Items	Total (35)	
	No.	%
I- **Medical Past history**		
- **Presence of chronic illness**		
Diabetes	12	34.29
- **Fever & infection**	11	31.43
- **Urinary problems (N=13 nurses)**		
Frequency	5	14.29
Incontinences	4	11.43
Frequency & incontinences	4	11.43
- **Injuries**		
Fall	0	0
Accident	3	8.57
Twisting	18	51.43
- **Numbness**	5	14.29
- **Hospitalization & surgery associated with back pain**	0	0
- **Smoking**	2	5.71
II- **Pain management strategies**		
- **Non-pharmacological back pain management**		
Rest in bed	35	100
Binder	7	20
Physiotherapy	6	17.14
Hot compresses	16	45.71
Relaxation	33	94.29
Distraction	10	28.57
- **Pharmacological back pain management**		
Analgesic	28	80
Anti inflammatory	12	34.29
None	7	20

Table (3) illustrates low back pain characteristics as stated by the studied nurses' pre-program intervention. All and nearly all of nurses (100% & 97.14%) stated that common location of back pain is lumber vertebra and that work is the main cause of low back pain. More than two third (71.43% &68.57%) of them suffered from low back pain for more than 5 years and the onset was gradually respectively. Regarding quality of back pain more than one quarter (28.57%) of nurses described back pain as Throbbing, burning& numbness. Also, 77.14% and 54.29% of them stated that the intensity of back pain was worse with time and was worse late at night respectively. The most (88.57% &85.71%) of studied nurse pointed to standing and walking were the factor aggravating pain respectively.

Table (3): Percentage distribution about back pain characteristics as stated by the studied nurses pre-program intervention.

Items	Total (35)	
	No.	%
Location of back pain		
Cervical	19	54.29
Lumbar	35	100
Cervical & Lumbar	19	54.29
Causes of back pain		
Known (work)	34	97.14
Unknown	1	2.85
When pain start		
One year ago	4	11.43
2-5 years	6	17.14
> 5 years	25	71.43
Quality of back pain		
Throbbing	8	22.86
Shooting	3	8.57
Knife like	2	5.71
Hot burning	4	11.43
Heavy	6	17.14
Throbbing, burning& numbness	10	28.57
Throbbing, burning& cramping	2	5.71
Onset of back pain		
Sudden	11	31.43
Gradually	24	68.57
Time of the worse back pain		
In the morning	0	0
In the afternoon	0	0
In the evening	16	45.71
Late at night	19	54.29
Intensity of back pain differ with time		
Improve	2	5.71
Not improve	6	17.14
Worse	27	77.14
Rhythmicity of back pain		
Constantly	1	2.85
Nearly Constantly	5	14.29
Intermittently	10	28.57
Occasionally	19	54.29
Factors aggravating pain		
Standing	31	88.57
Sitting	2	5.71
walking	30	85.71
physical effort	27	77.14

Table (4) shows differences between nurses' knowledge regarding low back pain and body mechanics pre and post program implementation. Less than half and about one quarter (45.71% & 25.71%) of them had satisfactory total knowledge pre- program implementation regarding back pain & body mechanics respectively. While, the majority (94.29% & 82.86%) of them had satisfactory knowledge post-program implementation respectively. Also, there were highly statistically significant difference regarding total knowledge of back pain and body mechanics pre- and post-program implementation (Z-= 4.43 & p=0.0000) and (Z=4.06, p=0.0000) respectively.

Table (4): Differences between nurses' knowledge regarding low back pain and body mechanics pre and post program implementation.

| Items nurses' knowledge | Satisfactory level (n=35) | | | | Z | P value |
| | Pre | | Post | | | |
	No.	%	No.	%		
Back pain						
Function of the spine	5	14.29	27	77.14	5.28	0.0000
Factors causing back pain	7	20	29	82.86	5.26	0.0000
Diagnosis	20	57.14	33	94.29	3.62	0.0003
Prevention	10	28.57	30	85.71	4.83	0.0000
Doctor call	6	17.14	32	91.43	6.24	0.0000
Methods of pain management	8	22.86	31	88.57	5.53	0.0000
Total Knowledge regarding back pain	16	45.71	33	94.29	4.43	0.0000
Body mechanics						
Definition	8	22.86	28	80	4.78	0.0000
Aim	7	20	30	85.71	5.51	0.0000
General Principles	15	42.86	32	91.43	4.33	0.0000
Principles with doing physical tasks	10	28.57	28	80	4.32	0.0000
Principles during helping patient positioning, movement and transfer	5	14.29	26	74.29	5.05	0.0000
Total knowledge regarding body mechanics	9	25.71	26	82.86	4.06	0.0000
Total knowledge	10	28.57	31	88.57	5.10	0.0000

Table (5): Differences between nurses' practice regarding low back pain and body mechanics pre and post program implementation.

| Items nurses' practice | Satisfactory level (n=35) | | | | Z | P value |
| | Pre | | Post | | | |
	No.	%	No.	%		
General principles of physical task						
Maintain Proper Body Alignment.	0	0	23	65.71	5.85	0.0000
Reaching	17	48.57	25	71.43	1.95	0.0510
Pivoting	3	8.57	24	68.57	5.16	0.0000
Pushing	5	14.29	26	74.29	5.05	0.0000
Pulling	0	0	27	77.14	6.63	0.0000
Lifting and Carrying	4	11.43	28	80	5.76	0.0000
Total	**0**	**0**	**23**	**65.71**	5.85	0.0000
Principles during helping patient						
positioning, movement in bed	0	0	25	71.43	6.24	0.0000
Transfer from bed to wheel chair	0	0	20	57.14	5.29	0.0000
Transfer from wheel chair to bed	0	0	20	57.14	5.29	0.0000
Transfer from bed to trolley	4	11.43	21	60	4.24	0.0000
Transfer from trolley to bed	4	11.43	22	62.86	4.45	0.0000
Total	**0**	**0**	**20**	**57.14**	5.29	0.0000
Total practice	0	0	21	60	5.48	0.0000

Table (5) shows differences between nurses' practice regarding low back pain and body mechanics pre and post program implementation. None of them had satisfactory practice regarding general principles of physical tasks and principles during helping patient pre-program implementation, while more than half (65.71% & 57.14%) of them had satisfactory practice post program implementation respectively. Also, there were a highly statistically significant differences regarding practice pre and post program implementation (Z-= 5.85 & p=0.0000) and (Z = 5.29, p= 0.0000) respectively.

Figure (1) shows that there was no significant difference in intensity of back pain pre & post program implementation (X= 2.8 & $P > 0.05$).
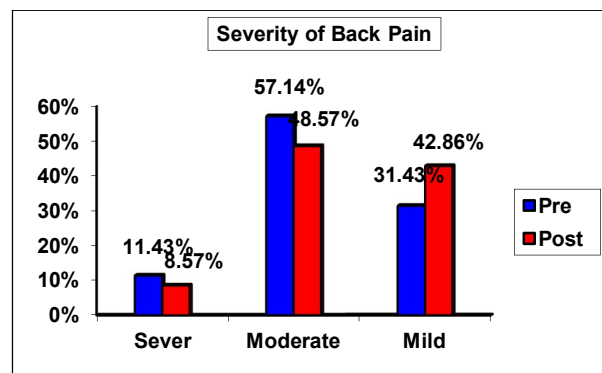

Figure (1): Difference of low back pain intensity among the studied nurses' pre and post program implementation.

Figure (2) shows disability level among the studied nurses suffering from low back pre and post program implementation. There was no statistically significance difference in functional disability level pre &post implementation (X= 2.1 & $P > 0.05$).
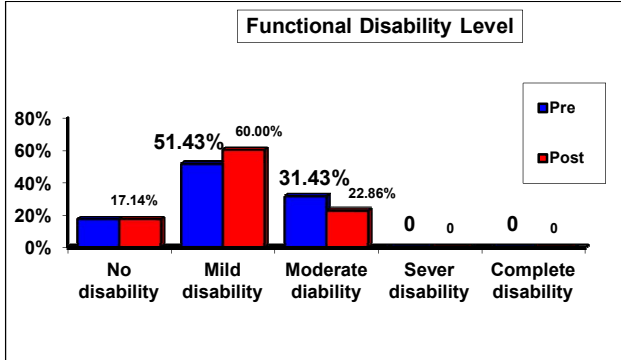
Figure (2): Difference of disability level among the studied nurses suffering from low back pain pre and post program implementation.

Table (6) shows correlation between intensity of low back pain among the studied nurses and total knowledge and practice pre implementation. There were statistically positive correlations between intensity of low back pain and nurses' knowledge and practice regarding body mechanics and back pain pre program implementation. Also, the intensity of back pain increased with unsatisfactory knowledge and practice.

Table (7) shows relation between intensity of low back pain and socio demographic characteristics of the studied nurses. There were statistically significant correlations between intensity of low back pain and age, years of experience, number of children and body mass index. While there were no statistically significant relations between intensity of low back pain and gender and marital status.

Table (6): Correlation between intensity of low back pain among the studied nurses and total knowledge and practice pre program implementation.

Total level of the nurses' knowledge & practice	Total No (35).	Intensity of back pain pre intervention			r	P value
		Mild N = 11	Moderate N = 20	Sever N = 4		
Knowledge Satisfactory Unsatisfactory	10 25	6 5	3 17	1 3	0.01	0.05 S
Practice Satisfactory Unsatisfactory	0 35	0 11	0 20	0 4	0.99	0.05 S

Table (7): Relation between intensity of back pain and socio demographic characteristics of the studied nurses.

Socio demographic characteristics	Severity of back pain			Total No (35).	Test	P value
	Mild N = 11	Moderate N = 20	Sever N = 4			
Age 20 - 35 > 35	7 4	3 17	1 3	11 24	r = 0.95	0.05 S
Years of experience < 5 5 – 10 10 - 15 > 15	3 3 0 5	2 2 1 15	0 1 1 2	5 6 2 22	r = 0.89	0.05 S
Number of children None 1 – 3 > 3	4 5 2	1 14 5	0 1 3	5 20 10	r = 0.92	0.05 S
Body math index (BMI) Ideal Over weight Obese	3 5 3	2 11 7	0 2 2	5 18 12	r = 0.73	0.05 S
Gender Female Male	9 2	17 3	2 2	28 7	X=2.585 Df = 2	0.274 NS
Qualification Diploma Technician Bachelor	2 4 5	16 2 2	2 1 1	20 7 8	X=11.22 Df = 4	0.024 NS
Marital status Single Married	7 4	8 12	2 2	17 18	X=2.585 Df = 2	0.274 NS

Table (8): Percentage distribution about work related risk factors affecting nurses' performance in ICU contributed to low back pain as stated by the nurses.

Work Related Risk Factors	Total (n=35)	
	Yes	No
The working environment		
Enough room space to move freely in a good posture?		100%
Provision for alternative working positions/seats?		100%
Machinary/workbench at a convenient height?		100%
Is a floor slipper/uneven / littered?		100%
Lightening adequate	100%	
Storage areas not too high/low/awkward to reach?		100%
Presence of lift devices		
Mechanical lift assist equipment		100%
Gait or transfer belt with handles		100%
Slide board		100%
Draw sheets	100%	
Transfer mats	100%	
Shower or toilet chair		100%
Pelvic lift device		100%
Duration, frequency and job design		
Can the task be shared/rotated between staff?	100%	
Long duration (> 8 hours)?	100%	
Fixed, static work?	100%	
Sufficient rest or recovery time		100%
Insufficient number staff member?	100%	
High work load?	100%	
The load		
Frequently heavy?	100%	
The patients most commonly dependent?	100%	

This table (8) reveals work related risk factors affecting nurses' performance in ICU contributed to low back pain. As regard the working environment, not all machinery/workbench at a convenient height and commonly storage areas are too high/low/awkward to reach. As well as, unavailability of lift devices and shower or toilet chair. In-relation to duration, frequency and job design factors, commonly the nurses reported long duration (> 8 hours), fixed static work, insufficient rest or recovery time insufficient number staff member and high work load. Concerning the load factors, all of the nurses reported that, frequently heavy and the patients most commonly dependent.

4.Discussion:

This quasi-experimental study evaluated the effect educational program on performance of Intensive Care Unit nurses to decrement the low back pain. Back pain is an acute or chronic condition restricting people's physical activities. Nurses suffer from low back pain two folds more than ordinary people and lose more working days than usual. It is generally accepted that nursing staff belong to the group of high-risk professions with regard to the

occurrence of musculoskeletal injuries, especially in the area of the lumbar spine **(Mayl et al., 2003).** In addition, **Sun et al., 2007** found that the prevalence of low back pain was 87% in ICU nurses.

Regarding the characteristics of the studied nurses. The results of the present study illustrated that about two thirds of them were more than thirty five years old, near half were diploma nurses and none of them attended training course about body mechanics. This was supported with **Roupa et al., 2008** who found that the overwhelming majority of the individuals involved were 30-41 years of age and employed as hospital ward nurses suffering back pain. With respect to their level of education, it should be pointed out that a mere 2.5% of the nurses had completed only basic training.

Also, the results of the present study illustrated that the majority of them were female, married whose more than half of them had one to three child, were overweight and obese and had fifteen years of experience. While **Mohammadi et al., 2002** who found that the highest prevalence was seen in those working less than 3 years (68.3%). Low back pain was more prevalent in females (73.8%) than in males (46.3%). Single individuals had the lowest low back pain prevalence (36.4%). **Crook et al., 2001** found a higher prevalence of overweight or obese participants among nurses suffering from back pain.

Regarding past history of the studied nurses, the results of the present study showed that about one third of them had diabetes. Meanwhile, **Ritzwoller et al., 2006** established that Prevalence estimates for low back pain in patients with diabetes ranged from 4,8% to 5,1%

Also, the study result revealed that only two of the studied nurses were smoker**. Hestbaek et al., 2006** found that smoking have been found to contribute towards increased back pain levels. While, **Kwon et al., 2006** found no statistically significant correlation between smoking and back pain. This results may be due to the majority of the studied nurses were female and the Egyptian culture not accepted that especially females to be smokers.

Concerning back pain characteristics as stated by the studied nurses pre-intervention, the results of the present study show that all and nearly all of nurses stated that common location of back pain is lumber vertebra and that work is the main cause of back pain respectively. Also, **Rahmah et al., 2008** found that most respondents claimed the commonest site to develop back pain was at the lower back area. This could be due to lumbar region received the highest pressure when a person manually lifting.

Regarding non-pharmacological back pain management strategies among the studied nurses pre intervention, the results revealed that all of them rest

in bed, the majority of them do relaxation and near half of them do hot compresses. This was congruent with **Stevenson and Hay, 2004** found that the rest was the most use in the treatment of low back pain but stated that it might led to increased disability. This might be due to rest and relaxation in bed and hot compresses causing muscle relaxation and decrease strain of muscles leading to decrease back pain.

Concerning pharmacological back pain management, the majority of them take analgesic. While less than quarter of them didn't take medication for relieve of back pain. This was supported by **Punnett *et al.,* 2005** found that the use of medication are very common among people with back pain. This might be due to medication is the fastest and effective method to relieve pain.

Regarding quality of back pain, the present study revealed that more than quarter of studied nurses described back pain as throbbing, burning & numbness, more than two third of them suffered from back pain for more than 5 years and the onset was gradually. **Mahmoud, 2001** reported that 13.2% described quality of back pain as burning and 30.2% as Throbbing.

The most of studied nurses pointed to their work was the main cause for back pain and standing and walking were the factors aggravating pain. Also, more than half of them stated that the back pain was worse late at night. This goes in the same line with many researchers, among them **Smedley *et al.,* 2004** who found that stress in the workplace is one of the most significant factors leading to the occurrence of lower back pain and **Naude, 2008** who found that sitting, standing and walking for more than six hours per day had the highest percentages of back pain, this may be an indication that a balance should exist between prolonged sitting, standing and walking. It should be noted that lifting and heavy physical duty, including bending and twisting, is part of the occupational activities of hospital employees and thus plays a huge role in the development of back pain.

 The result shows that there was no significant difference in intensity of back pain between pre & post-program implementation. This result was congruent with **Hartvigsen *et al.,* 2009** who found in a study the effectiveness of body mechanics in reducing back pain among nurses and significant differences were found between the two groups.

The results of the current study showed that all of the studied nurses had back pain and more than half of nurses had moderate back pain pre-program implementation while less than half of them had moderate ack pain post-program implementation with no significant statistical difference between pre & post program implementation. **Rahmah *et al.,* 2008**

illustrated that, 51% of nurses claimed to have mild pain, 46% claimed to have moderate pain and 72% claimed it was work related. While **Wongthanakit *et al.,* 2005,** stated that about 76.2% of the nurses had low back pain preventive behavior at a moderate level.

Regarding intensity of back pain, the present study revealed that most of the studied nurses had worse back pain with time. **T**hat was supported with **Trinkoff *et al.,* 2006** who illustrated that the intensity of the problem of lower back pain depends on the rank an**d** working hours of the individual nurse**.** While Nevertheless, **Martinelli*,* *et al.,* 2004** found the incidence of lumbar spine injuries to be lower in those nurses who had been specially trained in how to prevent occupational lower back pain. In the same line, the findings of a study from the University of Canada by **Roupa *et al.,* 2006** showed that the frequency of occurrence of lower back pain and hence personal functionality were influenced by the duties of the individual nurse and in particular by the amount of loads he/she was called upon to lift on a daily basis**.**

Regarding functional disability level, the present study revealed that about one half of nurses had mild disability and about one third of them has moderate disabilities pre-program implementation, while increased number in mild disabilities to about two third post-implementation and decreased the number to less than one quarter post-implementation in moderated disabilities with no statistically significance difference in functional disability level between pre- & post-program implementation. That was supported with **Punnett *et al.,* 2005** that pointed to low back pain does not directly produce premature mortality but causes substantial disability and has

Regarding back pain knowledge differences of the studied nurses pre- & post intervention, the current result revealed that less than half of them had satisfactory knowledge pre-intervention, while the majority had satisfactory knowledge post intervention and there was a highly statistically significant difference regarding total knowledge of back pain pre and post intervention. This goes in the same line with **Sikiru and Hanifa, 2010** who found that, the general nurses' knowledge scores were lower overall, but increased as they became more experienced in nursing, despite the lack of formal education.

Regarding nurses' knowledge about methods of prevention of back pain, the current study showed that less than one third of the studied nurses had satisfactory pre intervention while the majority of them had satisfactory knowledge post intervention and there was a highly statistically significant difference between them. This was supported with **Wongthanakit*,* *et al.,* 2005** who found that practical

skills, the encouragement from head nurses, colleagues and family members, positive attitudes about low back pain and insufficient knowledge of low back pain preventive behaviors altogether could explain 35.7% of low back pain preventive behaviors.

Regarding nurses' knowledge about back pain management, the current study showed that less than one quarter of the studied nurses had satisfactory pre intervention while the majority of them had satisfactory knowledge post intervention there was a highly statistically significant difference between them. This was supported with **Adriaansen et al., 2005** who found that educational program had contributed to an increase in knowledge scores in relation to pain management.

Regarding body mechanics knowledge of the studied nurses pre- & post intervention, about one quarter of them had satisfactory knowledge pre intervention, while, the majority of them had satisfactory knowledge post intervention. Also, there was a highly statistically significant difference regarding total knowledge of body mechanics between pre- and post-intervention. **Tinubu, 2010** identified that training in body mechanics and body awareness has been shown to be effective in improving knowledge about these.

The results of the current study showed that, none of the studied nurses had satisfactory practice regarding general principles of physical tasks and principles during helping patient pre intervention, while about two third and more than half of them had satisfactory practice post intervention respectively. Also, there were highly statistically significant differences regarding practice pre and post intervention respectively. These was contradicted with **Engkvist et al., 2001** who mentioned that training in body mechanics and body awareness has been shown to be ineffective.

Sun et al., 2007 found that heavy and frequent lifting was of most concern especially amongst the nursing staff and highest during observation of lifting and transferring of patients in bed, injection and suctioning. A high percentage of nursing staff (59%) experienced low back pain. Heavy physical duty is a part of the nursing staff's occupational activities and 90% of nursing staff reported that they frequently lifted objects or people during a working day. This can be used to explain why in this study a fairly large number of the nurses (58%) had low back pain.

Regarding practice of the studied nurses according principles during helping patient the result show that none of them had satisfactory level pre intervention. This finding is in line with **Smith et al., 2005** who established that manual handling of patients is the main cause of back pain among nursing staff. Another explanation may be the possible ignorance with regards to kinetic handling during these nursing activities which includes lifting and transferring patients **(Sun et al., 2007)**. It is clear from the literature that frequent and heavy lifting and loading of the spine increases the presence of low back pain. There should be a balance between the weight of the load placed on the spine and the ability of the spine to tolerate the load.

Naude, 2008, noted that lifting and heavy physical duty, including bending and twisting, is part of the occupational activities of hospital employees and thus plays a huge role in the development of back pain. Not incorporating the correct kinetic handling skills or working in a bad environment can aggravate the problem.

Concerning nurses' practice regarding general principles of physical tasks, the results of the present study revealed that none of them had satisfactory practice regarding proper body alignment and pulling, while the minority of them had satisfactory practice regarding pivoting, pushing and lifting pre intervention. This was contradicted with **Karahan and Bayrakter, 2009** who found that, the majority of the nurses used body mechanics correctly while sitting (53.6%), standing (58.7%), carrying (64.3%), pulling or pushing (79.4%), moving the patient to the side of the bed without an assistant (53.4%), moving the patient to a sitting position in bed (71.4%) and assisting the patient to a standing position (66.6%). However 57.1% of the nurses lifted and 82% extended incorrectly. The study concludes that some of the nurses do not use body mechanics correctly and the majorities have low back pain. However 57.1% of the nurses lifted and 82% extended incorrectly.

Concerning nurses' practice regarding principles for helping patient, the results of the present study revealed that none of them had satisfactory practice regarding positioning, movement in bed and transferring except the minority of them had satisfactory practice regarding transferring patient from bed to trolley and vice versa pre intervention while level of practice improved post intervention to about near two third regarding positioning, movement in bed and transferring patient from bed to trolley and vice versa and there were highly statistically significant differences regarding practice pre and post intervention respectively. This was go in the same line with **Hartvigsen et al., 2009** that found that the effectiveness of an intensive educational intervention program on reducing back pain among nurses trained and educated in body mechanics, patient transfer and lifting techniques and significant differences were found between the two groups, and both groups thought that education in patient transfer techniques had been helpful.

Silverstri, 2010 mentioned that, the factors related to back pain may be socio demographic factors (as age, gender, education level, smoking, body mass index, number of children), physical and work factors (Static and awkward body position, heavy physical work, night shifts, lifting, bending, twisting, pulling, and pushing).

The present study showed a significant positive statistically correlation between age of the studied nurses and severity of back pain which increased above 35 years old. Also, between years of experience and severity of back pain which increased above 15 years of experience. That was supported with **Jeffries et al., 2007** and **Rahmah et al., 2008** who found that prevalence of back pain is higher among older nurses compared to younger nurses where nurses aged > 40 years old has higher prevalence of backache which is 80.7%, although statistically it is not significant relationship between age and the presence of low back pain. While, **Roupa et al., 2008** found that pain affects all age groups equally pain affects all age groups equally. That may explained that workers at later age have more spinal damage which occurs while they are working. These accumulations of micro trauma fasten the degeneration process which occurs.

The current study shows that no significant statistically relation between gender of the studied nurses and severity of back pain. **Naude, 2008** found that only female gender was associated with increased risk of back pain and pain as a result of injury to the lumbar spine do not differ according to gender. Also **Mohammadi et al., 2002** found that back pain was more prevalent in females (73.8%) than in males (46.3%). In addition, it was congruent with **Schneider et al., 2005** who established that the chances of developing low back pain with female were significantly higher when compared to males**.**

The present study showed significant statistically relation between severity of back pain and qualification of the studied nurses which increased among diploma nurses. This may be due to diploma nurses have less knowledge and work more. That was contradicted with **Roupa et al., 2008** that found that back pain influences all levels of education equally.

The present study illustrated that no significant statistically relation between severity of back pain and marital status. While there was a significant statistically positive correlation between severity of back pain and number of children of the studied nurses. This was supported with **Mogren, 2006** who found that low back pain with multiple pregnancy is another common problem and 72% of pregnant women with low back pain take sick leave as a result of low back pain. Also**, Schneider et al., 2005**

established that the chances of developing low back pain if you were being married increased more especially with frequent pregnancy.

The present study showed that significant statistically positive correlation between severity of back pain and body mass index of the studied nurses which most of them were overweight and obese. This was supported by **Crook et al., 2001** that found that higher prevalence of back pain might was among overweight or obese participants, while, there was no correlation between BMI and low back pain. Also, **Naude, 2008** found that BMI was not associated with low back pain. **Janke et al., 2007** stated that the relationship between obesity and back pain may not be direct, but may be influenced by lifestyle choices and being sedentary.

The present study showed that there was a statistically positive correlation between severity of back pain and nurses' knowledge and practice regarding body mechanics and back pain pre intervention. Also, the severity of back pain increased with unsatisfactory knowledge and practice. This was supported by**; Brown, 2009; Waters et al., 2007; Karahan and Bayraktar, 2009** who reported that repetitive nursing care that involves high-risk manual tasks such as lifting, transferring, repositioning patients pushing, lifting and moving heavy equipment put nurses at an increased risk for developing sprains and strains to the lower back, neck, shoulders, wrists, and knees and there was significant statistically relation among them.

There are certain work related risk factors that seem to be associated with the risk of low back pain. The working condition is considered as a main cause of the back pain. This may be due to incorrect hospital work system. The result of current study revealed some work related risk factors affecting nurses' performance in ICU contributed to low back pain.

As regard The working environment, no enough room space to move freely in a good posture, not all machinery/workbench at a convenient height and commonly storage areas are too high/low/awkward to reach. This was supported with **Nelson and Fragala, 2004** who stated that the working environment is a risk factor, Health care workers may be forced to assume awkward postures because rooms and other spaces are small in size, crowded or have obstructions. These factors may also prevent getting help from other employees or using assist equipment. Poorly maintained floors can cause slipping, tripping and abrupt movements when lifting or moving patients, residents or equipment

As well as, the result of current study revealed that unavailability of lift devices and shower or toilet chair were work related risk factors affecting nurses'

performance in ICU contributed to low back pain. **Nelson and Baptiste, 2004** stated that, the ambulation lifts support a patient or resident during ambulation. The individual pushes the lift along as they walk. A strap in the back prevents them from falling backwards. Also, the draw sheets or incontinence pads commonly used to slide patients or residents between horizontal surfaces, or for repositioning in beds or chairs. To ensure an adequate grip, the provider should roll up the edges. This will also reduce forceful exertions and awkward upper body postures. The sheets or pads should be used in combination with friction-reducing devices such as slide boards, slippery sheets, plastic bags, or low friction mattress covers.

In-relation to duration, frequency and job design factors, the current study revealed that commonly the nurses reported long duration (> 8 hours), fixed, static work, insufficient rest or recovery time insufficient number staff member and high work load. Concerning the load factors, all of the nurses reported that, frequently heavy and the patients most commonly dependent. **Nelson et al. (2003b)** emphasized on, the nursing shortage has been exacerbated by occupational injuries and related disabilities. It is estimated that each year 12% of nursing personnel will consider a job transfer to decrease risk and another 12%-18% will actually leave the nursing profession due to chronic back pain. Meanwhile, **Owen and Staehler, 2003** stated that, the high-risk patient handling tasks are characterized by significant biomechanical and postural stressors imposed on the caregiver. Not surprisingly, factors such as the patient's weight, transfer distance, confined workspace, unpredictable patient behavior, and awkward positions such as stooping, bending, and reaching significantly contribute to the risk of performing patient handling tasks, shows relation between intensity of low back pain and socio demographic characteristics of the studied nurses. There were statistically significant correlations between intensity of low back pain and age, years of experience, number of children and body mass index. While there were no statistically significant relations between intensity of low back pain and gender and marital status.

Conclusions:

Less than half and about one quarter of the studied nurses had satisfactory total knowledge pre-program implementation regarding back pain & body mechanics respectively. While, the majority of them had satisfactory knowledge post-program implementation. Also, there were highly statistically significant difference regarding total knowledge of back pain and body mechanics pre- and post-

program implementation. There was no statistically significance difference in functional disability level pre &post implementation. There was no significant difference in intensity of back pain pre & post program implementation. There were statistically positive correlations between intensity of low back pain and nurses' knowledge and practice regarding body mechanics and back pain pre program implementation. There were statistically significant correlations between intensity of low back pain and age, years of experience, number of children and body mass index. While there were no statistically significant relations between intensity of low back pain and gender and marital status.

Recommendation

1. Health education on proper posture and correct lifting techniques should be introduced in the workplace to reduce the burden of low back pain among the nurses working in different setting
2. Guidelines for preventing low back pain should be provided and the nurses should encourage and support the practice of low back pain preventive measures to prevent the injury and promote a better quality of life of the nursing personnel.
3. The study should be replicated on large sample and different hospitals setting in order to generalize the results.
4. Developing a simplified and comprehensive booklet including guidelines about correct lifting and handling techniques.
5. Further study is recommended to evaluate the association between low back pain and its associated factors

Implication

The present study has implication for nursing practice and education. For practice, the intensive care nurses play an important role in caring for the patients through expert efficient care. So, the results of the study could be used to determine target areas for development of procedure and educational program regarding to the principles of body mechanics, proper lifting, transferring and handling the patients to assist themselves to live better without suffering from low back pain.

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10/10/2012

A Double-Blind, Randomized Clinical Trial Comparing Cardioprotective Effects of N-acetylcysteine and Glucose-Insulin-Potassium as an Additive to Cardioplegia during Coronary Artery Bypass Grafting

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Abstract: Optimum conditions for many coronary artery bypass graft surgeries (CABG) necessitate the heart to be prevented from beating. Cardioplegic solution and its ingredients are thus of utmost importance in cardioprotection. An ideal protection will help the heart return into its normal function after CABG. This research compared the cardioprotective effects of adding either N-acetylcysteine (NAC) to Cardioplegic solution with infusion of glucose-insulin-potassium (GIK) in patients with low ejection fraction (EF). In a double-blind randomized clinical trial, 60 elective CABG patients with EF < 50% were evaluated. The patients were numbered according to their reference to the Heart Center of Mazandaran (Iran) and their arrangements in the operation list. They were randomly allocated to 2 groups of 30 by a computer program to receive either GIK (group G) or NAC (group N). Compared to group G, group N had significantly lower incidence of arrhythmia during and after the operation (p = 0.041). They also needed lower doses of inotropic medications after the termination of cardiopulmonary bypass (CPB) (p = 0.041). The 2 groups were not significantly different in the need for shock or pacemaker after CPB and using pacemakers and inotropic drugs in the intensive care unit. Changes in mean EF from before to after the operation were 0.87 ± 0.85% in group N and -2.24 ± 1.02% in group G (p = 0.012). The mean troponin I levels were 0.406±0.316, 0.41 ± 0.512 in groups N and G, respectively (p = 0.41). NAC seems to be more beneficial than GIK for protecting myocardial cells, decreasing threatening signs of patients, especially arrhythmia, and increasing EF after CABG. It would probably decrease the mortality risk associated with arrhythmias.
[Mohammad Reza Habibi, Shervin Ziabakhsh-Tabari, Alireza Khalilian, Samira Rahemi, Rozita Jalalian. **A Double-Blind, Randomized Clinical Trial Comparing Cardioprotective Effects of N-acetylcysteine and Glucose-Insulin-Potassium as an Additive to Cardioplegia during Coronary Artery Bypass Grafting**. *Life Sci J* 2012;9(4):3126-3130] (ISSN:1097-8135). http://www.lifesciencesite.com. 457

Keywords: Coronary Artery Bypass Graft, N-acetylcysteine, Cardioplegia. Glucose-insulin-potassium (GIK)

1. Introduction

Optimum conditions for many coronary artery bypass graft surgeries (CABG) necessitate the heart to be prevented from beating. On the other hand, the heart would not survive without an appropriate blood circulation. Since cardiac ischemia and reperfusion can produce free radicals and thus damage cardiac myositis and coronary artery endothelial cells, cardioplegia should be performed according to scientific and guaranteed principles to prevent ischemic incidences and irreversible complications (1,2). In addition, overproduction of free radicals causes macromolecular injuries, lipid peroxidation, and tissue deterioration (3) as a result of changes in cell membrane permeability and arrangement of membrane proteins following reperfusion and ischemic injury. Therefore, the composition of cardioplegic solution plays a vital role in protecting the heart. In fact, using an ideal

protection, the heart will return to its normal function after the termination of cardiopulmonary bypass. Previous studies have employed different kinds of cardioplegic solutions such as crystalloid, blood, and L-arginine cardioplegic solutions (4,5). Research has also shown that adding factors to inhibit oxygen free radicals to the primary solution of cardiopulmonary bypass pump or to the cardioplegic solution can improve the heart function (6). On the other hand, patients with an ejection fraction (EF) lower than normal need to benefit from precise and specific medical supports or else their heart will not be able to function properly despite the conducted surgical procedures. In such cases, supportive measures are taken before, during, and after the surgery to decrease the complications of myocardial ischemia. Among these measures is using glucose-insulin-potassium (GIK) before operation and cold blood cardioplegia during the surgery. Being a branched-chain, low

molecular weight thiol compound with antioxidant properties, N-acetylcysteine (NAC) improves microcirculation and suppresses neutrophil aggregation. It can also be transferred into myocardial cells and increase intracellular glutathione concentration. Since cellular glutathione has antioxidant effects, it can decrease the risk of ischemia (7-9).

This research hence compared the clinical effects of adding NAC to cardioplegic solution with those of GIK administration on heart protection in patients with low EF. Since the mentioned clinical methods have not previously been compared, this study tried to shorten hospitalization period and reduce treatment expenditures. It also attempted to present more scientific and functional solutions for decreasing complications of myocardial ischemia during CABG.

2. Material and Methods

In a double-blinded randomized clinical trial, 60 elective CABG patients with an EF lower than 50% and an age of 35-75 years old were evaluated. The patients were numbered according to their reference to the Heart Center of Mazandaran (Iran) and their arrangements in the operation list. On the other hand, subjects were excluded in case of requiring intra-aortic balloon pump during the operation, prolonged cross-clamp period of 1.5 hours or more, and sensitivity to NAC.

The eligible subjects were randomly allocated to 2 groups of 30 individuals by a computer program to receive either GIK (group G) or NAC (group N). In group G, 10 cc/h of GIK solution was infused constantly during the surgery. Group N was injected with a cardioplegic solution containing 200 mg NAC. Normal saline was used as placebo in both groups (injected in group G and infused constantly in group N) to prevent the surgical team form identifying the drugs. A cardiopulmonary bypass pump was used for all cases in both groups. In order to ensure blinding, an anesthesia technician numbered the medicines and placebos (n = 30 for each). The cardiologist and anesthesiologist were not aware of the numbering and the kind of used drug during the surgery. The code of the administered medication was recorded in each patient's follow-up form. After decoding at the end of the survey, the kinds of drugs were recorded in patient forms.

Echocardiograms were ordered and performed by the same specialist before and 3-5 days after CABG to compare EFs. Frequency of arrhythmia, need for inotropic drugs during and after the operation, need for shock and pacemaker, commencement of normal heart rhythm, postoperative levels of cardiac enzymes, ECG

changes, central venous pressure (CVP), and duration of hospital and intensive care unit (ICU) stay were also recorded and compared between the 2 groups.

Ethical considerations were taken into account by describing the aims and quality of the study to the patients and obtaining written consents from all participants. Besides, the questionnaires were filled out anonymously and the results were surveyed generally. The patients were also allowed to withdraw from the study at their wish. This survey did not impose any extra costs on either patients or insurance companies.

Quantitative and qualitative variables were analyzed by t-test and chi-square test, respectively. In all statistical analyses, p values less than 0.05 were considered as significant.

3. Results

The mean age of the participants (n = 60) was 62.5 ± 7.2 years old. Males and females constituted 58.3% (n = 35) and 41.7% (n = 25) of the whole population, respectively. The mean age of patients was 63.2 ± 6.1 (range: 44-74) years old in group N and 61.4 ± 5.9 (range: 45-71) years old in group G. There was no significant difference between the 2 groups in terms of age and sex distribution (p = 0.68). A history of myocardial infarction was reported by 8 patients of group N (26.6%) and 6 patients of group G (20%) (p = 0.84).

Groups N and G were not significantly different in the mean duration of pumping (78.3 ± 17.6 minutes vs. 74.1 ± 21 minutes; p = 0.73). The mean duration of aortic cross-clamping was 42.35 ± 14.27 minutes in group N and 44.6 ± 19.61 minutes in group G (p = 0.56). The normal rhythm of the heart started 2.5 ± 2.4 minutes and 2.2 ± 1.1 minutes after aortic cross-clamp removal in groups N and G, respectively (p = 0.37). The mean EF before surgery was 45.4 ± 4.2% in group N and 47.3 ± 2.9% in group G (p = 0.17). However, the mean EFs of groups N and G were significantly different 5 days after the surgery (52.3 ± 8.0% vs. 45.1 ± 10.0%; p = 0.01). The changes in mean EF from before to after the operation were 0.87 ± 0.85% and -2.24 ± 1.02% in groups N and G, respectively (p = 0.01).

After the surgery, the mean level of troponin I was 0.4 ± 0.3 in group N and 0.4 ± 0.5 in group G. As mentioned earlier, NAC can increase intracellular glutathione concentration by moving into myocardial cells. In addition, its antioxidant effects are expected to change the levels of cardiac enzymes. Nevertheless, troponin I levels were not significantly different between the 2 groups.

The mean duration of hospitalization was 7.4 ± 1.9 days in group N and 8.2 ± 1.8 days in group G (p > 0.05). The mean ICU stay was 45.6 ± 3.1

hours in group N and 48.2 ± 5.2 hours in Group G (p > 0.05).

The incidence of arrhythmia during and after operation in group N was significantly lower than that in group G (p < 0.05). However, there were no significant differences between the 2 groups in

requiring shock after separating the patients from the pump, placing pacemaker after pumping and in ICU, and in prescribing an inotropic in ICU (p > 0.05). Moreover, none of the patients needed shocking in ICU (Table 1).

Table 1. Relative frequency of some incidences in glucose-insulin-potassium group (group G) and N-acetylcysteine (group N) after cardiopulmonary bypass (CPB) termination and during intensive care unit (ICU) stay

		Group N	Group G	P
After CPB termination	Arrhythmia	3 (10.0%)	8 (26.6%)	0.08
	Shock	3 (10.0%)	7 (23.3%)	0.15
	Pacemaker	2 (6.6%)	3 (10.0%)	0.56
	Inotropic drug	4 (13.3%)	12 (40%)	0.04
During ICU stay	Arrhythmia	5 (16.6%)	14 (46.6%)	0.03
	Shock	0	0	0.99
	Pacemaker	0	1 (3.3%)	0.56
	Inotropic drug	5 (12.6%)	13 (42.3%)	0.12

Values are expressed as n (%).

4. Discussions

One of the traditional and acceptable methods for stopping the heart during CABG is using a cardioplegic solution along with a cardiopulmonary bypass machine. Previous studies have evaluated the toxicity of adding different compounds such as glucose-aspartate-insulin to cardioplegic solutions (10-12). According to research, the antioxidant effects of intracellular glutathione make it useful in establishing the cellular perfusion which decreases during ischemia (13,14). NAC is a medication containing thiol groups. It can cause increase intracellular glutathione concentration by transferring into myocardial cells. In the present research, 60 elective CABG patients were evaluated to compare the cardioprotective effects of cardioplegic solutions containing either NAC or GIK. Similar to the findings of Davudi and Rasuli (15), we could not establish any significant differences between the 2 groups in demographic specifications, the mean pumping duration, aortic cross-clamp duration, and the mean EF before surgery.

On the other hand, statistically significant differences between the 2 groups were found in terms of the incidence of arrhythmia and the need for an inotropic drug after the termination of cardiopulmonary bypass machine, the incidence of arrhythmia in ICU, the mean EF after the operation, and the mean changes of EF from before to after the surgery.

As mentioned before, arrhythmia is one of the acute and prevalent complications after CABG which can occasionally lead to death. In our study, patients who were received GIK developed a

significantly higher incidence of arrhythmia after the operation. Curvnes et al. stated that patients suffering from atrial fibrillation have lower glutathione content in their left atrial cells (14). Using NAC in the present research could have elevated glutathione concentration in heart cells and thus reduced the rate of arrhythmia caused by ischemia. Adding insulin to a cardioplegic solution to improve the aerobic myocardial metabolism has not been found to be more effective than placebo in decreasing the rate of atrial fibrillation after operation (16). Therefore, using NAC in cardioplegic solutions seems more efficient than using GIK (17-20). Likewise, Bruemmer-Smith et al. showed that using GIK solution did not decrease myocardial cells injuries. GIK was not hence superior to other additive materials in eliminating arrhythmia (18).

After the operation, we detected lower, but not significantly, levels of troponin enzyme in group N compared to group G. Rorrigus et al. assessed the administration of cardioplegic solutions containing NAC, aspartate, and glucose. They reported NAC to significantly decrease cardiac enzymes after the surgery in comparison with the other 2 compounds (11). The difference between the 2 studies might have been caused by different dosages and methods of drug administration. As declared by Hammasy et al., compared to placebo, the oral administration of NAC before operation did not make any significant changes in the rate of clinical parameters and levels of enzymes (21). To our surprise, some clinical parameters, such as the need for shock and pacemaker after separating the patients from cardiopulmonary bypass machine, the need for

pacemaker and inotropic drugs in ICU, dosage of inotropic drugs during and after the operation, the mean hospital and ICU stay, and the level of troponin enzyme, were not significantly different between the 2 groups of the present study. The low number of cases requiring shock or pacemaker and the strict guidelines about how and when to discharge patients from the ICU could have been responsible for the absence of significant statistical differences between the 2 groups. Nevertheless, the clinical need for inotropic drugs in the ICU was lower in group N. In addition, group N received lower dosages of inotropic drugs after the surgery than they did during the surgery. In contrast, Koromaz et al. could not establish any significant differences in clinical efficacy of cardioplegic solutions with or without NAC after the operation (8).

According to the results of comparisons between NAC and GIK in the present study and previous research, adding NAC to a cardioplegic solution not only improves the enzymatic effects of the solution in cellular level, but also has clinical effects on decreasing the incidence of some complications such as arrhythmia and the need for inotropic drugs during the surgery and after separating patients from the cardiopulmonary machine. On the other hand, despite the favorable clinical effects of adding GIK to a cardioplegic solution, high incidence of arrhythmia limits the use of this compound. However, Vento et al. reported NAC to reduce the levels of myeloperoxidase and myocardial glutathione while no hemodynamic differences were observed between the 2 groups of NAC and glucose-magnesium receivers. Moreover, arrhythmia was detected in neither group (22).

Most previous studies have compared the myocardial protective effects of NAC and other compounds including normal saline at the molecular level (11,20). The present study thus employed a practical innovation since it showed the beneficial effects of NAC over GIK in decreasing the incidence of some signs and complications like arrhythmia and improving heart function. These findings are consistent with the antioxidant properties of NAC and the laboratory results obtained by other studies. Overall, NAC seems to be superior to GIK in protection of myocardial cells during open heart surgery due to its ability in reducing the rate of threatening signs, especially arrhythmia, and increasing EF after operation. It would also decrease the risk of mortality caused by arrhythmia after operation.

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11/12/2012

Comparison of shear pile force and moment in slippage reinforced with shear pile

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Abstract: High importance of landslide and notable loss of cost and life in various country, leads extensive research in soil mechanics for this problem. Soil stability increases by several methods. The methods work as the factor of causing decrease active pressure or increase passive pressure. One of these is using of shear or soldier pile as single or wall system. Piles by increasing of passive force against landslide will cause the increase of slope stability. Also piles in this manner can operate as deep foundation for structures founded up the slope. In these situations using of them will be lead to economic construction. To use piles for slope control, both structural and geotechnical resistance of piles, must be considered. As the piles in slope are subjected to large axial and shear force, also bending moment, their design needs specific attention. In this research, shear pile response studied with limit equilibrium method, LPILE software and finite differential method approach using FLAC, for two piles with different elasticity modules. Shear and axial force and bending moment diagram for structural designing of piles, from these methods will be presented. Results with emphasis of suitable effect of pile on slope instability control, shows that, location of pile in the slope and elasticity module has significant effect on the forces and bending moment of pile.

Keyword: Slope stability, landslide, shear pile, LPILE, FLAC

1. Introduction

Each slippage, rolling or block motion of soil, stone or combination of both is called landslide. Assessment of probable danger of failure is caused to accurate recognition of hillside and so suitable methods can be selected for hillside retrofit. Decision on the suitable method needs following cases:

a- type and shape of failure
b- Relation between geology condition and potential shape of failure
c- Importance of hillside activity or size and velocity of it
d- Effective element in instability
e- Shape and characteristic of failure
f- Value of movement and displacement of hillside
g- Possibility of mathematical analysis usage

Terzaghi divided Landslide reason in two group: external cause and internal cause. Increase of active shear stress is cause of external cause that is occurred result of geometric change, loading and uploading of hillside, Shocks and vibration, Drawdown and etc. decrease of shear strength is cause of internal cause that is occurred result of Progressive Failure, erosion, water seepage and etc.

Reinforced concrete pile can be designed for stability of landslide. Making of shear pile is rather simple and don't need special contractor. These piles can be installing during of landslide and are less trouble than other methods.

Commonly, shear piles in geotechnical culture is used as a structural member for transmittal of axial load to underside resistant layers or resistance of lateral load and bending moment on top of pile cab and in low references, shear piles was considered in landslides control. In this paper, piles role is studied in landslide control and its design under distributed and point shear force and moment in pile length.

In last studies, diagrams were presented for determination of suitable distance between shear pile because of interaction of soil and pile, effect of soil arching phenomenon for shift of lateral load and in result decrease of lateral load on piles and negative effect of adjacency piles on use of maximum pile capacity.

Using of pile can increased coefficient of slope stability that value of this increase depend to pile geometry, it's location, distances of piles together, soil type and slope of geometry. Too , piles is introduced as a suitable and certain solution in stability with time limitation, limitation in shape in end of work, limitation in access, high depth of slide sheet, without creation of risk for slope in during of installation.

For increasing of pile effect on soil slope stability, it is necessary that pile pass from slide sheet and then continue with enough length.

2- Boundary equations on the base of load-deformation curve

One of the methods for study of pile behavior in soil trench is boundary equations on the base of load-deformation (P-Y) curve. In this study assumed that pile obtained its strength against shear from earth bearing capacity in touch to itself.

This problem is an interaction between soil and structure and has similar behavior to beam on the elastic bed that was solved by Hetenyi (1946).

$$EI\frac{d^4y}{dx^4} + Q\frac{d^2y}{dx^2} - P + w = 0 \qquad (1)$$

That Q= axial load on the pile (if exist), x= length coordinate, y= lateral displacement of pile in point x, P= lateral reaction of soil per length, EI=bending severity of pile and w=load distribution in pile

This differential equation is solved by using soil load-deformation (P-Y) curves. Drawing plan of it is shown in Fig (1).
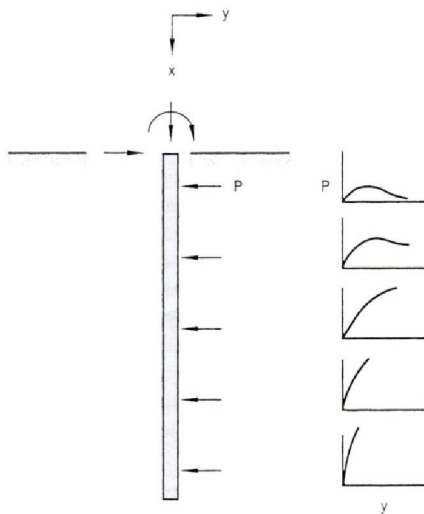

Figure 1. P-Y curve with depth for buried pile under lateral loading (Reese et al 1989 [24])

Reese & Wang (1989) [25] write LPILE program for solve of differential equation. P-Y curve changes with alteration of soil properties, depth, load condition (statically, periodic, temporary and etc). LPILE program permit to geotechnical designer to:
1-Intern soil properties on the base of P-Y curve.
2-Intern real P-Y curve resulted of insitu pile test.
3-Draw P-Y curve from several models of soil and stone.

3- Study of pile behavior in soil trench
3-1- Study of pile behavior by LPILE program

In this paper, LPILE program is used for P-Y analysis and comparison with results of other methods model. This program can presented P-Y curve, shear, and moment and displacement diagrams n length of pile.

P-Y analysis is on the base of modules of bed reaction and considers soil as Winkler elastic-plastic environment (Fig (2)). In this method, soil is modeled by separate nonlinear springs that are set in length of pile and in various depth of soil.
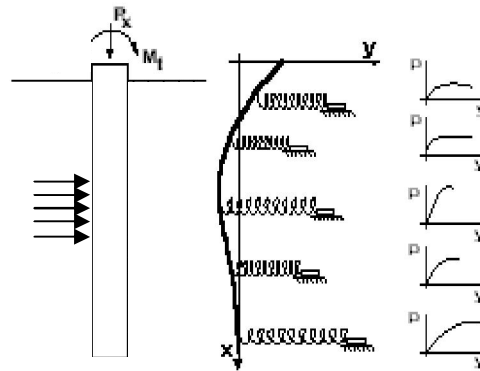
Figure 2. pile modeling under the lateral loading by separate nonlinear springs

Independent of spring behavior is fault of this method, because soil properties in each depth are biased from top and bottom soil. P-Y curves are resulted of P-Y analysis that is independent of shapes and hardenings of pile. P-Y curves show ratio of lateral pressure of soil to pile displacement. Spring behavior is elastic-plastic so P-Y curve in specific depth with increasing of soil deformation change from zero to ultimate lateral strength of soil.

This program has suitable ability for identifying of pile behavior under lateral distributed and point loading. Program inputs are soil properties, subterranean water level, geometry and material of pile, condition of pile cap and distributed and point loads and moment on the pill and its output such as diagrams of shear and moment, pile displacement, P-Y curves and etc.

LPILE program can't consider finite trench and can't model of suitable slope, so only one example modeled with this program according to following properties (Table1).

Resulted of write program according to Ito& Matsui (1975) equation was used as input load of pile. Obtained results of analysis by this software are presented in Fig (3-4)

Table 1.properties of various parts of model

Soil	
Unit weight(KN/m^3)	20
Cohesion(KN/m^2)	10
Internal friction angle	20
Elasticity module(kpa)	2e5
Poisson's ratio	0.25
pile I	
Unit weight(KN/m^3)	78.5
Elasticity module(kpa)	2e8
Poisson's ratio	0.2
Diameter(m)	0.5
pile II	
Unit weight(KN/m^3)	23.5
Elasticity module(kpa)	2e7
Poisson's ratio	0.15
Diameter(m)	0.5
Boundary element	
Elasticity module(kpa)	2e5
Poisson's ratio	0.25
Cohesion(KN/m^2)	10
Internal friction angle	20
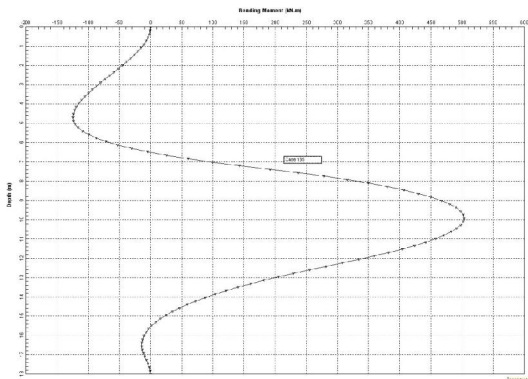
Figure 3- bending moment of pile under lateral load by using finite equation inputs
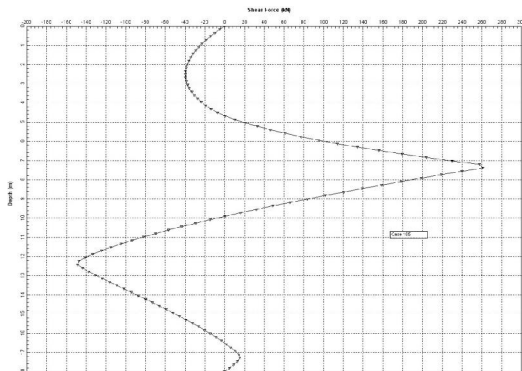
figure 4- shear force of pile under lateral load by using finite equation inputs

3-2- Study of pile behavior by FLAC software

3-2-1- study of axial force, bending moment and shear force in two pile with different elasticity modules and in maximum increase of stability coefficient

One of the parameters that can be effective on the pile force in soil slope is elasticity module of pile. So two pile with same properties but with main difference in elasticity module ($E_1 = 10 \times E2 = 2 \times 10^8 Kpa$) were studied in slope with angle=30 degree and in position with 80% of slope distance from toe. Other geometry and geotechnical properties of soil and pile were same.
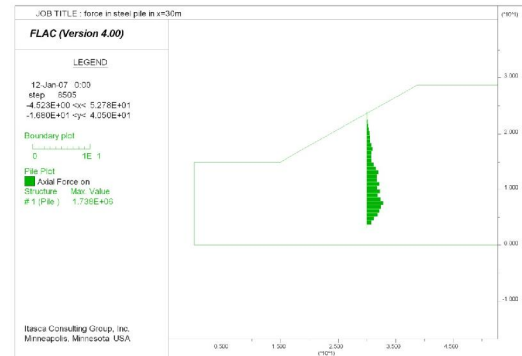
Figure 5- axial force in pile I, maximum value is 1738 KN
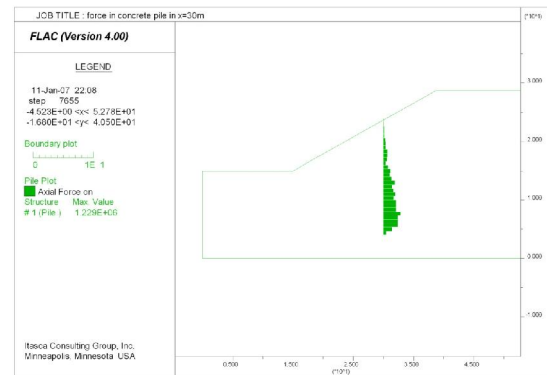
Figure 6- axial force in pile II, maximum value is 1229 KN
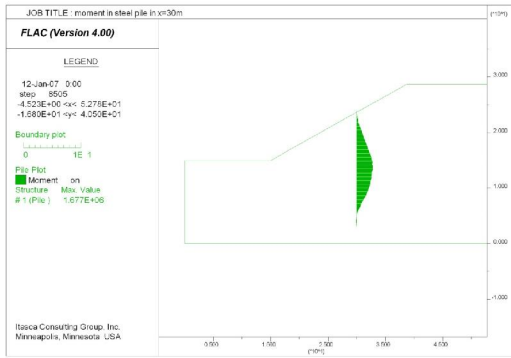
Figure7- bending moment in pile I, maximum value is 1677 KN-m

Figure 8-bending moment in pile II, maximum value is 1596 KN-m

Figure 9-shear force in pile I, maximum value is 297 KN

Figure 10-shear force in pile II, maximum value is 43 KN

Following diagrams were obtained for shear and moment from output of FLAC software.

Figure 11-bending moment in pile under lateral load by using FLAC input
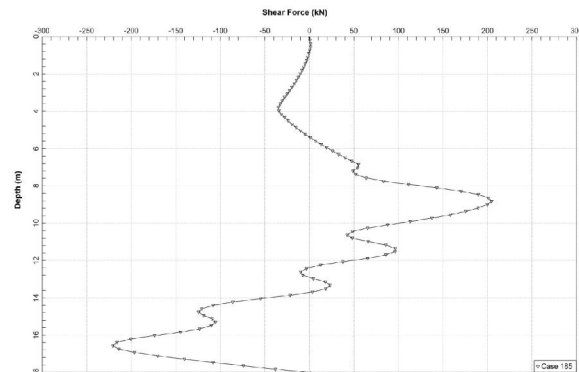
Figure 12-shear force in pile under lateral load by using FLAC input
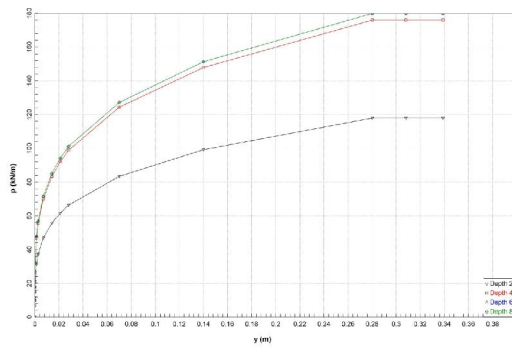
Figure 13- P-Y curve for pile under lateral load

3-2-2- comparison of forces in pile with different elasticity modules and in different distance from slope heel

Change of axial force, shear, bending moment and displacement according distance from toe is presented in Fig (14-17).
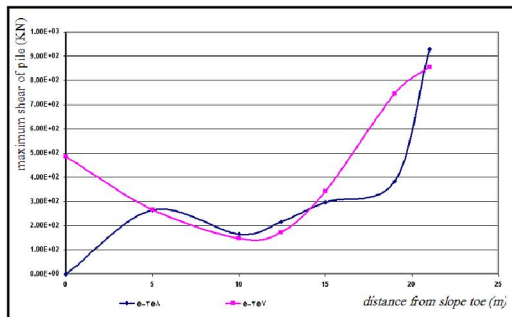
Figure14- comparison of maximum shear of pile in two pile with different elasticity modules and in different distance from slope heel
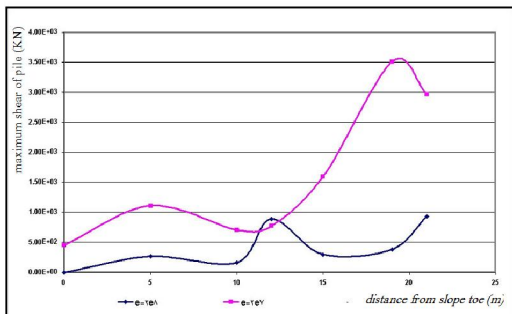
Figure15- comparison of maximum moment of pile in two pile with different elasticity modules and in different distance from slope heel
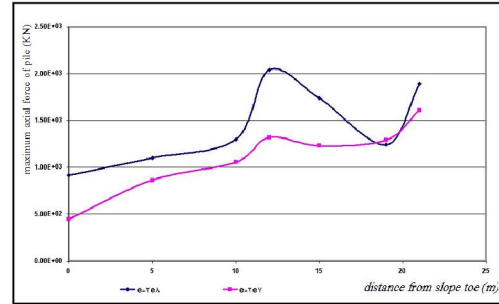
Figure 16-comparison of maximum axial force of pile in two pile with different elasticity modules and in different distance from slope heel
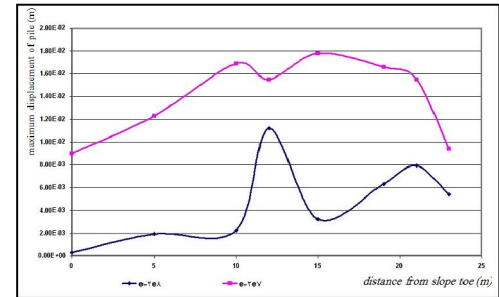
Figure 17-comparison of maximum displacement of pile in two pile with different elasticity modules and in different distance from slope toe

As shown in Figures, with locating of pile in 80-85 percent of slope heel, safety coefficient is increased largely and maximum shear and moment are bigger value in this zone. Also maximum moment in pile with lower elasticity module is strongly bigger than pile with higher elasticity module. This point is correct in maximum displacement and shear.

3-2- Study of pile behavior in soil trench by using wrote program on the base of finite equation of Matsui & Ito (1975)

this equation calculate pile force by using of geometry and geotechnical inputs such as internal friction angle, coherence, specific gravity, pile diagonal, distance of piles (ax to ax) and pile height. This equation is solved on the based of table 2 information.

Table 2- input of program on the base of Ito & Matsui (1975)[13] equation

	Soil 1	Soil 2
Unit weight(KN/m^3)	19.8	19.2
Cohesion(KN/m^2)	10	40
Internal friction angle	20	0
Pile diameter	0.5	0.5
Distance of pile (m)	2	2
Pile height in slip circle(m)	8	8

Results of program for determination of lateral load on the pile are in the following figures:
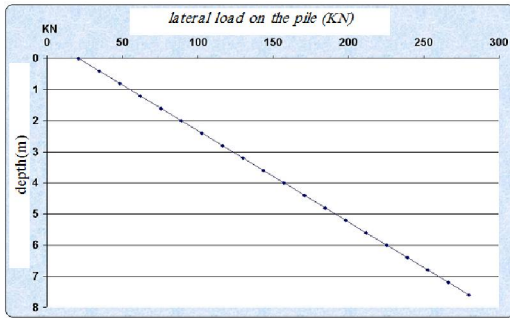
Fig 18- lateral load on the pile with soil 1 by using of Ito & Matsui (1975)equation
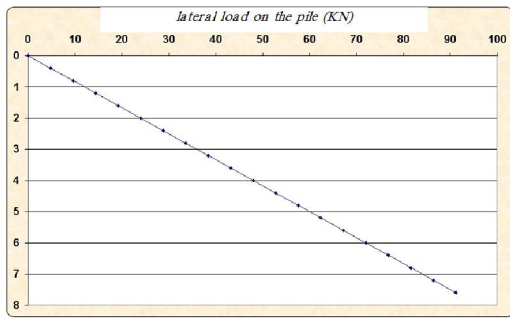
Fig 19- lateral load on the pile with soil 2 by using of Ito & Matsui (1975) equation

This equation can be used only to infinite slops and don't consider other significant parameters such as location of pile in slope, elasticity module of pile and angle of slope on the lateral load of pile.

4- Results

In comparison of finite equation methods on the base of Ito & Matsui formula, displacement-force curves method with using of LPILE software and FLAC as finite element software, it can be seen obviously that two initial method don't consider

significant parameters on determination of lateral load of pile. According to figures of FLAC software modeling, location of pile in the slope and elasticity module has significant effect on the forces and bending moment of pile.

By downward movement of soil, significant axial force is load to pile specially in top part of slope. With attention to strength of pile in axial force bearing, it hasn't determinant role in pile design, but if there is vertical load on the pile, this force should be considered in calculations.

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11/12/2012

The Study of Bank Erosion in Kashkan River Meanders

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Abstract: Kashkan River is an important branch of Karkheh River. The water basin of this river up to Poledokhtar station is 9400 km[2]. After passing 270 km and confluence with Seymareh River at western south of Poledokhtar city, the river (which is now called Karkheh River) flows toward Karkheh Dam. This river due to its morphological characteristics includes various meandering and braiding reaches. Bank erosion at the meanders damages valuable agricultural lands and aggravates the danger of floods. The knowledge of the river behavior is useful for its training. To study the periodic changes of the river plan form, topographic maps and satellite photos were compared together and field inspections accomplished. For determining the meanders characteristics and their development rates, numerous field inspections were done and satellite photos used. On the basis of geometric characteristics of the meanders and using empirical relations, the rates of bank erosion at critical reaches were predicted and some technical ideas suggested.

Keywords: Meander-Bank Erosion-Kashkan-River

Introduction

Problems recognition of rivers meander erosion causes better remedy for protecting against their risks and damages. Problems such as land demolition in river behavior and sediment accumulation behind the dams are some of the aftermaths of bank erosion in meandering rivers. Kashkan River meander causes removing the valuable agricultural lands, and also causes increasing the flood risk, side structures are also at risk. Finally, farming efficiency fall could increase the villagers immigrations rate. Due to national planning, Kashkan meander problems are studied priorities about water. In figure 1, Kashkan basin and sub-basin and in figure 2, its hydrography network in Lorestan Province is shown.
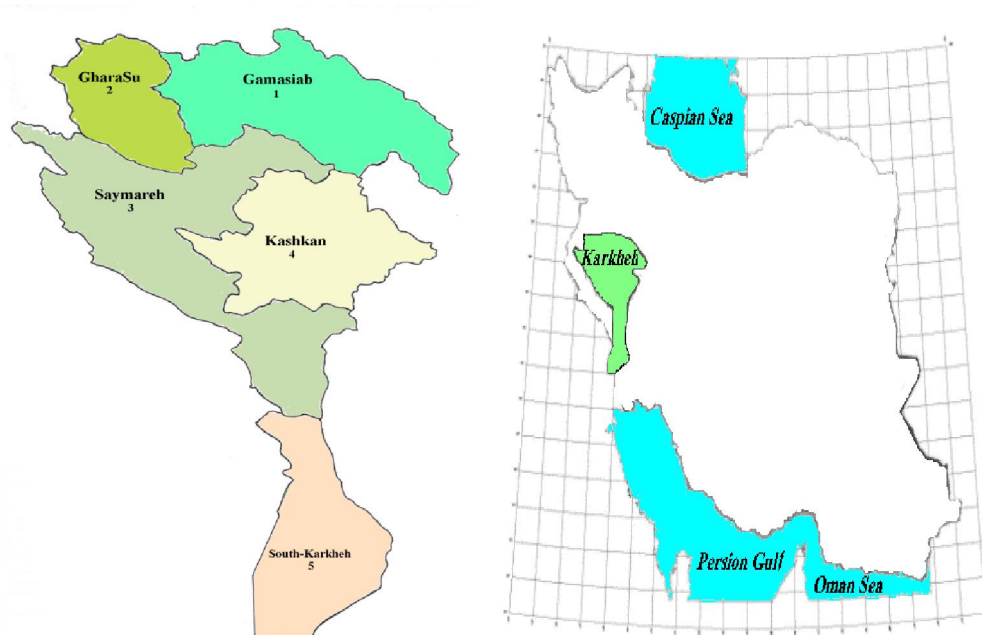
Figure 1- Karkheh basin and its Kashkan sub-basin
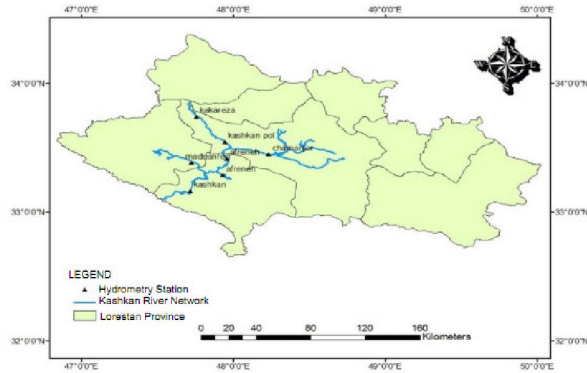
Figure 2 – Kashkan hydrography network in Lorestan Province
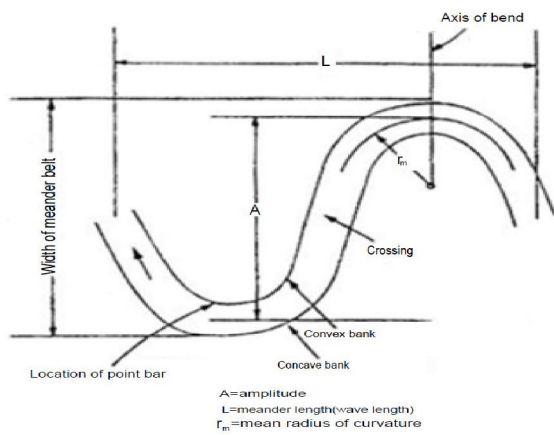
A = dW^n

$A = 2.7 \ W^{1.1}$

Where, w is width of meander belt, A is amplitude; n and d are fixed coefficients. Relationship 2 is used in English system. The different extensional forms of meander loops are shown in figure 4.
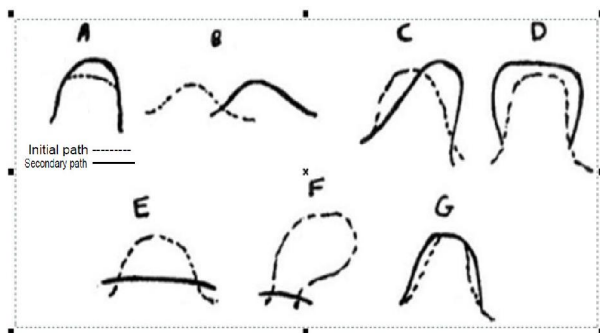
/E=Chute-cutoff/F= Neck-cutoff/G= Lateral extension =Translation/C= Rotation /D= Conversion B / A=Extension

Figure 4- different extensional forms of meander loops

Figure 3 –geometric characteristics of a meander bow

Meander Geometric Characteristics

Leopold has presented figure 3 to show the characteristics of a meander loop parameters including curvature radius(R), river width (B), meander wave length (L), amplitude (A) and other geometric characteristics. Central angle is an important parameter which is studied in the meandering rivers.

The angle of two rays of both sides of a bend is called central angle.Using the central angle, Kornise (1980) has suggested a quantitative-based division in order to categorize the level of 'being meander' in alluvial rivers. It is shown in table 1.

Table 1- Quantitative-based division of alluivial rivers

Central angle(degree)	River Morphology
–	straight river
< 41	Semi Meander river
41 – 85	Undeveloped Meander river
85 – 158	developed Meander river
185 – 296	More Developed Meander-like river
More than 296	River Ox-bow

Meander Geometric Relations

Friedkin and Leopold have presented the Meander Geometric Relations as followed in the relationships 1 and 2 respectively.

(1)

(2)

Materials and Methods

Using of sat pictures (ETM) and comparing with its maps of 1958 of mapping organization of Iran, the changing of the river path process was studied, that is explained below.

First, maps 1: 50000 were scanned and special points coordinates exchanged to metric coordinates. Then, the river path was determined and digitized and kept to compare with previous pictures in a separated file. Regarding that pictures should be matched with maps, pictures coordinates correcting based on that maps was conducted. Considering that in some cases it is require knowing the distance and area or perimeter they converted to the UTM coordinate upon which the essential measurement could be done.to do this, zone position should be determined firstly, then the proper projection system taken. An elliptical (Clarc 1880) and (WGS 84) have been taken. The latitude level that has been taken is the free level of Oman Sea and then using softwares as GIS Ilwis and Arc info the special points with certain coordinate have been converted to the UTM coordinate system and this coordinate has been

delivered to the both of the topographic maps and sat photos. to better specify the river path and to make photos more clear, color composites know as false color composite was used that the best composites which specify the river path area, by trial and error was among 1, 3, 4 ETM and 1, 5, 7 ETM bands (figure 5-

left and 5-right respectively) which after making color composition of bands and adding related layer to the map that has been obtained by digitizing 1:50000 maps, we can observe the changes in river plan. Of course this overlapping of river plan has causes some errors that it has been tried to minimize them.
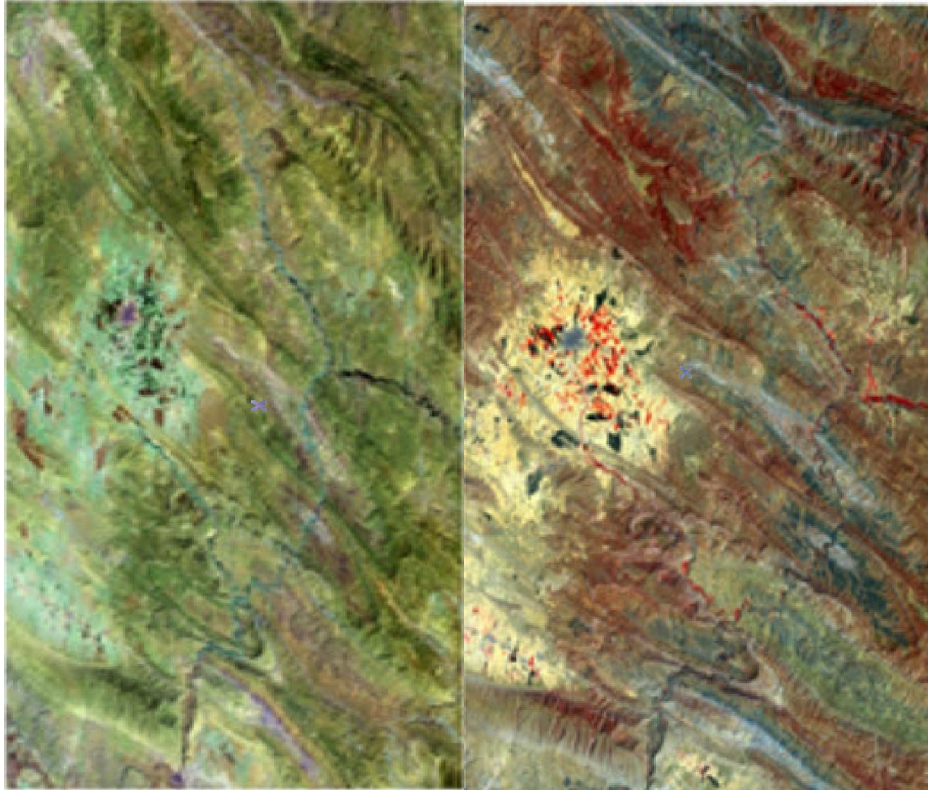
Figure 5- the combination of bands (left: 1, 3, 4 ETM) and (right: 1, 5, 7 ETM)

The taken reach to compare two plans should has following conditions.

1. It should be suited on an alluvium area, since at a rocky and mountainous area the displacement and change in the rivers plan path mainly occur as a result of tectonic processes and bank erosion by river stream has minor role.

2. On the map, both in the old and new plans of the river there should be two specific right and left bank. In other word, the river width should be specified. Because if the river path on the map is only a single curve, considering the scale of 1:50000 maps that is one millimeter on the map is equals 50 meter on the field and taking eye's error into consideration, determining the displacement rate will be accompanied with error or even obvious mistake.

3. There wouldn't be errors caused by matching river's old and new paths as a result of gathering sat photos.

The reach to predict the bank erosion that is obtained from sat photos should has the following conditions:

- It should be located at an alluvium area because in a rocky or mountainous area the bank erosion by the river stream has minor role.
- Comparing the old and new plans of rivers it should be specified that the reach would be erosive and it underwent more erosion than other ones.
- It should have two successive meander loops with a specified width of meander belt.
- Observations had been done of the river and regarding the nature of the work, it had been tried to visit the river whenever the stream decreases relatively. As in this position the alternate bars, point bars and the bed erosion pattern are specified more and better and the mutual effects of the river hydraulic and its plan geometry can be easily evaluated.

Finally, six regions include Cham palk, Golhu Solfa, Khatereh, Charkhestaneh, Dooab and Dule bozorg were selected to predict their bank erosion.

Also, a reach of the river with 108 kilometer length was considered to measure the geometrical characteristics such as arc radius and arc length, finally considering central angles of each meander loop, its situation in present can be specified. The maximum loop extension till its stabilization can be predicted (Leopold and Wolman, 1960). The calculation sample for the meander in the Cham palk area (Figure 6 & 7) is as following:

Width of meander belt (W) = 550 m, A =$2.7W^{1.1}$, A=10309.2ft=3143 m

"A" is the amplitude of the meander (Figure3) in the stable position.

The maximum value that river should advance to stabilize naturally=A-W=

3143-550=2593 m,

Hence, the maximum value that river should advance to stabilize naturally, from every side = 2593/2=1296.5 m.

Results

Figure 8 shows the central angle of the meander loops. Figure 9 shows the frequency percent of meander Progress at the studying area.at present among 49 studying loops in a reach by 108 kilometer length between Varpol and Teimurabad regions, 6 percent of loops have not been developed. In other word, in this reach, the river meanders have much potential to develop. In Charkhestaneh area the river takes a wide braided pattern. Also in a reach of the river's path in Cham palk area this state is seen. At Kashkan bridge because of the decrease in speed and sedimentation the river has an island (braided) pattern. The ox-bow pattern is seen in Golhu sofla region.
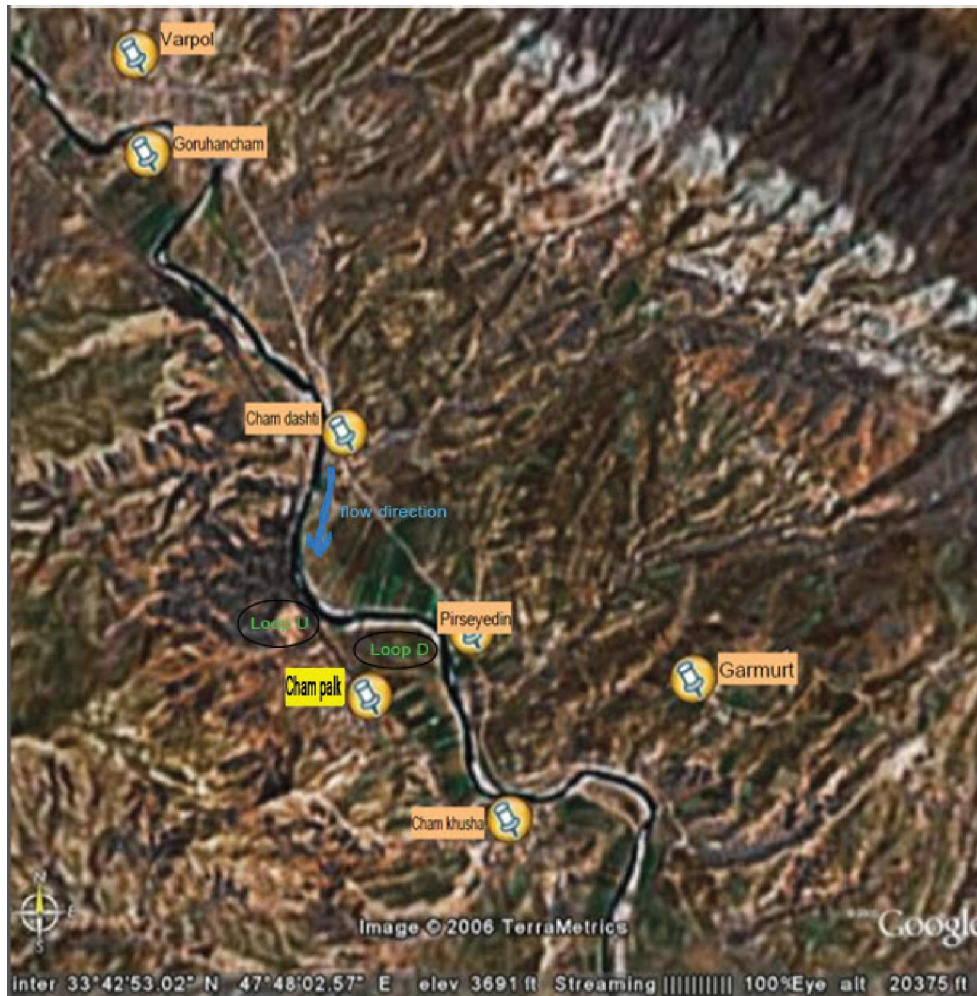
Figure 6: Loops U (upstream) and D (downstream) in Cham palk area

Figure 7: Loops U (upstream) and D (downstream) in Cham palk area
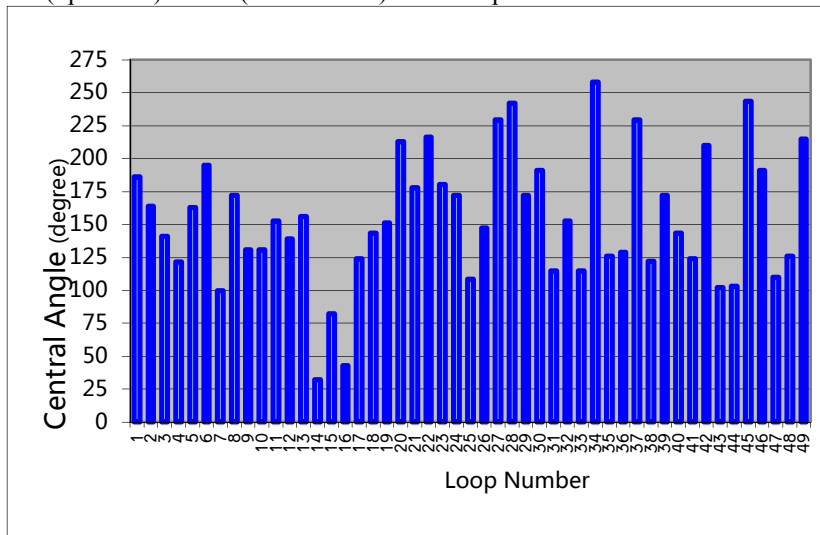
Figure 8: Central angle in erosive loops of the Kashkan River
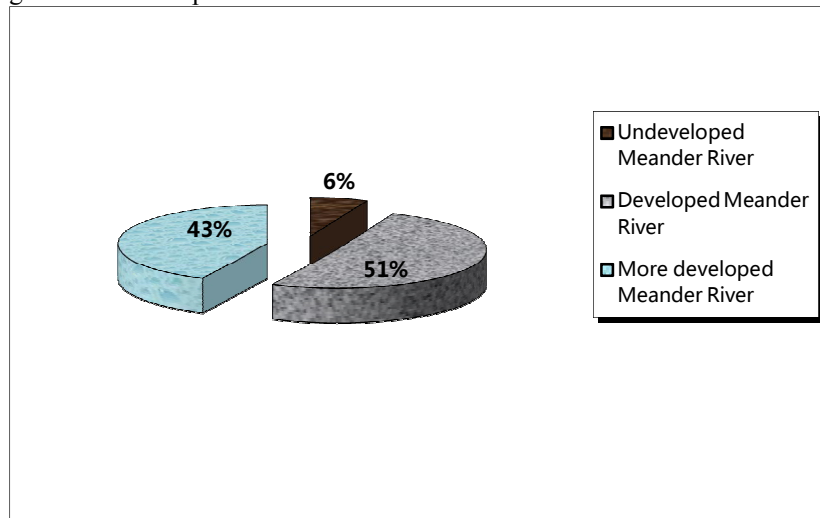
Figure 9: Frequency percent of the meandering progress in the erosive loops of the Kashkan River.

Conclusion

Kashkan River since 1958 that related maps are available has undergone bank erosion in its flood plain reach. This erosion in some regions is more and in others is less. In meander bends the rate of erosion is more than other parts that have weaker curvature. The maximum erosion has occurred in the distance between Khatereh and Amirabad regions such that in Charkhestaneh the displacement of river's plan has occurred about 260 meters. The river also has altered its pattern in this area because of the enormous erosion and it takes a braided pattern. At the downstream of the Kashkan Bridge also plan displacement is seen about 150 meters. The river at the distance between Cham khusha and Golhu sofla has less displacement than Khatereh and Amirabad region. In this reach, river displacement is up to 56 meter.

Based on calculating, it is predicted that on the average the river will advance from every sides in Golhu sofla and at the upper area of the Cham palk 1297 meter (Figures 7&8) to stabilize naturally. The river may have less distance to the stability point at the reachs which had extreme erosion in the past than other reachs. Also it is possible that the river will be more erosive at the reachs which had relatively less erosion to reach its stable point. As an example for the first state it can point to the Charkhestaneh region and for the second one to the Cham palk. But just because the river had less erosion in the past it can't be certain that it will be more erosive in future to reach its stability. Meander loops geometry and obviously width of meander belt are determinant, for example it can point to the Golhu sofla area.

Floods at the year of 2005-2006 a wide range of the precious lands at Charkhestaneh area had been vanished that if the river right bank in this section and close to the village semi-deep well will not be stable, we will see this event again in future.

Generally, the river needs bank stability and engineering practices from Cham palk and Cham dashti to Kashkan-bridge upstream in order to protect agricultural lands. But this doesn't mean to not requiring this in other reachs of the river but because in the mentioned reachs border there are more lands it has more priority.

For the future researches the followings are recommended:

1. The river physical model at erosive intervals can be prepared and doing experiments on the model to complete results.

2. One good solution to study the bank erosion rate of the river during various times is to signify the river bank and following erosion trend through this way. Doing this together with on-time visiting, even the effects of the stream fluctuations and flood streams on the meander extension can be examined.

3. Sampling of the bed (bottom and sides) materials and their gradation analysis can made other results about erosion in the meanders.

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2012/12/11

The Right of Saudi Women to Sign for their Health Care in Saudi Arabia, Fact and Fiction

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Abstract: Background and Objectives: The Islamic Sharia Law support Women's Health Rights and the basic law of Saudi Arabia declares that "The state takes care of health issues and provides health care for every citizen". There is an assumption and misconception that Saudi women must obtain permission from their legal guardian before they can obtain medical care and sign for treatment and surgery. The objective of this study is to identify the facts of the right of Saudi women to consent for their own surgical health care among patients with breast cancer. **Methods:** A retrospective chart review study was carried out between the period 2008-2011 at King Abdulaziz University Hospital. The questionnaire reviewed the treatment modalities (surgery, chemotherapy, radiotherapy and diagnostic radiology), type of surgery procedure (lumpectomy, mastectomy, reconstructive surgery and others), age of patients and who did sign the consent form for surgery. **Results:** Total consents taken were 1015 (the same patient may have had more than one consent forms). Among them 201 (19.9%) were consents for surgery, 581 (57.2) were consents for agreeing to chemotherapy, 25 (2.5%) were for radiotherapy and 208 (20.4) were consents for diagnostic radiology procedures. Out of the (201) consents for surgical procedures 81 (40.4%) were for lumpectomy, 100 (49.7%) were for mastectomy and only 1 (0.5%) consent was for reconstructive surgery. Other minor procedures consents constituted 19 (9.4%). Most of the studied patients were in the age range (40-49) and (50-59) representing more than 50% of the studied cancer patients. Regarding the person who signed the consent, he is the patient himself 71% among age group (20-29), 67% among (30-39), 85% among (40-49) and 93% among (50-59). After that the consent is signed by the guardian. No significant difference between age group and relationship between person who signed the consent (P>0.05). **Conclusions:** Women in Saudi Arabia have the right by Sharia law i.e. values of Islamic Law and by rules of Ministry of Health to take decisions and sign for themselves. Yet there is still need to empower women and health care providers with more information and knowledge in this context to avoid fatal consequences.

Keywords: Health rights, surgical consent form, Saudi women, Breast cancer.

1. Introduction

Islamic Shariah law and values of the Islamic Law stress the right to health. Further, international treaties and declarations have paid special concern to the right of health care. In the basic Law of Saudi Arabia, the right to health care is referred to in Article 31. which declares that, "The state takes care of health issues and provides health care for every citizen" 1.

There is an assumption and claims that the right to health is not fully supported in Saudi Arabia. Concern for this can be seen in (The Convention on the Elimination of all Forms of Discrimination against Women) CEDAW Committee Report of April 2008. "The committee expressed concern about the lack of information and data on health problems and expressed concern that women may require permission of their male guardian to access health facilities". 2.

A particular misconception is that Saudi women for social and different reasons must obtain permission from the man who is their legal guardian (the father, husband or son of the woman) before women can obtain medical care.3, 4.

The objective of this study is to examine the myth and identify the facts of the right of Saudi women to consent for their own medical and surgical health care. It was carried out among patients with breast cancer.

2. Material and Methods:

This retrospective chart review study was carried out for the period between 2008-2011 at King Abdulaziz University Hospital. The study was approved by the Biomedical Research Ethical Committee at the Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia. Medical records of breast cancer patients were reviewed. The consent forms were reviewed for the following

treatment modalities (surgery, chemotherapy, radiotherapy and diagnostic radiology), type of surgery procedure (lumpectomy, mastectomy, reconstructive surgery, and others), age of patients and who did sign the consent form).

3. Results:

Total consents taken were 1015 (the same patient may have had more than one consent forms). Among them 201 (19.9%) were consents for surgery, 581 (57.2) were consents for agreeing to chemotherapy, 25 (2.5%) were for radiotherapy and 208 (20.4) were consents for diagnostic radiology procedures. See Table 1.

Out of the (201) consents for surgical procedures 81 (40.4%) were for lumpectomy, 100 (49.7%) were for mastectomy and only 1 (0.5%) consent was for reconstructive surgery. Other minor procedures consents constituted 19 (9.4%). See Table 2

Table 3 showed surgical consent of the studied patients with breast cancer according to age group, marital status and relationship to patient. The total number of patients consent form was 129. Most of the studied patients were in the age range (40-49) and (50-59) representing more than 50% of the studied cancer patients. Regarding the person who signed the consent, he is the patient himself 71% among age group (20-29), 67% among (30-39), 85% among (40-49) and 93% among (50-59). After that the consent is signed by the guardian. No significant difference between age group and relationship between person who signed the consent (P>0.05).

Table 1: Distribution of the consent of Breast Cancer Patient at King Abdulaziz University Hospital (2008-2011)

Number of Patients	164	
Number of Consent forms	1015	
Consent related to	n	(%)
Surgery	201	(19.9)
Chemotherapy	581	(57.2)
Radiotherapy	25	(2.5)
Diagnostic Radiology	208	(20.4)

*Patient may have more than one consent.

Table (2): Types of Surgical Procedure (n=201) for Patients with Breast Cancer at King Abdulaziz University Hospital (2008-2011)

Surgery Procedure	Number	Percentage
Lumpectomy	81	40.4
Mastectomy	100	49.8
Reconstructive(Plastic)	1	0.4
Other Surgery		
• Breast Mass Localization	19	9.4
• Breast Quader-ectomy	11	5.3
• Breast Abscess	1	0.5
• Chest Wall Scrooma for radical excision	1	0.5
• Remove Tumor in chest wall	1	0.5
• Re-excision of recumbent malignant nodules over post mastectomy	1	0.5
• Drain &re-suturing breast	1	0.5
• Axillaries Lymph Node Dissection	1	0.5
	2	1
Total procedure	201	100

Table (3) Consent according to Age, Marital Status and Relation to patient (Per Patient):

Age	Total Number	Married /Non Married	Signature By		Relationship to Patient			
			Patient	Guardian	Husband	Father	Son	Other
20-29	7(5,4%)	3/4	5 (71.42%)	2(28.57%)	2(100%)			
30-39	21(16.27%)	12/6	14(66.66%)	7(33.33%)	2 (20.57%)	1(14.28%)	1(14.28%)	3(42.85%)
40-49	35(27.13%)	27/8	30(85.71%)	5(14.28%)	1 (20%)		3(60%)	1(20%)
50-59	29(22.48%)	21/4 (2)	27(93.10%)	2(6.89%)	2(100%)			
60-69	23(17.82%)	19/4	18(78.26%)	5(21.73%)	2(40%)		1(20%)	2(40%)
70-79	10(7.75%)	10/0	4(40%)	6(60%)			5(83.33%)	1(16.66%)
80-89	1(0.77%)	1/0		1(100%)	1(100%)			
90-100	1(0.77%)	1/0		1(100%)	1(100%)			
No age	2(1.55%)	1/1		2(100%)	1(50%)		1(50%)	
Total	129		98(75.96%)	31(27.03%)	9(29.03%)	1(.8%)	13(10.2%)	7(5.4%)

4. Discussion:

There is a misconception that women in Saudi Arabia are still treated as "Perpetual Minors" and need their male guardian's permission to access health care facilities. Similarly, it is believed that some health sectors believe that women are not allowed to consent for themselves for medical and/or surgical procedures. (2)

When we studied the consent forms for patients who underwent surgery for breast cancer during the period from 2008 to 2011 who had surgery in the form of lumpectomy and mastectomy which represent the procedure that took place in 40.4% and 49.8% of the studied cases, reviewing the consent forms shows that majority of cases were signed by patients herself in 85% and 93% for the age groups (40-49) and (50- 59) respectively which shows the actual practice in our hospital.

The rest were signed by the guardian which means some still do not consent for themselves . There was no significant difference between the age group and relationship between the person who signed the consent.

The misconception about women's right to consent comes from the ignorance among some women and some doctors and their resulting beliefs that women have no right to give consent for medical procedures necessary for the women.

Frequently, when invasive medical procedures are necessary for the management of diseases affecting a woman, a male "guardian" is sought to sign the consent form.

This may be the case in some hospitals, where some require a guardian's permission before women are admitted, or are allowed to consent to medical procedures for themselves or their children. A guardian may also be consulted before the woman is discharged.

In fact, such a concept is unfounded and can be dangerous.

That it might be dangerous was illustrated by two cases in 1984. The first one was "Fatal rupture of uterus because a husband refused consent for caesarean section for his wife in obstructed labor" and "Delay of urgent hemodialysis for 7h waiting for a husband to give consent for the procedure".

This was the time when this problem came to the front desk of officials in Saudi Arabia and the following was stressed upon .

In Islamic Law: "a mature mentally sound woman has the full right to accept or refuse any medical procedure offered to her, and she does not need the approval of her husband, son, father or brother before giving such consent." The Ministerial Resolution implementing the Regulations on the Practice of Medicine and Dentistry of the Royal Decree M/3 of 2 October 1988 states that "In accordance with the stipulations contained in Royal Circular No. 4/2428/M dated 29.7.1404H based on resolution no. 119 dated 26.5.1404H (27 February 1984) rendered by the Committee of Senior Ulema, prior to delivering medical treatment or carrying out an operative procedure, the legally competent patient's consent, be he/she male or female, shall be obtained. In cases where the patient's judgment is obscured, the consent of the patient's representative shall be obtained. In addition, the doctor must give the patient or the guardian all the information on the treatment or operation that he intends performing. (5)

In many Muslim countries the family plays a major role in decision making and sometimes, the decision can easily be delegated to the father or doctor as they think they know better.(6)

Unfortunately, until now there are some doctors who ignore, deny or do not recognize the right of women to consent for treatment; in these cases the doctors contacted the guardian of the patient (generally the husband or a brother) so that he could sign the form of informed consent. (7)

Recently there was a circulation from Ministry of Health no. 11/26/84484 on 14th February 2012 to all health care sectors emphasizing that the above regulation should be adhered to and reconfirming that a female has the right to consent for medical and surgical procedures even for caesarean sections, the only exception is for hysterectomy or tubal ligation as these major decisions concerning reproduction should be taken by both husband and wife.(8)

Women do not know, recognize or understand their health rights, therefore education and empowerment of women as well as health care providers and future professionals with knowledge and education about existent Law and Ministry of health rules and regulations is mandatory. Basic education in human rights and women's health rights will empower women more to get involved directly in decision that are affecting their lives .

As this is a retrospective study it was not possible to determine reasons behind not taking consent from the patient herself in the group that consent was taken from the male guardian which was a small group. This presents a limitation to this study and we are currently running a large multicenter prospective study to determine this in details.

In conclusion, women in Saudi Arabia have the right by Sharia law i.e. values of Islamic Law and by rules of Ministry of Health to take decisions and sign for themselves. This clarifies the misconception that is wrongly taken against women's health rights in Saudi Arabia. Yet there is still need to empower women

and health care providers with more information and knowledge in this context to avoid fatal consequences and to avoid myths and misconception about Islamic rules and Sharia.

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11/11/2012

Evaluation of some Plant Growth Promoting Rhizobacteria (PGPR) to Control *Pythium aphanidermatum* in Cucumber Plants

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Abstract: Twenty isolates of bacteria were successfully isolated from rhizosphere soil samples collected from different plant species growing at various locations in North Jeddah, Saudi Arabia to investigate their effects on *Cucumis sativus* L. cv. Marketmore growth and damping-off disease caused by *Pythium aphanidermatum*. The results of dual culture method showed that only three isolates out of twenty, which have a great antagonistic effect on the growth of *P. aphanidermatum* referring to inhibition index. The selected isolates were identified in two genera with three species as *Bacillus subtilis, B. amyloliquefaciens* and *Pseudomonas aeruginosa,* that causing inhibition in fungal growth by rate 38.1±3.8, 66±5.0 and 78.1±6.8%, respectively. Under greenhouse condition, the efficacy of different treatments with bacterial isolates and their possible combination were recorded a varied significant effect to suppress damping off symptoms caused by *P. aphanidermatum*. All treatments with the isolates of PGPR were recorded growth promoting effect in the absence of pathogenic fungus comparing with untreated plant. The best result in plant height, stem length, plant fresh and dry weight were recorded in treatment with *B. subtilis* (23.7±1.04 cm, 13.5±0.87 cm 0.62±0.02 g and 0.033±0.007 g), flowed by *P. aeruginosa* (19.3±1.15 cm, 9.00±1.0 cm, 0.61±0.07 g, 0.029±0.002 g) then *B. amyloliquefaciens* (17.0±1.30 cm, 8.97±0.90 cm, 0.53±0.01 g, 0.031±0.004 g). On contrast, all seeds were completely dead, when treated with *P. aphanidermatum* individually or in combination with PGPR isolates except two treatments, which used *B. amyloliquefaciens* and *P. aeruginosa* for coating seeds. Consequently, these two isolates have the potential not only to protect cucumber seedling against *P. aphanidermatum* infection but also to improve the plant growth parameters.

1. Introduction

Cucumber plants (*Cucumis sativus* L.) are one of the main greenhouse crops widely grown in Saudi Arabia. The total planting area for cucumber production decreased from 3636 hectares in 2006 to 3149 hectares in 2010, and production decreased from 242004 ton in 2006 to 220978 ton. Among all vegetable produced in greenhouse, cucumber production area decreased from 3.2% to 2.8% and yield decreased from 9.2% to 8.7%, respectively (Ministry of Agriculture, 2011).

One of the major factors inhibits growth and yield of cucumber is damping-off caused by *Pythium* species. In most cases Pre- and post-emergence damping-off in cucumber is caused by *Pythium aphanidermatum* and other *Pythium* spp. (Abbasi and Lazarovits, 2006). In major *Pythium* can result economic losses in both greenhouse and field production systems under favorable conditions for disease development (Georgakopoulos *et al.* 2002; Abbasi and Lazarovits, 2006). The damage effects causing by *Pythium* spp. can increase in the association with some plant-parasitic nematode (*Meloidogyne incognita),* which known as complex diseases that can cause highly significant losses to field and greenhouse grown cucumbers and other cucurbits (Zitter *et al.* 1996; Koening *et al.* 1999). They are ubiquitous in soil and in water, distributed worldwide, and with very diverse host ranges. *Pythium* species include some of the most important and destructive plant pathogens, causing losses of seeds, pre-emergence and post-emergence damping-off. In addition to causing rots of seedlings, roots, or basal stalks, decays of fruits and vegetables during cultivation, storage, transit or at the market and serious damages of a wide variety of crops in KSA (Yu and Ma, 1989; Al-Sheikh, 2010).

The part of problem can effectively be solved by the use of chemical fungicides. However the indiscriminate use of chemical fungicides is not recommended for the management of plant diseases because of their collateral adverse effects on the environment, along with negative effects on animal and human health. Moreover, their efficacy has been reduced by the appearance of microbial resistance (Sanders, 1984; Cook and Zhang, 1985) and their

detrimental effect on the biological nitrogen fixation by rhizobia (Altier and Pastorini, 1988).

Many studies are interest in biological control by beneficial microorganisms (Moussa, 2002; Kim *et al.* 2008a, b, 2009; An *et al.* 2010; Sang *et al.* 2011) or composts (Sang *et al.* 2010; Sang and Kim, 2011) has increased consistently as an alternative disease control to substitute for various hazardous chemical controls against airborne or soil borne plant pathogens (Lamour and Hausbeck, 2000; Kim *et al.* 2008c; Kim and Kim, 2009). In this regard some rhizobacterial isolates were isolated from root surface or interior, which known as beneficial microorganisms and have been utilized as bio-control agents. These beneficial bacteria have the ability to colonize rhizosphere or plant roots and/or to produce secondary metabolites including antibiotics, extracellular enzymes, hydrogen cyanide (HCN), siderophores, and phytohormones (Kamilova *et al.* 2005; Kim *et al.* 2009).

The objectives of this study was established to isolate some bacteria with antagonistic activity against *Pythium aphanidermatum* for potential use as biocontrol agents, investigation of the effect of selected bacteria on *Pythium* damping-off control and finally, providing information valuable for use in integrated programs for damping-off management in KSA.

2. Material and Methods
2.1. Isolation and purification of bacteria

One gram of dry soil sample was added to 100 ml of nutrient broth medium (pH 6.6-7.0) in 125-ml Erlenmeyer flask. The mixture was shaken for 3 min and incubated for 6 hrs at 25±1ºC. Then loopfull's of the resulting suspension were streaked into plates of nutrient agar medium plates and allowed to grow. Colonies that were formed after incubation at 30ºC were selected and streaked again on N-agar medium to obtain pure cultures. All isolates were maintained on nutrient agar slants at 4ºC for the further experiments. Bacteria were purified through the single colony technique used for isolation and purification of the bacterial culture (Salle, 1954). The isolated bacteria were identified according to Bergey's Manual of Determinative Bacteriology (George, 2005) based on the characters such as morphology, physiology and nutritional, cultural characteristics and biochemical tests.

2.2. Agar plate-based fungal inhibition assays

Bacterial strains were tested for pathogen inhibition on potato dextrose agar (PDA). *Pythium aphanidermatum* was maintained on 1x PDA. For inhibition assays, a 5 mm-diameter agar plug of a 7-day-old culture of the pathogen was transferred to 1

cm from the edge of a plate of 1/4 x PDA and incubated at 23± 2 °C in darkness. After 24 hrs, 5 µl from an exponentially growing bacterial culture at optical density 600 of 0.1 was spotted 1 cm from the other edge of the 1/4 x PDA plate. The inhibition index was defined as:-

$$\text{Inhibition index} = [y \div (x + y)] * 100$$

Where "y" is the distance between the leading edge of the fungus and the edge of the bacterial colony, and "x" is distance between the leading edge of the fungus and the center of the agar plug (McSpadden and Weller, 2001). Assays were conducted three times, with each strain replicated twice in each assay.

2.3. Greenhouse experiment
2.3.1. Preparation of pathogenic inoculums:

An aggressive isolate of *Pythium aphanidermatum* was kindly supplied from Microbiology Lab., National Research Center (NRC), Egypt. The isolate was cultivated on autoclaved barley grains for 7 days at 21±2°C. The fungal inoculum was calculated based on the number of fungal propagules (FP) present in 1 g inoculum (1.3×10^7 g^{-1} inoculum).

2.3.2. Inoculation and experimental design:

Five seeds of *Cucumis sativus* L. cv. Marketmore were planted in plastic bags containing 500 g of sterilized soil (pH 6.7 the soil had 33.4 mg kg^{-1} extractable N, 6.2 mg kg^{-1} extractable P, and 44.6 mg kg^{-1} extractable K). Sixteen treatments with three replicates were used as follows: 1- Soil was infested with phytopathogenic fungus (*Pythium aphanidermatum)* before planting time by rate 1.3×10^7 FP g^{-1} soil. 2- Seeds of *Cucumis sativus* L. cv. Marketmore were coated by using 1 ml from pure culture for the different three isolate of PGPR (separately) by rate 3.6×10^6, 1.2×10^6 and 2.4×10^6 CFU ml^{-1} to *Bacillus subtilis*, *B. amyloliquefaciens* and *Pseudomonas aeruginosa*, respectively. 3- Seeds were treated with different possible combination between the three bacterial isolates (*B. subtilis, B. amyloliquefaciens* and *P. aeruginosa*) by the same rate. 4- Seeds were planted in the presence of pathogenic fungus and antagonistic bacteria as described in previous steps (2 and 3). 5-Seeds were planted free from any treatments including microorganisms (non-infested control).

Seed germination and seedlings were check daily to determine plant survival and recording any changes in seedling. At the end of the experiment (14 days) plants were removed from the soil then plant growth parameters were determined. As well as final

germination percent (FGP) (ISTA, 1993; 1999) was calculated based on the following equation:-

$$FGP = \frac{\text{Number of germinating seeds}}{\text{Total Numbeer Of seeds}} \times 100$$

Mean daily germination (MDG) was calculated according to the following equation (Moradi *et al.* 2008):-

$$MDG = \frac{FGP}{d}$$

Where "d" are the days to the maximum of final germination.

The germination index (GI) was calculated as described in the Association of Official Seed Analysts (AOSA, 1983) by following formula:-

$$GI = \frac{\text{No. of germinated seed}}{\text{Days of first count}} + - - + \frac{\text{No. of germinated seed}}{\text{Days of final count}}$$

The infection index (II) was calculated as follows:-

$$II = \frac{\text{No. of infected seed}}{\text{Days of first count}} + - - + \frac{\text{No. of infected seed}}{\text{Days of final count}}$$

3. Statistical analyses

One-way ANOVA and Duncan multiple range test were used to evaluate the significant difference in the concentration of different study sites. A probability at level of 0.05 or less was considered significant (Bailey, 1981). Standard errors were also estimated.

3. Results and Discussion:

A total of 20 isolates for plant growth promoting rhizobacteria (PGPR) were isolated on N-agar medium from soil samples, which collected from various locations in North Jeddah, KSA. Under *In vitro* conditions isolates B_1, B_2 and B_3 were showed highly significant reduce of fungal mycelium growth to *Pythium aphanidermatum* (38.1±3.8%, 66.0±5.0% and 78.1±6.8%, respectively) on PDA plates in a triplicate assay (Table 1). These results are in agreement with many previous studies reported that the antagonistic activity of some isolates of PGPR against different damping-off disease caused on various crops (Baker and Paulitz, 1996, Anjaiah *et al.* 1998, Harris and Adkins, 1999, Tambong and Hofte, 2001, Perneel *et al.* 2007, 2008). The inhibitory effects were more prominent on PDA than on NA medium. The nutrient constituent of the media plays a significant role in influencing the production of a particular antifungal metabolite (Hebbar *et al.* 1992b) by the antagonistic rhizobacteria. The differences in the inhibitory effect on the fungal pathogens might be due to the nutritional differences

of the two media. Similar observations were also reported earlier with *Pseudomonas cepacea* (Hebbar *et al.* 1992a). The selected isolates were identified in two genera with three species as *Bacillus subtilis*, *B. amyloliquefaciens* and *Pseudomonas aeruginosa* (B_1, B_2 and B_3, respectively).

Table 1. The influence of 20 isolates of PGPR against aggressive isolate from *Pythium aphanidermatum in vitro*

Bacterial isolate	Inhibition index[*] (%)
B_1[✗]	38.1± 3.8
B_2[✗]	66.0± 5.0
B_3[✗]	78.1±6.8
B_4	25.8 ±3.3
B_5	21.0 ±2.5
B_6	15.6 ±1.3
B_7	3.50 ±0.6
B_8	13.5 ± 1.9
B_9	5.00 ± 1.6
B_{10}	5.10 ± 1.0
B_{11}	15.5 ±2.2
B_{12}	12.5 ±2.0
B_{13}	0.1 ± 0.1
B_{14}	7.00 ±0.7
B_{15}	5.00 ±0.7
B_{16}	0.0 ± 0.0
B_{17}	15.5 ±2.2
B_{18}	4.00 ±2.2
B_{19}	20.0 ±2.8
B_{20}	0.0 ± 0.0

The data are the mean of three replicates ± SD, *Inhibition index defined as [y/(x+y)](100), where x is the distance from the center of the plug to the leading edge of the fungus and y is the distance from the edge of the bacterial colony to the growing edge of the fungus, ✗ Selected isolates for *in vivo* experiment.

Data presented in Table (2) showed that the efficacy of the three isolated species from PGPR on growth parameters of *Cucumis sativus* L. cv. Marketmore in the presence or absence of aggressive isolate for pathogenic fungus *P. aphanidermatum* under greenhouse condition. The highly values to plant growth parameters were recorded in all treatments in the absent of pathogenic fungus with the presence of *Bacillus subtilis* alone or in combination with the other two isolates. The best result in plant height, stem length, plant fresh and dry weight were recorded in treatment with *B. subtilis* (23.7±1.04 cm, 13.5±0.87 cm 0.62±0.02 g and 0.033±0.007 g), flowed by *P. aeruginosa* (19.3±1.15 cm, 9.00±1.0 cm, 0.61±0.07 g, 0.029±0.002 g), then *B. amyloliquefaciens* (17.0±1.30 cm, 8.97±0.90 cm, 0.53±0.01 g, 0.031±0.004 g). These results are in agreement with (Kamilova *et al.* 2005; Kim *et al.*

2009). While in the presence of pathogenic isolate of *P. aphanidermatum* caused completely death in all treated seeds due to pre-emergence damping-off. Similar results recorded by Lee *et al.* (2010) who recorded that, *P. aphanidermatum* was a very aggressive strain caused pre-and post emergence damping-off in cucumber plants.

On the other hand, two isolates of PGPR (*P. aeruginosa* and *B. amyloliquefaciens*) have a good antagonistic effect to inhibit or suppress the effect of *Pythium* diseases when using separately.

These results were in agreement with some previous studies indicated that *P. aeruginosa* produces different types of antibiotic that play a major role in suppression of *Pythium* (Tambong and Hofte, 2001; Perneel *et al.* 2008).

In addition to control of pathogenic fungus by using isolate of *Pseudomonas* has been reported to be due to competition for iron, antibiosis and induced systemic resistance in the host (Pieterse *et al.* 2001; Berg *et al.* 2002). However, further studies will be required to investigate factors involved in suppression of *P. aphanidermatum* induced damping-off using *P. aeruginosa*. Also many studies have shown that cucumber growth was affected by *B. amyloliquefaciens* in the presence of damping off causal fungi (Baker and Paulitz, 1996; Harris and Adkins, 1999).

The effects of bacterial combination on suppression effect of damping off disease, that due to

the antagonism between the bacterial strains may be attributed to the competition, which occurs between the organisms, require the same nutrients by one reduce the amount available to the other. In addition to the toxins or antibiotics secreted in the growth area as well as the production of antifungal volatiles (Lefiert *et al.* 1995; Saleh, 1997; Walker *et al.* 1998; Abo-Elnaga, 2006).

Data illustrated in Figure 1, showed that the using of *B. subtilis* alone or mixed with the other isolates (*P. aeruginosa* and *B. amyloliquefaciens*) was significant increased in the values of final germination percent (FGP%) to cucumber cultivar comparing with infested treatments, as well as germination index (GI), on the other hand, infection index (II) were significantly increased by decreasing in values of suppression effect with related to infested control. Chemical control of root diseases is often inconsistent and is a target for public concern due to possible environmental consequences; however, selected biocontrol agents may be potentially effective in suppressing disease in the field (Weller and Cook, 1983). Cropping systems and soil properties influence both detrimental and beneficial microorganisms in the rhizosphere, which subsequently impact root health, plant vigor, and crop yield (Rovira *et al.* 1990; Hornby and Bateman, 1997).

Table 2. The efficacy of three isolated species from PGPR on growth parameters of *Cucumis sativus* L. cv. Marketmore In the presence or absence of pathogenic *Pythium aphanidermatum* under greenhouse condition

Plant treaded with	Plant growth parameters					
	Length (cm)			Weight (g)		Chlorophyll content (Unit)
	Plant	Stem	Root	Fresh	Dry	
Untreated	17.5±0.8	7.17±0.72	10.33±1.59	0.25±0.06	0.027±0.005	12.45±3.38
Pythium aphanidermatum (Pa)	P[*]	P	P	P	P	P
Bacillus subtilis (Bs)	23.7±1.04[*]	13.5±0.87[*]	10.37±0.29	0.62±0.02[*]	0.033±0.007[*]	16.05±1.5[*]
Bacillus amyloliquefaciens (Ba)	17.0±1.30	8.97±0.90	8.030±2.00	0.53±0.01[*]	0.029±0.004[*]	12.43±0.50
Pseduomonas aeruginosa (Psa)	19.3±1.15[*]	9.00±1.00	10.13±2.08	0.61±0.07[*]	0.031±0.002	16.00±5.15[*]
(Bs) + (Ba)	22.0±5.20[*]	10.5±1.32[*]	11.50±5.70	0.65±0.01[*]	0.037±0.003	16.03±3.03[*]
(Bs) + (Psa)	21.83±0.7[*]	9.00±2.00	12.8±2.70[*]	0.59±0.03[*]	0.029±0.001	12.6±1.90
(Ba) + (Psa)	15.7±0.20	10.0±0.87	5.67±0.58	0.19±0.03	0.020±0.002	11.27±0.8
(Bs) + (Ba)+(Psa)	11.83±1.6	5.00±1.00	6.83±1.76	0.19±0.03	0.022±0.002	5.6±2.030
(Bs) + (Pa)	P	P	P	P	P	P
(Ba) + (Pa)	15.0±0.21	6.00±0.90	9.00±0.16	0.18±0.32	0.22±0.010	8.33±0.13
(Psa) + (Pa)	12.33±0.6	5.67±0.58	6.67±0.58	0.17±0.03	0.17±0.010	5.70±0.13
(Bs) + (Ba)+(Pa)	P	P	P	P	P	P
(Bs) + (Psa)+(Pa)	P	P	P	P	P	P
(Ba) + (Psa)+(Pa)	P	P	P	P	P	P
(Bs) + (Ba)+(Psa)+(Pa)	P	P	P	P	P	P

Mean of three replicates± SD, [*] significant at level 5%, [*]P: Plants can't survival under fungus infection rate (1.3×10^7 propagules g^{-1} soil).

Strains of rhizobacteria with ability to reduce severity of root diseases of cereal crops have been selected for field application to increase crop

productivity (Lemanceau and Alabouvette, 1993; Hornby and Bateman, 1997). However, performance of selected rhizobacteria introduced into some field

soils for disease suppression has been very inconsistent (Thomashow and Weller, 1996; Moussa *et al.* 2012). Data illustrated in Figure 1, showed that the using of *B. subtilis* sole or in mixed with the other isolates *(P. aeruginosa* and *B. amyloliquefaciens*) was significant increased the values of final germination percent (FGP%) to cucumber cultivar comparing with infested treatments, as well as germination index (GI), on the other hand, infection index (II) were significantly increased by decreasing in values of suppression effect in related to infested control. Chemical control of root diseases is often inconsistent and is a target for public concern due to possible environmental consequences; however, selected biocontrol agents may be potentially effective in

suppressing disease in the field (Weller and Cook, 1983) Cropping systems and soil properties influence both detrimental and beneficial microorganisms in the rhizosphere, which subsequently impact root health, plant vigor, and crop yield (Rovira *et al.* 1990; Hornby and Bateman, 1997). Strains of rhizobacteria with ability to reduce severity of root diseases of cereal crops have been selected for field application to increase crop productivity (Lemanceau and Alabouvette, 1993; Hornby and Bateman, 1997). However, performance of selected rhizobacteria introduced into some field soils for disease suppression has been very inconsistent (Thomashow and Weller, 1996; Moussa *et al.* 2012).
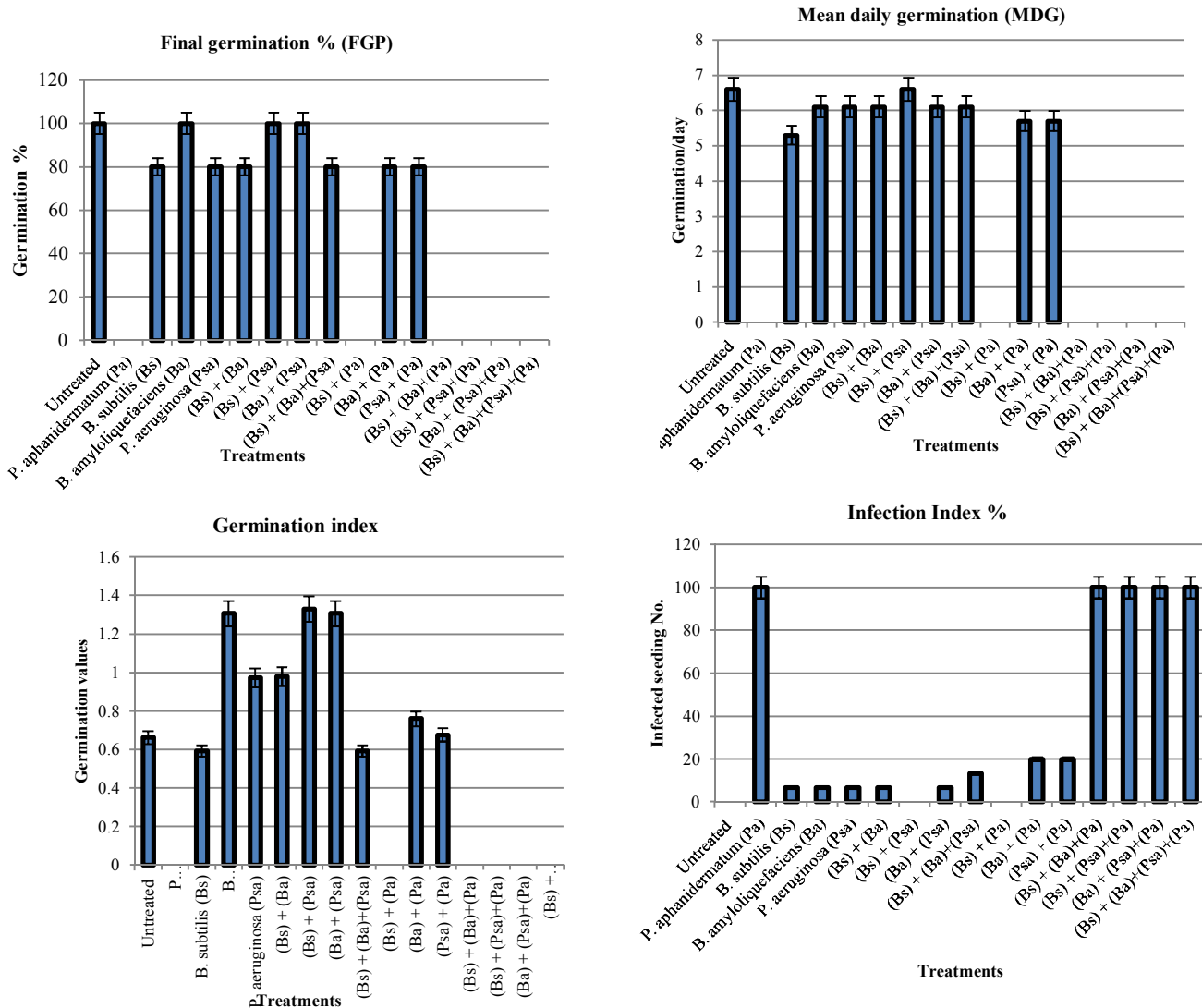
Figure 1. Effect of different treatments with PGPR individually and/or mixed on the final germination percent, mean daily germination, germination index and infection index of *Cucumis sativus* L. cv. Marketmore in non-infested and infested soil with *Pythium aphanidermatum*.

4. Conclusion

We conclude that, the selected isolates *B. amyloliquefaciens* and *Pseudomonas aeruginosa* significantly reduced the incidence of damping-off disease of cucumber caused by *Pythium aphanidermatum*. Fluorescent pigment and antifungal antibiotics (or metabolites) of *Pseudomonas aeruginosa* and antifungal antibiotics of both bacilli give successful root colonization of the biocontrol agents might be involved in biological suppression of the pathogens; and these strains have potential not only to protect cucumber seedling from *P. aphanidermatum* infection but also to improve the plant growth parameters

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11/11/2012

Cytotoxic and insect -repellent activities of surface flavonoids from *Datura stramonium* L. Grown in Egypt

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Abstract: Three flavonoidal aglycones viz; F1 (Chrysin), F2 (Kampferol) and novel F3(3,7- dimethylether quercetin), were isolated from acetone wash of fresh leaves of *Datura stramomium* L. Isolated compounds were identified on the basis of their physico-chemical properties, Co-TLC, ^{1}H-NMR, ^{13}C-NMR and CIMS specrtum. Significant cytotoxic activity against three tumor cell lines (liver, cervix & breast), was recorded for the isolated compounds. In addition, remarkable repellent action of surface falvonoids against House Flies (*Musca domestica*) was recorded.

1. Introduction:

Leaf surface flavonoids (exudates) are usually found in plants, which grow in arid or semi-arid habitats, and often in association with aromatic terpenoids on the leaf surface (Williaims *et al*.,1997). The leaf surfaces of many plants are covered by various non glandular and glandular trichomes. Trichomes with their lipophilic exudates (flavonoid aglycones, waxes, terpenes and lipids) may protect leaves against extensive light, UV-B radiation, and desiccation (Ehleringer, 1982; Karabourniotis *et al*., 1993; Cockell and Knowland, 1999; Tattini *et al*., 2000; Juma *et al*., 2001), or they may form the first line of defense against insects and herbivores by entrapping, deterring, or poisoning (Harborne, 1991; Wagner, 1991; Hare, 2002). For Solanaceae, in particular, trichome exudates are responsible for the mortality of neonate larvae; the removal of exudates using an ethanol solution increase larval survival (Gurr and McGrath, 2002).

Datura stramonium L., known by the common names Jimson weed or Datura is a plant in the Solanaceae (nightshade) family, which is believed to have originated in the Americas, but is now found around the world (*Datura stramonium* information from NPGS/GRIN).

Datura stramonium L. is a foul-smelling, erect annual, freely-branching herb that forms a bush up to 2 to 5 feet (60–150 cm) tall. The leaves are approximately 3 to 8 inches (8–20 cm) long, smooth, toothed, soft, irregularly undulate. The upper surface of the leaves is a darker green, and the bottom is a light green. The leaves have a bitter and nauseating taste, which is imparted to extracts of the herb, and remains even after the leaves have been dried.(Stace, 1997).

For centuries, *Datura* has been used as an herbal medicine to relieve asthma symptoms and as an analgesic during surgery or bone setting. It is also a powerful hallucinogen and deliriant, which is used spiritually for the intense visions it produces. However, the tropane alkaloids which are responsible for both the medicinal and hallucinogenic properties are fatally toxic in only slightly higher amounts than the medicinal dosage, and careless use often results in hospitalizations and deaths.

Many studies showed that certain genera of Solanaceae plants, particularly *Datura stramonium* L., produce a range of biologically active alkaloids, including tropane alkaloids (Sato *et al*., 2001). In recent decades Solanaceae have only rarely been studied for the occurrence of externally accumulated surface flavonoid aglycones, although in many species glandular trichomes and sometimes even their resinous exudates are obvious. Results on some Solanaceae genera have been published previously (Wollenweber, 1990; Wollenweber and Dörr, 1995 and Wollenweber *et al*., 2005).

Earlier, glycoside patterns have been reported for five Datura spp. (Pate and Averett, 1986) but concerning free aglycone exudates only one report has been published (Wollenweber *et al*., 2005).

The aim of this study was therefore designed to isolate the surface flavonoids from leaves exudates of *Datura stramonium* L. and evaluate cytotoxic potentials of these flavonoids against selected tumor cell lines. Another specific goal was to determine the insect repellent activity of the exudate against house flies**.**

2. Material and methods

2.1. Plant material

Fresh leaves of *Datura stramonium* L. was collected from plants cultivated in the Experimental Station of Medicinal and Aromatic Plants, Faculty of Pharmacy, Cairo University, Giza, Egypt. The authentication of the plant was kindly confirmed by

Prof. Dr. Mohamed El-Gebally, Prof. of Plant Taxonomy, NRC, Dokki, Giza. Voucher specimens are kept in the Department of Pharmacognosy, Faculty of Pharmacy, Cairo University.

2.2. Chemicals

2.2.1 Reference samples:

Reference phenolic samples: Quercetin, kampferol and chrysin (E. Merck, Darmstadt, Germany).

2.2.2 Material for chromatography:

Silica gel G (60 mesh) for TLC, silica gel (70-230 mesh) for CC, precoated TLC plates (silica gel 60 GF$_{254}$) from E. Merck (Darmstadt, Germany), sephadex LH-20 from Pharmacia (Uppsala, Sweden).

  Solvent systems:

  Chloroform - methanol (in different ratios v/v).

  Spray reagents; aluminium chloride reagent for flavonoids (Markham, ,1982).

2.3. Material for biological evaluation:

2.3.1. Plant extracts:

The biological evaluation was performed on the three isolated compounds.

2.3.2. Tumor cell lines:

Tumor cell lines (cervix, HELA), (liver, HEPG2) and (breast, MCF7) from National Cancer Institute of Egypt were used for cytotoxic screening.

2.3.3. Insects for testing repellent effect:

House Flies (*Musca domestica*) were collected from flies trap in the Garden of Misr International University.

2.4. Apparatus:

2.4.1. NMR Jeol GLM, Jeol TMS Route instrument (^{1}H-NMR, 300 MHZ, ^{13}C, 75 MHZ, Japan).

2.4.2. Mass spectrometer: chemical ionization, Finnigan, CA, USA

2.5. Phytochemical study:

2.5.1. Extraction, isolation and Identification:

One Kg of fresh leaves was dipped briefly (10 second) in acetone. The concentrated acetone wash was chromatographed on Sephadex LH-20 column (l.5x30cm) using chloroform/methanol 98:2 as eluent. Similar fractions were pooled and the solvent was then evaporated under reduced pressure and some fractions yielded on concentration compounds F1 & F2 (15mg and 17mg; respectively). Another combined fraction was further purified on Sephadex LH-20 column (1 x 20 cm) using methanol as eluent. Subfractions were collected together and the solvent was stripped off under reduced pressure to yield, on concentration, compound F3 (13 mg). The structures of these isolated compounds were established on the basis of physicochemical data, Co TLC, 1H-NMR, 13CNMR and CIMS (Table 1).

2.6. Biological study:

2.6.1. Cytotoxic activity:

Potential cytotoxicity of the tested samples (Compounds F1, F2 and F3) was tested at the National Cancer Institute of Egypt adopting the method of Skehan (Skehan & Strong, 1990). Cells were plated in a 96-wells plate (10[4]cells/well) for 24hrs before treatment with the tested sample to allow attachment of the cells to the wall of the plate. Different concentrations of each of the tested samples under study (0, 1, 2.5, 5 and 10 µg/ml) were added to the cell monolayer. Triplicate wells were prepared for each individual dose and were incubated for 48hrs at 37°C in an atmosphere of 5% CO_2. After 48hrs, cells were fixed, washed and stained with Sulphorodamine B stain. Excess stain was washed with acetic acid and attached stain was recovered with Tris-EDTA buffer. Colour intensity was measured in an ELISA reader. The survival curves of each of the tumor cell lines (cervices, liver and breast) were plotted and IC50 was calculated for each of the tested samples (Table 2)

2.6.2. Repellent activity against house flies:

Flies repellency value of surface flavonoids was tested adopting the method of Carloina (Carloina *et al.,*2006). Comparative study between two leaves of *Datura stramonium* one unwashed fresh leaf (Fig. 9A) & other is acetone-washed leaf (Fig. 9B). The leaves were allowed to dry for 5 minutes before being placed in a 10 cm petri dish . Ten House Flies (*Musca domestica*) were released in the center of each Petri dish, and both flies & their residual distribution were recorded after 3hours later. Repellency values were calculated by dividing the number of flies that move away from each leaf by the total number of Flies. Each experiment was replicated 4 times and results were recorded in table (3) and shown in figure (2).

3. Results and Discussion

3.1. Investigation of flavonoidal exudate content:

Compound F1 is white residue, exhibited a molecular ion peak at m/z 255. **^{1}HNMR spectrum of compound F1(Table1 & Figure 1)** showed the signals characteristic for chrysin (Harborne *et al*., 1975 and Mabry *et al*. 1996). **Ring B** is free from any substitution and this was confirmed by presence of 2 multiplets at δ 7.8 and δ 7.24 ppm; one integrated for two protons 2' and 6' while the other integrated for three protons 3',4' and 5'. On the other hand, **ring A** is substituted only in positions 5 and 7 which was verified by the presence of two *meta* coupled doublets of protons 8 and 6 at δ 6.3 and δ 6.1, respectively.

Compound F2 is pale yellow solid, exhibited a molecular ion peak at m/z 286. The **^{1}HNMR** spectrum of F2 **(Table1 & Figure 1)** showed the signals characteristic for kaempferol (Harborne *et al*., 1975 and Mabry *et al.,* 1996). Spectrum showed the presence of two meta-coupled aromatic protons at δ 6.3 and 6. 4 corresponds to H-6 and H-8 protons

appeared separately as doublets having coupling constants 2.3 and 2.1 Hz; respectively.

In addition, the **1HNMR** spectrum of F2 also showed the presence of two doublet of doublets at δ7.3 and 7.8 with coupling constants 8.1/2.2 Hz and 8.3/2.1 Hz respectively corresponds to the 4 aromatic protons of ring B; characteristic for the 3,5,7,4'-tetrasubstituted flavones

Compound F3 is yellowish white solid, exhibited a molecular ion peak at m/z 330. **1HNMR spectrum of compound F3(Table1 & Figure 1)** showed the signals characteristic for quercetin (Harborne *et al*., 1975 and Mabry *et al*., 1996). **Ring B** is substituted in 3' and 4' positions and this was confirmed by presence of a multiplet at 7.5 ppm, integrated for two protons, 2' and 6' and an *ortho* coupled douplet ascribed to proton 5'. Singlet signal at 3.9 ppm integrated for 6 protons attributed to dimethoxy groups. **13CNMR sectrum** had signals for carbons essentially identical to those of quercetin 3,7-dimethyl ether. Spectrum recorded two methoxy signals at 60 and 58 ppm attributed for C-3 & C-5 & this was confirmed by molecular ion peak in of F3 (330m/z) ascribed to dimethoxy derivative of quercetin contrasting from tri-methoxy derivative reported previously (Wollenweber *et al*., 2005).

Aglycones were isolated from hydrolyzed extracts of *D. stramonium* L. (Lakshmi and Krishnamoorthy, 1991), but free aglycones exudates detected in the leaf wash of this species, has been found only once before (Wollenweber *et al*., 2005).

3.2. Cytotoxic activity:

Considering cytotoxic activity (Table 2) a high potency of compound F1 was noticed only against liver cell line. On the other hand highly oxygenated compounds F2 & F3 recorded higher activities against both cervix and breast tumor cell line than compound F1. Highest activity of oxygenated isolated compound (F2 & F3) may be attributed to nature of these types of cancer as both cervix & breast cancers are hormone-dependant cancer

3.2. Repellent activity against house flies:

The average repellency percentage of houseflies for the unwashed fresh leaves recorded 82% of total number of tested flies after 3hrs (Table 3 & Fig. 9B). This compared to the average repellency percentage of acetone- washed leaves recorded (15%) (Table 3 & Fig. 9A). The results showed unwashed leaves provided significantly better repellency compared to the acetone- washed leaves. The results appraise the importance of surface flavonoids exudes on the surface of *Datura stramonium* L. leaves and their role as defensive barrier against different insects and herbivores.

Table 1. 1H-NMR, 13C-NMR & CIMS data of compounds F1, F2 & F3 isolated from the leaves exudate of *Datura stramonium* L. grown in Egypt.

Carbon number	F1	F2	F3	
	δ_H	δ_C	δ_H	δ_C
2	-	-	-	153.1
3	**6.8,** *s*	-	-	138.5
4	-	-	-	176.6
5	-	-	-	159.1
6	**6.1,** *d (1.9 Hz)*	**6.3,** *d (2.3 Hz)*	**6.2,** *d (2.1 Hz)*	100.1
7				165.4
8	**6.3,** *d (1.9 Hz)*	**6.4,** *d (2.1 Hz)*	**6.6,** *d (2.1 Hz)*	95.3
9	-	-	-	154.1
10	-	-	-	103.4
1'	-	-	-	119.8
2'	**7.8,** *m*	**7.3,** *dd (8.1 , 2.2 Hz)*	**7.5,** *d (2.2 Hz)*	111.4
3'	**7.24,** *m*	**7.8,** *dd (8.3 , 2.1 Hz)*	-	142.6
4'	**7.24,** *m*	-	-	148.7
5'	**7.24,** *m*	**7.8,** *dd (8.3 , 2.1 Hz)*	**6.8,** *d (8.1 Hz)*	117.9
6'	**7.8,** *m*	**7.3,** *dd (8.1 , 2.2 Hz)*	**7.5,** *dd (8.1 , 2.2 Hz)*	119.8
3 OH	-	**12.5,** *s*	-	-
5 OH	**12.3,** *s*	**12.5,** *s*	**12.5,** *s*	-
7 OH	**12.3,** *s*	**12.5,** *s*	-	-
3' OH	-	-	**12.5,** *s*	-
4' OH	-	**12.5,** *s*	**12.5,** *s*	-
3 OMe	-	-	**3.9,** *s*	60
7 OMe	-	-	**3.9,** *s*	58
CIMS m/z	**255** (M[+], 98%), **226**(27%),	**286** (M[+], 100%), **258**(44%).	**330** (M[+], 100%)	

Table 2. Cytotoxic activity of compounds F1,F2 & F3 isolated from the leaves exudate of *Datura stramonium* L. grown in Egypt.

Cell Line	IC_{50} (υg/ml)		
	Compound F1	Compound F2	Compound F3
Cervix (MCF7)	1.51	0.83	0.79
Breast (HELA)	0.96	0.66	0.61
Liver (HEPG2)	0.67	0.87	0.91

Table 3. Repellent activity of leaves exudate of *Datura stramonium* L. grown in Egypt against House Flies (*Musca domestica*)

% repellency	Fresh leaf without wash	Fresh leaf after washing
First determination	90 %	20 %
Second determination	80 %	10 %
Third determination	90 %	10 %
Fourth determination	70 %	20 %
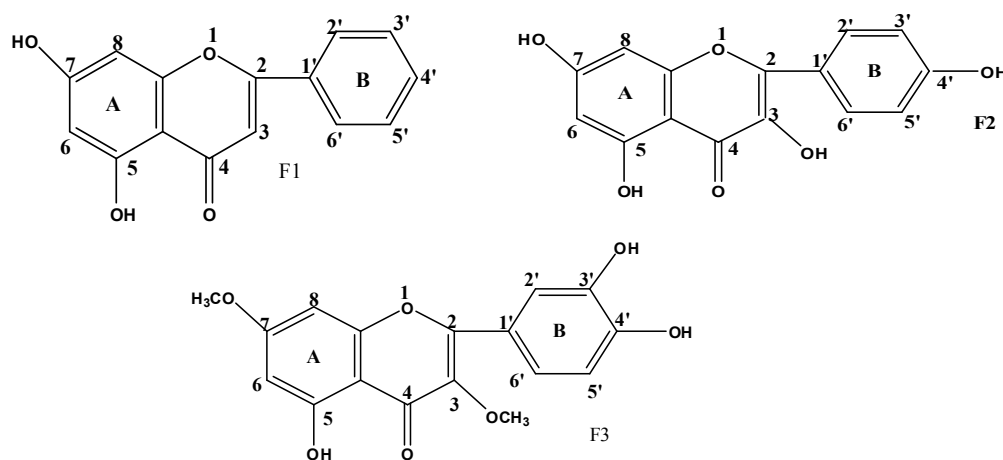
Figure 1. Isolated compounds from acetone wash of *Datura stramonium* L. leaves.

(A) Acetone-washed leaf   (B) Unwashed leaf

House Flies redidual
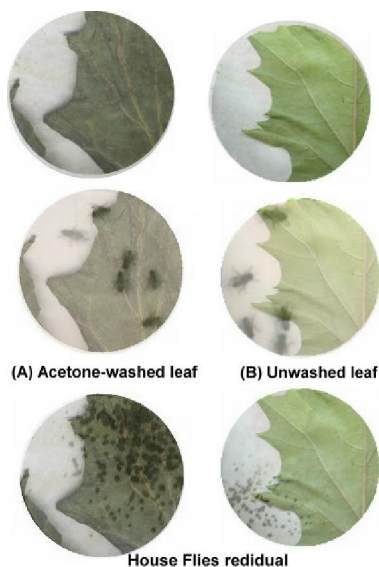
Figure 2. Repellent activity of leaves exudate of *Datura stramonium* L. grown in Egypt. against House Flies (*Musca domestica*)

4. Conclusions

Two known aglycones chrysin & kampferol in addition to dimethoxy quercetin derivative were isolated from the wash of *Datura stramonium* L. leaves for the first time. The structures of isolated compounds were identified on the basis of spectroscopic and chemical studies as well as by comparing their physical and spectral properties reported in the literature. Free aglycones could be detected in the leaf wash of Datura species, indicating that these aglycones most probably occur in glycosidic form as tissue constituents.

All isolated compounds exhibited significant cytotoxic activities against liver, cervix and breast cell lines. Consequently, simple wash of *Datura stramonium* leaves instead of destructive extraction revealed a new hope for designing novel molecules for treatment & prevention of liver and hormone dependent cancer.

Consumers now have an array of "natural" insect repellents from which to choose. These are made from benign-sounding plant extracts and exudates. Many natural insect repellents, deemed "minimum-risk pesticides" by the Environmental Protection Agency, are exempt from safety testing because their active and inert ingredients have been deemed safe for the intended use. Significant insect repellent effect has ecological importance where the observed effects of leaf exudates of *Datura stramonium* L. on the House Flies (*Musca domestica*) offer an eco – friendly new natural formula act as insect repellent and fight herbivores.

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11/11/2012

Effect of NPK and Growing Media on Growth and Chemical Composition of Fishtail Palm (*Caryota mitis* Lour)

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Abstract: This study was carried out, to investigate the effect of NPK and growing media on growth and chemical composition of fishtail palm (*Caryota mitis.* Lour). The results revealed that using CPN significantly increased plant height and stem diameter. Treating the plants grown in CPN or in peat moss media with 4 gm NPK at monthly dose gave the best seedling growth. Plants grown in CPN resulted in the tallest plants, the thickest shoots from using 2 or 4 gm NPK, plants grown in CPN or peat moss gave the highest number of leaves .Using sand medium affected more than clay on the response of the plants to NPK . Using composted peanut (CPN) resulted in the largest leaves, clay medium was the last effective. The highest NPK rate (4g) resulted in the greatest value for leaf area. The greatest value of fresh and dry weight of shoots was recorded for plants grown in CPN, while clay medium gave the lowest values. Applying NPK at 4gm was the most effective on increasing the fresh and dry weight of roots. The highest content of chl.-a had been determined in plants grown in peat moss followed by composted peanut (CPN).While Ch-b was the highest in that grown in peat moss or in clay . NPK rates affected significantly on increasing Chl.-a&b contents but decreased carotine contents. The content of carotine, was the lowest in seedlings grown in CPN. Caryota seedlings grown in CPN medium contained the highest value of total carbohydrates in the leaves; using NPK at any rate significantly enhanced the accumulation of carbohydrates in the leaves. Fertilization of the plants; grown in clay with 4 gm NPK , decreased indoles content .Growing The plants in peat moss without NPK treatments (control) increased the content of indoles in the leaves. Generally, plants grown in sand or clay, under the same level of NPK rate, contained more phenolic compounds than those grown in peat moss or CPN media. Caryota seedlings grown in CPN medium and fertilized with4 gm NPK, contained the highest values of N and P- content in leaves, whereas that grown in clay medium and fertilized with NPK at any rate contained the highest value of K.

1. Introduction:

Caryota mitis. Lour is a popular palm tree known as fishtail palm or Burmese fishtail palm, belongs to Fam. Aracaceae. It is an evergreen shrub or small tree, the leaves are compound, the leaflets are rather thick and waxy, and it is the only palm with leaves that are subdivided twice. The shape of the leaflets gives it its common name. It also has a unique way of flowering: the first flowering mop-like cluster emerges from the top of a mature palm; subsequent clusters emerge below and so on. The palm also reproduces numerous suckers growing from the base. Fruits are roundish which turn purplish when they ripen. It has multiple trunks and the bark is smooth. It grows slowly to a height of 4-6 m with a crown diameter of 3.0 m. and fragrant purple flowers, produced in large clusters in late winter and early spring (Zona 2006). Caryota used as a specimen ornamental plant in private and public gardens, due to its showy leaves and flowers; it will do well either in sun or in light shade as well as in high pH soils and can tolerate other types of soils. Anderson (2004) stated that fishtail palms are used in the toughest interior environments where most other plants won't survive. These plants can bring the graceful tropical look to all but the darkest, driest, and coolest locations in the home,

office, or shopping center. Palms are best, however, in bright interiors, where their unusual form with slim smooth trunks and large pendulous leaves contrast with the typical tree and shrub form of other interior plants. The ability of most palms to tolerate adverse conditions makes them ideal for interior environments. Palm species vary in size so they can be used as large or small specimens planted individually in containers or in groups in large beds. Some species branch freely from the base to form large clumps of shorter plants, while other species grow singly to form arborescent individuals.

Successful greenhouse and nursery production of container-grown palms is largely dependent on the chemical and physical properties of the growing media. The media should be well drained and yet retain sufficient water to reduce the frequency of watering, Anderson (2004) stated that well drained media of most types: peat, bark, soil, sand, or other components are acceptable and comparable for palm production and maintenance. The frequency of water and fertilizer applications depends upon the type of media used and the growth rate of the palms. Selection of the proper media components is critical to the successful production of palms. Peat is a very common component in both nursery and

greenhouse mixes. Peat is usually included in a mix to increase the water-holding capacity or to decrease the weight. Nowadays, several organic materials became the most important materials required to substitute of peat moss for cheap production of many plants, in this respect, Borscht (2006) stated that palms grown in containers are susceptible to nutrient deficiencies, Container substrates are generally have greater nutrient holding capacity than soils. Thus leaching and insolubility of nutrients are much less of a problem. Also, container-grown palms are often fertilized with more complete fertilizers, to avoid most deficiencies. Most potting substrates consist largely of organic components such as bark or peat that have high carbon to nitrogen ratios. This means that the microbes that break down these components need a supplementary source of N in order to do so. These soil microbes will therefore be competing with plant roots for N, Which is the most important limiting element in container production. Fertilization of container-grown palms with high in N such as 18N-6P2O5-12K2O work well for container-grown palms. Borji, *et al*., (2012) stated that date-palm peat (with or without fermentation period) has suitable physical properties, availability, low cost and efficiency and could be a new substrate that was introduced for replacing with other media.

Plant-based composts in some areas provide a low-cost media amendment. Particle sizes for plant-based compost can be either too large or too fine depending on the source material and composting process critical issues to consider are the availability and consistency of the product and the particle size. Rice hulls are available in different forms. Cotton gin trash is another organic waste product can increase the water- and nutrient-holding (CEC = 200 meq/100 gm) properties of media and has a pH of 5.5 to 6.0. Peanut shells as remained wastes of cultivating peanut at increasing area has considerable volume, which its compost can be used as available sources of ornamental plants medium. Alidoust, *et al.* (2012) on dracaena plant conducted a research to evaluate the possibility of using peanut shells compost as appropriate medium in the cultivation of ornamental plants using a 2:1 ratio of peat to perlite and peat was used as control treatment and peat was

replaced by 15, 30, 45, 60,and 100 % v/v of peanut shells compost. Peanut shells compost affected on growth properties, like; height and dry weight of leaf as compared to control. It was found that peanut shells compost increased the growth of plant but their effect on plant growth was promoted when accompanied with nutritional solution.

Medium to coarse sands (0.25 to 2 mm).Can be used as soil amendment for its properties. Calcareous sands or sands from the ocean that are obviously saline in nature should be avoided. Soil or clay is still occasionally used in a container mix primarily because of its local availability or to add weight to a predominantly organic-based mix.

Application of N, P, or K, fertilizers can simply be applied to the surface of the potting substrate. Kent *et al.* (2007) on *Cordyline fruticosa* stated that an N-P-K ratio of 1:1:1 was recommended for soil-based media, whereas a ratio of 3:1:2 was suggested for soilless media. Watfa (2009) on Aleppo pine seedlings found that application with NPK (1:1:1) had a remarkable effect on increasing height of Aleppo pine seedlings. All NPK fertilization treatments significantly increased the stem diameter, number of leaves and root length and fresh weights of leaves, stems and roots. All NPK ratios increased the content of carbohydrates in the leaves. The highest N content was recorded by using NPK at ratio of 1:1:1 and 2:1:1, while potassium content in stems it was at (1:1:1).

2. Materials and Methods

This study was carried out in the greenhouse of the Ornamental Hort. Dept. Fac. of Agric. Cairo Univ., Giza, during the two seasons of 2008/2009 and 2009/2010 ,to investigate the effect of NPK and some growing media on growth and chemical composition of *Caryota mitis* Lour seedlings.

The seedlings of *Caryota mitis* Lour. Were planted on 10 [th] January, 2008 in 40 cm. plastic pots filled with clay or sand or peat moss or composted peanut (CPN). NPK fertilizer (Polyfeed, NPK: 14:7:37) at the rate of 0, 1, 2 and 4 g /pot. Had been applied as soil drench after a month from planting at monthly intervals for 16 months. The plants received regular agricultural practices of irrigation. The chemical and physical prosperities of the media are shown in Table (A&B)

Table (A): The chemical characteristics of the organic media.

Organic media	O.C. %	Total N%	C/N Ratio	pH 1:2.5	EC dS/m	Available nutrients ppm		DTPA-extractable (ppm)			
						P	K	Fe	Mn	Zn	Cu
peatmoss	45	0.56	80.35	6.30	0.32	20	780	9.60	5.54	4.86	0.60
composted peanut	36.1	1.40	25.84	6.50	0.62	160	980	30.0	9.00	11.60	1.10

Table (B): Mechanical and Chemical analysis of soil

pH	E.C ds/m	Sand		Silt	Clay	Texture class	Cations				Anions		
		Course	Fine				Ca++	Mg++	Na+	K+	HCO3+CO3	Cl-	SO4-
7.3	0.8	4.4	25.5	32.9	37.2	Clay-loamy	3.2	0.6	2.5	1.3	1.9	1.3	4.4

The following data were recorded at the end of experiment, for each season: plant height, stem diameter, leaf area, number of leaves / plant, fresh and dry weights of shoots and roots. Chemical determinations: Chlorophyll a, b and total carotenoids were determined according to Saric *et al. (*1967), total carbohydrates in dried leaves were determined according to Herbert *et al. (*1971). The contents of N, P and K were determined using the wet digestion procedure. Minerals contents (N, P and K) were determined in a known weight (0.50 gm) of the dried sample of leaves, at 65 ^{O}C for 48 hrs to be then ground and wet digested using H_2SO_4: H_2O_2 method described by (Cotteine, 1980).

Total nitrogen content was determined using Nesslar method; phosphorus content was determined according to Troug and Meyer, (1939). The content of potassium was determined by using operation chart of Shimadzu Atomic Absorption Flame Spectrophotometer. Phenols and indoles contents (mg/g F.W) were determined in fresh Samples (2g) of leaves, which were crushed and extracted with 80% ethanol at 0°C for 72 hours, the ethanol being changed every 24 hours, as described by Selim *et al*. (1978).

The different treatments were replicated 3 times havin3 plants (pots)/ replicate. The layout of the experiment was a split in a complete randomized design. The means of the different treatments were compared by using L.S.D test at 5% probability, according to Sendecor and Cochran, (1980).

3. Results and Discussion
A. Effect on vegetative growth
1. Plant height
Data in Table (1) showed that the different growing media as well as NPK treatments affected significantly on the height of caryota seedlings, in both seasons. In the first season, growing the plants in peat moss or composted peanut (CPN) resulted in the tallest plants (93.82 and 113.20 cm, respectively), whereas in the second season, the values were 101.4 and 118.5 cm, respectively. In this reared, Saleh.(2000) on *Ficus benjamina* found that peat moss media resulted in higher yield and yield components than the other planting media. Garcia, *et al*. (2001) observed that the best plant productivity and quality of Epipremnum and Spathiphyllum plants were obtained in substrates based on either coconut coir dust or peat than soil-based medium. Singh *et al*. 2002. On Maranta bicolor, stated that obtained the maximum plant height when plants were grown in cocopeat and leafmould mixture (1:1) or cocopeat alone. Davis *et al*. (2009) found that western larch seedlings performed best when grown in either of 100% peat medium or the peat: bark medium.

Concerning the effect of NPK, the data revealed that raising NPK rate significantly increased the seedling height and the highest rate (4gm / seedling) resulted in the tallest plants (122.2cm). The combined effect of media and NPK treatments indicated that, the application of NPK at 4 gm/seedling to plants grown in CPN resulted in the tallest plants (150.19 cm) in the first season and (152.73cm) in the second one. In this regard, Watfa (2009) found that application of NPK (1:1:1) had a remarkable effect on increasing height of Aleppo pine seedlings. Cicek *et al.* (2010) reported that NPK -fertilization had a large and positive effect on the diameter and height of Fraxinus angustifolia.

2- Stem diameter
Data in Table (1) illustrated that growing the plants in CPN significantly increased the thickness of stem, in both seasons, as compared with the other growing media (18.25 and 19.51 mm, respectively). NPK at (4gm) seedling significantly increased the stem thickness to the highest values 18.09 and 18.52 mm, respectively), against 10.82 and 10.51 mm for control plants, respectively. Similar findings were reported by Watfa (2009) found that all NPK fertilization treatments significantly increased the stem diameter of *Aleppo pine* seedlings,

Boughalleb,*et.al.(*2011) on *Citrus limon* and *C.sinensis,* concluded that raising N rates increased stem diameter. The combined effect of media and NPK treatments revealed that, the application of NPK at 2or 4 gm/seedling to plants grown in CPN resulted in the thickest shoots, in the first and second seasons.

3-Number of leaves/plant
The different growing media and NPK rates affected on the number of leaves of Caryota seedling to shown in Table (1). Concerning the response to media, it was found that growing plants in CPN followed by peat moss medium, significantly increased the formation of leaves, in both seasons, as compared with the other growing media, plants grown in CPN formed 6.74 and 7.33 leaves / seedling in the first and second seasons respectively. Saleh(2000) on *Ficus benjamina* stated that peat moss media resulted in higher yield and yield components than the other planting media whereas,Idun ,*et al* (2011)on *Ixora coccinea* and *Ficus benjamina* revealed that 50% teak sawdust+50% coconut coir was the best soilless medium, that produced the highest number of leaves to the highest values7.77 and 8.21 leaves /seedling, respectively),. All NPK treatments at 4 gm increased significantly the formation of leaves as compared with the control. Against 4.77 and 5.13 in the two seasons, respectively, for the control. These findings are in line with Cicek *et al. (*2010). Who found that NPK -fertilization had a

large and positive effect on diameter and height of *Fraxinus angustifolia*, during the first 3 years of growth. Boughalleb,*et.al.(*2011) on *Citrus limon* and *Citrus sinensis* .The combined effect of media and NPK treatments revealed that, the application of NPK at 2or 4 gm/seedling grown in CPN or peat moss resulted in the highest number of leaves ,in the first and second seasons. Also, the data indicated that plants grown in sand medium showed more response to the application of NPK than growing in clay. Al-Menaie *et al.* (2012) revealed that Cassia trees exhibited maximum plant height and number of leaves when N: P: K was applied at 1g/l in a growing medium comprising of sand: peat moss: humus (1:1:1 v/v).

4- Leaf area

Data in Table (1) indicated that growing the plants in composted peanut (CPN) resulted in the largest leaves (746.4 and 751.9 cm2, respectively), in both seasons, whereas growing the plants in peat moss resulted in larger leaves than those grown in sand or clay in both seasons. Davis *et al.* (2009) stated that western larch seedlings performed best when grown in either the 100% peat medium or the peat: bark medium. Raising NPK rate significantly increased the leaf area of caryota seedlings, giving the largest leaves (749.5 and 759.1 cm2) at the (4gm / seedling) in the first and second seasons, respectively. Similarly, Treder, *et al.* (1999), found that seedlings of *Ficus benghalensis* and *F. lyrata* grown in peat had greater leaf surface area than plants grown in peat + rockwool. Cicek *et al.* (2010) concluded that NPK -fertilization had a large and positive effect on diameter and height *Fraxinus angustifolia*, during the first 3 years of growth. Regarding the combined effect of media and NPK treatments on leaf area, the data indicated that, the application of NPK at 4 g/seedling to plants grown in CPN resulted in the tallest plants, giving (981.0 and 895.0 cm2) in the first season and second seasons, respectively. In both, the smallest leaves were obtained on plants grown in clay medium without NPK fertilization (control), giving the values of 361.5 and 381.6 cm2 , in the first and second seasons, respectively.

5- Fresh and dry weights of shoots

Data shown in Table (2) revealed that, growing plants in CPN significantly increased the fresh weight shoots, in both seasons, as compared with the other growing media(306.90 and 321.90 gm , respectively) .In both seasons, plants grown in clay medium gave the lowest values of the fresh weight of shoots. In this regard, Sanjay, *et al.* (2008) on *Acacia catechu, Azadirachta indica and Pongamia pinnata*. Observed that tree species exhibited fast growth and high biomass as well as favorable seeding quality in growing media containing 80% compost. Application of NPK at

the rate of (4gm) affected significantly on increasing the fresh weight of shoots giving to the highest values (305.7 and 322.2 gm, respectively), against 138.6 and 147.1gm, respectively, for the control plants. Using NPK at 4 gm/seedling to plants grown in CPN resulted in the heaviest shoots (405.7 and 411.8 gm) in the first and second seasons, respectively .The dry weight of shoots , in both seasons, followed the same trend of shoots fresh weight . Watfa (2009) on Aleppo pine seedlings stated that NPK fertilization increased fresh weights of stems and roots.

6- Fresh and dry weights of roots

The effect of NPK treatments and growing media on fresh and dry weights of roots of Caryota seedling is shown in Table (2). Concerning the response to media, the obtained data indicated that growing plants in CPN followed by sand medium, significantly increased the fresh weight of roots, in both seasons, as compared with other growing media, Karakir *et al.* (1994) stated that root growth of fig plants was best in a mixture of sand + perlite. Whereas, Zaghloul *et al* .(1996).found that growing *Philodendron domesticum* in peat alone or peat + sand (1:1) gave the greatest plant height and root fresh weights for plants grown in CPN which gave 109.2 and 104.1 gm fresh roots / seedling, in the first and second seasons, respectively. In this regared, Osaigbovo and Nwaoguala (2011) on seedlings of *Dialium guineense*, stated that sand or top soil was the best for shoot and root dry weights. In both seasons, plants grown in clay medium gave the lowest values of roots fresh weight. Concerning the effect of NPK, data in Table (2) revealed that applying NPK at 4g/seedling was the most effective on increasing the fresh weight of roots, which increased significantly to the highest values (103.8 and 91.97 gm, in the first and second seasons, respectively). The dry weight of roots , in both seasons, followed the same trend of fresh weight of roots. Bumgarner *et al.* (2008) *on Quercus rubra* seedlings stated that fertilization increased aboveground biomass production and nutrient content, but decreased root dry weight.

B-Effect on chemical constuitents
7- Pigments content

The data in Table (3) showed that chlorophyll a & b and carotene contents in the leaves of Caryota seedlings grown in peat moss followed by composted peanut (CPN) resulted in the highest content of chl.-a (0.987 and 0.960 mg/gm F.W, respectively) in the first season, whereas in the second season, growing the plants in composted peanut (CPN) resulted in the highest content of chl.-a (1.050 mg/g F.W.).In this concern, El-Sallami (1996) revealed that the leaf contents of chlorophyll showed a positive relationship with growth for the mix of pea t+ clay. Concerning the

effect of NPK, the data revealed that NPK at the highest rate (4gm / seedling) resulted in the highest content of chl.-a (1.508 and 1.567 mg/gm F.W, in the first and second seasons, respectively). The combined effect of media and NPK treatments indicated that, the application of NPK at 4 gm to seedling grown in CPN resulted in the highest content of chl.-a in both seasons. Regarding the response of chlorophyll-b content to the different NPK rates and growing media as shown in Table (2), the results showed that, in the first season, growing the plants in peat moss; followed by clay gave the highest content of chl.-b, whereas in the second season, growing the plants in clay resulted in the highest content of chl.-b. Raising the rate of NPK significantly increased the content of Chl.-b and NPK at the highest rate (4gm) resulted in the highest content of chl.-b in both seasons. Rathore *et al.* (1985) mentioned that higher nitrogen and phosphorus application rates increased leaf chlorophyll contents .The application of NPK at 4 gm to seedlings grown in peat moss resulted in the highest content of chl.-b, in both seasons. As shown in Table (2), the content of carotene, in both seasons, was the lowest in seedlings grown in CPN .All rates of NPK decreased the content of carotene as compared with the control. The application of NPK at 4 gm to seedling grown in peat moss resulted in the highest content of chl.-b in both seasons.

8. Total carbohydrates content

It is obvious from Table (4) that, seedlings grown in CPN medium, in both seasons, contained the highest value of total carbohydrates content in the leaves, as compared with the other growing media. Also, data indicated that using NPK at any rate significantly enhanced the accumulation of carbohydrate percentage in leaves of Caryota seedlings, as compared to the control. The rate of (4gm) produced the highest values in plants grown in CPN followed by those grown in peat moss. In this regard, Watfa (2009) found that application of NPK rates increased the content of carbohydrates in the leaves of *Aleppo pine* seedlings

9- Indoles and phenols contents

Considerable variations were recorded on indoles content in the leaves of Caryota due to using the different media as well as NPK treatments, as shown in Table (4). In this concern, receiving the plants grown in clay and fertilized with 4 gm NPK, decreased indoles content to as 0.53 mg/1g F.W. compared with control 1.80 mg/1g F.W. in the first season, but in the second season, growing plants in peat moss without NPK treatments (control) increased the indoles in plants to the highest value (1.63 mg/1g F.W.) .Concerning phenols content, generally, it could be concluded from Table (3), that plants grown in sand or clay,

under the same level of NPK, contained more phenol compounds in comparison to those grown in peat moss or CPN media. Hanafy, *et al.* (2000). Mentioned that high nitrogen fertilization decreased soluble phenols in *Eruca vesicaria* foliage plant.

10- N, P and K contents

Data in Table (5) indicated that, seedlings grown in CPN medium and fertilized with 4 gm NPK, in both seasons, contained the highest value of N- content in the leaves, as compared with the other growing media. Also, data indicated that using NPK at any rate significantly increased the accumulation of nitrogen percentage in the leaves of Caryota seedlings, as compared to the control. The rate of (4gm) produced the highest values. Regarding the effect of media on P-content, the data showed that, seedlings grown in CPN medium and fertilized with NPK at 3 or 4 gm, in both seasons, contained the highest value of P- content in the leaves, comparing with the other growing media. Application of any NPK Fertilization rate caused an increment in leaf P- percentage in comparison with e control. It was evident from Table (5) that, in most cases, seedlings grown in clay medium and fertilized with NPK at any rate, in both seasons, contained the highest value of K- content in leaves, comparing with the other growing media. Using NPK at any rate significantly increased the accumulation of potassium percentage in the leaves of Caryota seedlings, as compared to the control. The rate of (2 and 4gm) produced the highest values, in this respect. Alidoust *et al. (*2012) used peanut shells compost as a growing medium for Dracaena plants, they concluded that the highest nitrogen of leaf was related to 15% treatment of peanut shells compost in the growing mix with nutritional solution. The lowest nitrogen obtained in 30% peanut shells compost without nutritional solution. The lowest extent of phosphorus concentration was related to 45% treatment of peanut shells. The highest K %was recorded for 30% peanut shells compost treatment with nutritional solution. El-Sallami (1996) revealed that the leaf contents of N, P, K, Mg showed a positive relationship with growth for th a mix of peat + clay which gave the best growth. Bumgarner,*et al.* (2008)stated that fertilization increased aboveground biomass production and nutrient content, but decreased root dry weight. Watfa (2009) on Aleppo pine seedlings found that using NPK at ratio of 1:1:1 and 2:1:1. Gave the highest values of N and K content in leaves. Boughalleb,*et.al*.(2011) on *Citrus lemon and Citrus sinensis* mentioned that percentages of N in the leaves were increased in proportion to the amount of N added while the percentage of P and K were decreased.

Table (1): Effect of growing media and chemical fertilization on Plant height(cm), Plant diameter(mm), Number of leaves/plant and Leaf area (cm^2) of *Caryota mitis* Lour seedling during 2008/2009 and 2009/2010 season .

Plant height (cm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	60.05	53.38	65.30	78.65	64.30	62.31	55.72	69.50	80.23	66.94
NPK 1g	85.70	75.30	89.08	100.66	87.68	90.12g	88.71	93.76	110.71	95.82
NPK 2g	99.10	90.18	101.52	123.28	103.50	105.30	91.34	112.34	130.30	109.80
NPK 4g	110.18	109.02	119.40	150.19	122.20	117.10	110.82	130.10	152.73	127.70
Mean	88.76	81.97	93.82	113.20	------	93.71	86.65	101.40	118.50	------
LSD at 5%	A= 1.215 B= 1.215 AB=2.431					A= 1. 152 B= 1. 152 AB= 2.305				
Stem diameter (mm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	11.08	09.10	10.30	12.79	10.82	10.69	09.16	10.60	11.57	10.51
NPK 1g	12.32	11.57	15.60	18.92	14.60	11.45	10.45	16.20	21.05	14.79
NPK 2g	13.77	16.97	16.00	21.27	16.94	12.56	17.80	17.90	22.48	17.86
NPK 4g	13.77	19.07	19.50	20.01	18.09	13.94	18.93	18.30	22.93	18.52
Mean	12.67	14.18	15.35	18.25	--------	12.16	14.09	15.75	19.51	--------
LSD at 5%	A= 0.3428 B=0.3428 AB= 0.6855					A= 0.2924 B= 0.2924 AB= 0.5848				
Number of leaves/plant										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	4.30	4.30	5.16	5.33	4.77	4.99	4.55	5.31	5.68	5.13
NPK 1g	6.43	4.50	6.19	6.66	5.94	6.58	5.64	6.91	7.00	6.53
NPK 2g	6.59	4.93	6.23	6.00	5.93	7.43	4.95	7.78	7.33	6.87
NPK 4g	7.43	6.31	8.35	9.00	7.77	7.90	6.63	8.96	9.33	8.20
Mean	6.18	5.01	6.48	6.74	--------	6.72	5.44	7.24	7.33	------
LSD at 5%	A= 0.1537 B=0.1537 AB= 0.3075					A= 0.07910 B= 0.07910 AB= 0.1582				
Leaf area (cm^2)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	410.1	361.5	489.0	510.7	442.8	413.8	381.6	499.0	560.9	463.8
NPK 1g	501.3	465.5	516.5	713.3	549.2	581.8	473.1	591.4	760.0	601.6
NPK 2g	565.6	445.1	610.5	780.4	600.4	573.4	481.0	671.0	791.6	629.3
NPK 4g	619.2	633.9	763.8	981.0	749.5	697.4	662.1	781.7	895.0	759.1
Mean	524.0	476.5	595.0	746.4	--------	566.6	499.5	635.8	751.9	-------
LSD at 5%	A= 3.421 B= 3.421 AB= 6.841					A= 2.164 B= 2.164 AB= 4.327				

Composted peanut = (CPN)

Table (2): Effect of growing media and chemical fertilization on fresh and dry weight of shoots and roots (gm) of *Caryota mitis* Lour seedling during 2008/2009 and 2009/2010 seasons

Fresh weight of shoots (gm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	122.1	90.8	130.7	210.7	138.6	135.3	93.5	138.9	220.7	147.1
NPK 1g	173.6	129.3	183.9	275.5	190.6	185.4	135.2l	196.9	297.5	203.8
NPK 2g	200.0	195.3	205.6	335.5	234.1	207.3	197.9	225.4	357.9	247.1
NPK 4g	287.5	230.0	299.5	405.7	305.7	298.0	266.5	312.5	411.8	322.2
Mean	195.8	161.4	204.9	306.9	-----	206.5	173.3	218.4	321.9	-----
LSD at 5%	A=2.654 B= 2.654 AB= 5.310					A= 0.773 B=0.773 AB=1.546				

Dry weight of shoots (gm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	33.7	23.4	36.8	63.9	39.4	35.8	26.2	42.9	72.1	44.2
NPK 1g	44.7	33.5	51.7	86.6	54.1	49.6	38.9l	56.8i	91.6	59.2
NPK 2g	52.3	46.8	57.9	104.3	65.3	67.5	50.6	71.0	119.0	77.0
NPK 4g	70.1	60.6	84.0	122.4	84.2	79.9	74.3	101.1	135.3	97.6
Mean	50.2	41.0	57.6	94.3	----	58.2	47.5	67.9	104.5	----
LSD at 5%	A=0.988 B=0.988 AB= 1.975					A=0.947 B= 0.947 AB=1.895				

Fresh weight of roots (gm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	68.0	33.6	63.0	80.0	61.1	50.0	35.8	50.6	81.9	54.5
NPK 1g	79.0	46.5	79.2	95.9	75.1	66.0	40.5	65.0	93.0	66.1
NPK 2g	86.0	49.3	68.3	110.0	78.4	66.3	53.8	83.8	110.7	78.6
NPK 4g	98.0	66.8	99.7	150.7	103.8	80.0	68.3	89.0	130.6	91.9
Mean	82.7	49.0	77.5	109.2	--	65.5	49.6	72.1	104.1	---
LSD at 5%	A= 0.942 B= = 0.942 AB= 1.886					A= 6.051 B= 6.051 AB= 1.227				

Dry weight of roots (gm)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	12.7	5.8	10.9	13.6	10.7	9.3	10.8	8.54	14.2	10.7
NPK 1g	15.8	8.3	13.5	15.9	13.4	12.3	13.5	10.8	16.4	13.2
NPK 2g	16.3	8.6	11.7	18.8	13.8	15.6	11.7	14.7	19.6	15.4
NPK 4g	18.3	11.9	15.6	26.6	18.1	15.8	15.6	15.6	22.3	17.3
Mean	15.7	8.6	12.9	18.7		13.2	12.9	12.4	18.1	--
LSD at 5%	A= 0.288 B= 0.288 AB= 0.577					A= 0.158 B= 0.158 AB= 0.316				

Composted peanut = (CPN)

Table (3): Effect of growing media and chemical fertilization on the contents of chlorophyll a,b and caroteniods (mg /gm F.W) in the leaves of *Caryota mitis* Lour seedling during 2008/2009 and 2009/2010 seasons.

Chlorophyll a (mg /gm F.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	0.310	0.350	0.410	0.490	0.390	0.360	0.300	0.310	0.400	0.3425
NPK 1g	0.600	0.890	0.400	0.500	0.597	0.590	0.950	0.550	0.560	0.6625
NPK 2g	1.030	0.880	1.510	0.900	1.080	1.010	0.910	0.850	0930	0.9250
NPK 4g	0.820	1.630	1.630	1.950	1.508	1.120	1.060	1.780	2.310	1.567
Mean	0.690	0.937	0.987	0.960	---------	0.770	0.805	0.872	1.050	---------
LSD at 5%	A= 0.210 B= 0.210 AB= 0.421					A= 0.0263 B= 0.0263 AB= 0.0527				
Chlorophyll b (mg /gm F.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	0.20	0.17	0.21	0.22	0.20	0.19	0.18	0.20	0.26	0.20
NPK 1g	0.24	0.51	0.51	0.31	0.39	0.25	0.51	0.56	0.30	0.24
NPK 2g	0.46	0.71	0.62	0.41	0.55	0.59	0.75	0.57	0.59	0.46e
NPK 4g	0.60	0.78	0.91	0.78	0.77	0.64	0.95	0.98	0.97	0.60
Mean	0.38	0.54	0.56	0.43	---	0.42	0.60	0.58	0.53	0.38
LSD at 5%	A= 0.026 B= 0.026 AB= 0.053					A= 0.027 B= 0.027 AB=0.052				
Caroteniods (mg /gm F.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	0.35	0.40	0.45	0.36bc	0.39a	0.30de	0.41ab	0.40ab	0.35bcd	0.37a
NPK 1g	0.41	0.40	0.26	0.22g	0.32bc	0.43a	0.39abc	0.36bcd	0.30de	0.37a
NPK 2g	0.40	0.36	0.29	0.29ef	0.34b	0.36bcd	0.33cd	0.41ab	0.35bcd	0.36a
NPK 4g	0.30	0.31	0.35	0.25fg	0.30c	0.39abc	0.31de	0.41ab	0.26e	0.34a
Mean	0.37	0.37	0.34b	0.28c	---	0.37ab	0.36b	0.40a	0.32c	---
LSD at 5%	A=0.027 B= 0.027 AB= 0.053					A= 0.026 B= 0.026 AB= 0.052				

Table (4): Effect of growing media and chemical fertilization on the contents of total carbohydrates content (%D.W),the indoles and phenols (mg /g F.W) in the leaves of *Caryota mitis* Lour seedling during 2008/2009 and 2009/2010 seasons.

Total carbohydrates content (%D.W),										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	10.80	11.70	12.00	13.50	12.00	11.00	10.90	12.70	12.80	11.85
NPK 1g	11.00	13.60	15.10	25.70	16.35	11.93	12.50	13.40	23.90	15.02
NPK 2g	13.40	14.30	19.00	28.90	18.90	14.00	13.10	18.30	27.30	18.17
NPK 4g	13.00	15.70	20.70	30.70	20.02	13.91	19.80	21.90	33.60	22.30
Mean	12.05	13.82	16.70	24.70	----	12.71	14.07	16.58	23.98	----
LSD at 5%	A=0.442 B=0.442 AB=0.884					A= 0.874 B= 0.874 AB= 1.747				
Indoles (mg /g F.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
	1.00	1.80	1.41	1.13	1.34	1.13	1.60	1.63	1.00	1.34
NPK 1g	1.81	1.46	1.15	1.06	1.37	1.60	1.35	1.60	1.01	1.39
NPK 2g	0.97	0.87	0.95	0.69	0.87	0.69	0.79	0.93	0.81	0.81
NPK 4g	0.83	0.53	0.85	0.73	0.74	0.68	0.43	0.86	0.69	0.67
Mean	1.15	1.65	1.09	0.90	----	1.03	1.04	1.26	0.88	------
LSD at 5%	A=0.037 B=0.037 AB= 0.075					A= 0.059 B= 0.059 AB=0.112				
Phenols (mg /g F.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	1.93	1.60	1.50	1.53	1.64	1.69	1.95	1.45	1.61	1.68a
NPK 1g	1.86	1.90	1.69	1.03	1.62	1.80	1.83	1.60	1.13	1.59b
NPK 2g	1.06	2.10	0.83	0.91	1.23	1.35	2.68	1.06	0.66	1.44c
NPK 4g	1.19	0.91	0.96	0.86	0.98	1.10	0.89	0.99	0.70	0.92d
Mean	1.51	1.63	1.25	1.08	----	1.49	1.84	1.28	1.02	---
LSD at 5%	A= 0.046 B= 0.046 AB= 0.091					A= 0.046 B= 0.046 AB= 0.091				

Composted peanut = (CPN)

Table (5): Effect of growing media and chemical fertilization on the contents of nitrogen, phosphorus and potassium (%D.W) in the leaves of *Caryota mitis* Lour seedling during 2008/2009 and 2009/2010 seasons.

Nitrogen (%D.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN peat	Mean	Sand	Clay	Peat	CPN	Mean
Control	1.20	1.30	1.36	1.49	1.34	1.21	1.36	1.40	1.53	1.38
NPK 1g	1.54	1.70	1.93	2.01	1.80	1.35	1.28	1.91	2.30	1.71
NPK 2g	1.98	2.01	2.01	2.23	2.06	1.73	2.17	2.11	2.19	2.05
NPK 4g	1.95	2.30	2.30	2.50	2.26	2.03	2.63	2.10	2.50	2.32
Mean	1.67	1.83	1.90	2.06	---	1.58	1.86	1.88	2.13	---
LSD at 5%	A= 0.037 B= 0.037 AB= 0.075					A= 0.037 B= 0.037 AB=0.075				
Phosphorus (%D.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	0.14	0.16	0.18	0.19	0.17	0.14	0.14	0.18	0.18	0.16
NPK 1g	0.24	0.25	0.31	0.41	0.30	0.19	0.26	0.39	0.36	0.30
NPK 2g	0.41	0.42	0.43	0.44	0.43	0.38	0.41	0.56	0.37	0.43
NPK 4g	0.35	0.37	0.51	0.46	0.42	0.33	0.39	0.49	0.43	0.41
Mean	0.29	0.30	0.35	0.38	----	0.26	0.30	0.41	0.34	----
LSD at 5%	A=0.026 B=0.026 AB=0.053					A=0.026 B=0.026 AB= 0.053				
Potassium (%D.W)										
Treatments	First season					Second season				
	Sand	Clay	Peat	CPN	Mean	Sand	Clay	Peat	CPN	Mean
Control	1.00	1.00	0.93	1.06	1.00	1.03	1.05	0.83	1.10	1.00
NPK 1g	1.69	2.37	1.93	2.31	2.08	1.96	2.29	1.28	2.00	1.88
NPK 2g	1.93	2.26	1.63	2.03	1.96	2.06	2.29	1.41	1.19	1.74
NPK 4g	2.13	2.28	2.05	1.91	2.09	2.19	2.23	2.31	2.13	2.22
Mean	1.69	1.98	1.64	1.83	--	1.81	1.97	1.46d	1.61	--
LSD at 5%	A= 0.026 B= 0.026 AB= 0.053					A= 0.037 B= 0.037 AB=0.075				

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11/11/2012

Determinants of Using EMS or Attending Emergency Department after Minor Stroke and High-risk Transient Ischemic Attack in Henan, China

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Abstract: Objective: On the basis of current evidence, treatment delay is minimal if patients contact the emergency medical services（EMS） or attend an emergency department (ED) immediately after minor stroke or high-risk transient ischemic attack (TIA). Little is known about the factors that can influence these actions in China.. Methods: Data were collected from university affiliated hospital records from March 2010 to March 2012, and a questionnaire was administered that included questions about socio-demographics, self-reported risk factors and hospital arrival. Potential impact factors of utilizing EMS or attending ED were analyzed by both univariate and multivariate logistical regression. Results: Of 4247 patients who sought medical attention within 24 hours, 61.05%(2593) used EMS or attended ED after minor stroke or high-risk TIA. Multivariate analysis demonstrated that consciousness dysfunction(OR 3.129, 95% CI 2.397 to 4.084) at symptom onset, a higher income (≥2001 Yuan/month) (OR 2.590, 95% CI 2.244 to 2.990), speech impairment (OR 1.343, 95% CI 1.208 to 1.493), Headache or vertigo (OR 1.223, 95% CI 1.090 to 1.372), atrial fibrillation(OR 1.539, 95% CI 1.180 to 2.007), and have family history of stroke(OR 1.290, 95% CI 1.107 to 1.504) were significantly associated with utilizing the EMS or attending an ED. Older patients (65-74years) were less likely to use EMS or attend ED than younger patients (OR 0.765, 95% CI 0.612 to 0.956), similarly to those who reported having previously TIA (OR 0.757, 95% CI 0.616 to 0.929). Conclusion: Utilizing EMS or attending ED after minor stroke or high-risk TIA in Chinese patients is not enough. Being elderly, previous TIA and lower income may contribute to this current status..

Introduction

There is now clear evidence that the risk of recurrence after TIA or minor stroke is relatively high. This risk has been estimated as ranging from 8% to 12% within the first week[1-3]. Prompt assessment and investigation of TIA and minor stroke followed by early initiation of secondary prevention is effective in reducing recurrent stroke[4, 5].Most guidelines now recommend that patients with minor stroke or high-risk TIA should be assessed within 24 hours.[5, 6]Consequently, timely medical attention is increasingly critical.

Some registry studies in emergency department (ED) found that use of emergency medical service (EMS) transport after acute stroke has been associated with decreased prehospital and in-hospital delay[7], including time to physician evaluation[8, 9],which was similarly important to patients after TIA and minor stroke. A recent systematic review of delays to seeking medical attention after TIA[10] reported that on the basis of current evidence, treatment delay was minimal if patients contacted the EMS or attended an ED immediately. However, little is known which factors can influence utilizing the EMS or attending an ED

after minor stroke or high-risk TIA in China. Information on these impact factors resulting delaying can be very useful to health care decision makers.

Subjects and Methods

The First Affiliated Hospital of Zheng Zhou University is a university-affiliated hospital placed in the Henan region in China. Influence area of the hospital involves 5 municipalities and includes rural and urban area, which covers population of about 270 0000 people. Maximum distance from influence area to the hospital is 50 km. All minor stroke or high-risk TIA patients admitted to our hospital within 14 days after the onset of symptoms from March 2010 to March 2012 were prospectively studied. We excluded patients referred from other hospitals. All questions were answered by the patients themselves if possible or by a stroke onset witness or a close relative for sociodemographic data. TIA was defined based on World Health Organization criteria[11]. High-risk TIA was defined as $ABCD^2$ scores ≥4[5]. Minor stroke was defined as acute occurrence of neurological deficit with focal or generalized involvement of the nervous system lasting for more than 24 hours, with National

Institutes of Health Stroke Scale score ≤3.[12, 13] All cases of minor stroke were confirmed by brain CT or MRI scan. Prehospital delay was defined as the time from symptom onset until the earliest documented time in the ED or outpatient clinics of our hospital. Patients were excluded if they had any unknown or missing time of symptom onset. Detailed baseline data such as age, sex, marital status, education, health insurance, place of residence, risk factors and symptoms were abstracted prospectively using paper-based registry forms. All cases were subsequently reviewed by the study's senior neurologist and the study protocol was approved by the ethics committee of our hospital. Written informed consent was obtained from the patients or their legally authorized representatives.

Statistical Analysis

For each factor analyzed, the number and percentage of patients who did and did not use EMS or attend ED were recorded for the TIA and minor stroke groups. The $\chi 2$ test was used to compare proportions of categorical variables, and the student's t-test test was used to compare continuous variables.

Multivariate odds ratios with 95% confidence intervals were calculated using a multiple logistic regression model. We introduced all variables that showed a significant association (P<0.05) in the univariate analysis. We considered P<0.05 to be statistically significant in multivariate analysis. All analyses were conducted using SAS (9.1) software.

Results

7467 consecutive eligible patients included in the analysis, only 8.37%(625) arrived at the hospital by EMS, the majority of this action (arrival) occurred within 72 hours; 38.88%(2903) by taxi, which continued as a high percent within 14 days**(Figure 1)**. Of 4247(56.87%) patients sought medical attention within 24 hours, 61.05%(2593) used or attended ED after minor stroke or high-risk TIA (**Figure2**).

Factors associated with utilizing the EMS or attending an ED in the univariate analyses are shown in **Table 1**. After minor stroke or high-risk TIA, older patients (65-74years) were less likely to use EMS or attend ED(p<0.0001), but patients with a higher income (≥2001 Yuan/month) were more likely to use EMS or attend ED(p<0.0001). Analysis of symptoms showed that sensory symptoms (p=0.0498), Speech symptoms (p<0.0001), Headache or vertigo (p=0.0007), and Consciousness dysfunction (p<0.0001) were associated with utilizing the EMS or attending an ED.
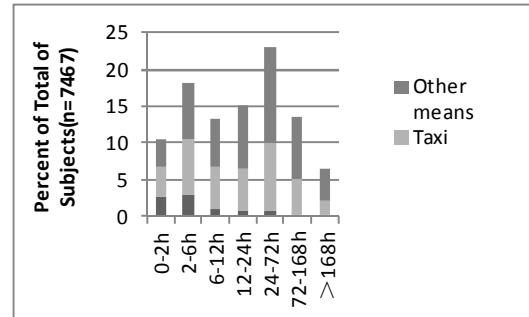

Figure1 Percentage distribution of arrival mode by delay time among patients after high-risk TIA or minor stroke within 14 days
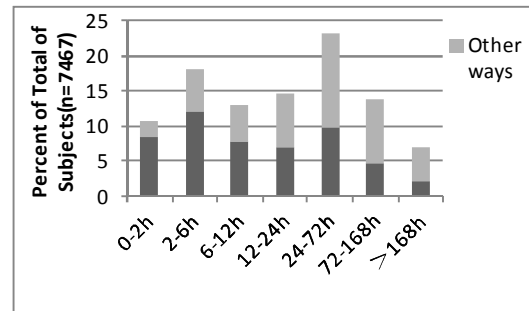
Figure2 Percentage distribution of presenting ways by delay time among patients after high-risk TIA or minor stroke within 14 days

Analysis of vascular risk factors showed that Previous TIA was significantly associated with not utilizing the EMS or attending an ED (p=0.0186), and Hypertension (p=0.0007) diabetes(p=0.0102) , coronary heart disease (p=0.0009), atrial fibrillation(p<0.0001), valvular heart disease (p=0.0022) and Family History of Stroke (p=0.0026) were associated with utilizing the EMS or attending an ED. There was no association between utilizing the EMS or attending an ED and sex, residence status, educational level, health insurance, with motor symptoms, or view symptoms at onset.

Multivariate analysis (**Table 2**)showed that older patients (65-74years) were less likely to use EMS or attend ED than younger patients (OR 0.765, 95% CI 0.612 to 0.956). Patients with a higher income (≥2001 Yuan/month) as opposed to those lower income (OR 2.590, 95% CI 2.244 to 2.990) more likely to use EMS or attend ED. One main symptom factor associated with utilizing the EMS or attending an ED was with consciousness dysfunction (OR 3.129, 95% CI 2.397 to 4.084) at symptom onset, the other independent factors were speech impairment (OR 1.343, 95% CI 1.208 to 1.493), headache or vertigo (OR 1.223, 95% CI 1.090 to 1.372), atrial fibrillation(OR 1.539, 95% CI 1.180.

to 2.007), and family history of stroke(OR 1.290, 95% CI 1.107 to 1.504). Surprisingly, those who reported having previously TIA (OR 0.757, 95% CI 0.616 to 0.929) were less likely to use the EMS or attend an ED

Table 1: Factors Related to the presenting to EMS or an ED after TIA or minor stroke: Univariate Analysis

	Used EMS or Attended ED		
	YES %(n)	NO %(n)	p
	50.69(3785)	49.31(3682)	
Stroke type			0.5841
High-risk TIA	18.94(717)	18.33(675)	
Minor stroke	81.06(3068)	81.67(3007)	
Sex			0.0833
Male	62.99(2384)	64.91(2390)	
Female	37.01(1401)	35.09(1292)	
Age(year)			<0.0001
18–44	6.05(299)	5.87 (216)	
45-64	41.53(1572)	42.80(1576)	
65-74	27.85(1054)	31.80(1171)	
75-84	21.22(803)	17.06(628)	
>85	3.36(127)	2.47(91)	
Educatin			0.1366
<high school	67.37(2529)	68.98(2502)	
≥high school	32.63(1225)	31.02(1125)	
Residence status			0.1327
Living alone	3.78(142)	3.14 (114)	
Living with others	96.22(3613)	96.86(3515)	
Health Insurance			0.5230
Medical insurance	82.22(3112)	82.78(3048)	
Own expense	17.78(673)	17.22(634)	
Average monthly			<0.0001
≤1000 Yuan	18.18(688)	29.85(1099)	
1001-2000 Yuan	11.70(443)	19.99(736)	
≥2001 Yuan	70.12(2654)	50.16(1847)	
symptoms			
Motor	63.92(2354)	62.29(2141)	0.1562
Sensory	23.75(879)	25.75(891)	0.0498
view	6.39(242)	6.33(233)	0.9076
Speech	38.49(1457)	30.96(1140)	<0.0001
Headache or	26.92(1019)	23.52(866)	0.0007
Consciousness	7.03(266)	2.36(87)	<0.0001
Cognitive	3.41(127)	3.45(120)	0.9243
Clinical			
Hypertention	65.50(2479)	61.71(2272)	0.0007
Diabetes	21.77(824)	19.36(713)	0.0102
Hyrpelipidemia	12.10(458)	10.76(396)	0.0678
Previous CHD	14.16(536)	11.60(427)	0.0009
Atrial fibrillation	5.71(216)	3.04(112)	<0.0001
Current Smoker	28.67(1055)	27.40(980)	0.1626
Family History of	13.54(478)	11.17(387)	0.0026
Previous TIA	5.68(215)	7.01(258)	0.0186
Previous Ischemic	27.08(1025)	26.15(963)	0.3652
Previous Valvular	1.95(73)	1.07(39)	0.0022
NIHSS at	2(0-3)	2(0-3)	0.0776
Pre-event	0(0-0)	0(0-0)	0.0685

NIHSS, National Institute of Health Stroke Scale; IQR, interquartile range; ED, emergency department; EMS,emergency medical service; CHD, coronary heart disease

Discussion

The low proportion of patients using EMS (8.37%) indicates a lack of public awareness that TIA or minor stroke is a medical emergency in China. In our study, older patients(65-74years) were less likely to use EMS or attend ED than younger patients, this seem to be in contrast to findings from some studies[7, 14] that older people were more likely to use EMS. Efforts should be made to inform this population about the risk of developing large infarcts and subsequent disability in China. Patients with a higher income as opposed to those lower more likely to use

EMS or attend ED, suggesting our health care maybe have economic differences.

Table2. Factors Related to the presenting to EMS or an ED after TIA or minor stroke: Multivariate Analysis

	Adjusted OR	95%CI	P
Age, y			
18–44	1		
45-64	0.897	0.724-1.112	0.3228
65-74	0.765	0.612-0.956	0.0187
75-84	1.053	0.833-1.332	0.6653
≥85	1.122	0.777-1.620	0.5387
Average monthly income per capita			
≤1000 Yuan	1		
1001-2000 Yuan	1.062	0.901-1.250	0.4740
≥2001 Yuan	2.590	2.244-2.990	<0.0001
Speech symptoms	1.343	1.208-1.493	<0.0001
Headache or vertigo	1.223	1.090-1.372	0.0006
Consciousness dysfunction	3.129	2.397-4.084	<0.0001
Family History of Stroke	1.290	1.107-1.504	0.0011
Atrial fibrillation	1.539	1.180-2.007	0.0015
Previous TIA	0.757	0.616-0.929	0.0078

OR, odds ratio; 95%CI, 95%confidence interval; ED, emergency department; EMS,emergency medical service.

Consciousness dysfunction, speech impairment, and headache or vertigo were associated with utilizing the EMS or attending an ED, perhaps these symptoms heightened sense of urgency. However, motor and sensory symptoms were not significant in this study. Public information on stroke symptoms is still needed, especially in high-risk populations. Furthermore, when patients are given information about stroke, more emphasis needs to be placed on the "call to action" and the emergency nature of stroke symptoms.

Population surveys have demonstrated that public perception and knowledge of TIA is poor[15, 16],and even those patients who recognized their symptoms as those of TIA did not always contact the EMS or attend an ED[17], a phenomenon that has also been documented after stroke[18, 19],which may explain why having a history of TIA did not have an effect on utilizing the EMS or attending an ED in our study.

More encouraging was the observation that patients with atrial fibrillation were more likely of utilizing the EMS or attending an ED , although this result seems to be in contrast to the usual poor awareness that the patients suffering from atrial fibrillation have increased risk of vascular diseases[20]. Having family history of stroke was an independent factor of utilizing the EMS or attending an ED in this study. Family members knew that the best response is to call an EMS or timely attend an ED in an emergency. This result is in agreement with another study[18] ,which showed that family history of stroke was a factor independently associated with a call for EMS within 1 hour after acute stroke.

Mass media educational campaigns do appear to work. An observational study assessing community stroke education with mass media campaigns observed increased ED attendance among patients with stroke and TIA[21], which appeared to that the media campaign have very great effect on ED attendance in patients with TIA. This suggested that the effective public educational campaigns including taxi driver should be utilized in China.

Although we think that our study data are valid, some potential limitations of this study should be discussed. TIAs and minor strokes before recurrence might have been under-reported as some patients are unable to give an account of previous TIA or minor stroke and corroborative accounts are not always available. A more comprehensive study of the factors associated with prehospital transport is needed in China, representing a mix of urban and rural hospitals and of research and community hospitals, including use of a standardized prospective interview questionnaire.

In conclusion, only half of those with high-risk TIA and minor stroke used EMS or attended ED in China. If the factors that influence utilizing the EMS or attending an ED can be better understood, interventions could be developed to increase these actions among this population. More effective work is needed to educate the public to seek medical review immediately after TIA and minor stroke in an attempt to avoid recurrent stroke and its devastating consequences.

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11/10/2012

The Effects of Osmanthus Fragrans Flower Extract on Maternally Deprived Rats in Early Life

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Abstract: In the past decade, oxygen radicals have been associated with the development of depression. Osmanthus fragrans is a plant that is distributed in areas of China, Japan and Taiwan. Report show that Osmanthus fragrans flower extract (OFFE), which contains a high amount of total flavonoid and polyphenol, has a significant antioxidant effect, and even has a neuroprotective function. The present study investigated the effects of OFFE on maternally deprived rats (MDP) in early life. The oxygen radical absorbance capacity (ORAC), glutathione (GSH) measurements and forced swim test (FST) were conducted to estimate the effects of OFFE on the MDP rats.The data showed that OFFE caused a significant dose-dependent increase in ORAC and GSH in the organs of the MDP rats, including the brain. At lower doses, the specific brain regions of MDP rats, such as the hippocampus, cerebral cortex, thalamus and cerebellum, also saw a significant increase in ORAC and GSH. In addition, the immobile time in the FST of OFFE treated MDP rats fell significantly at all treated doses. Moreover, the results of lower dose treatment experiments showed a correlation between the antioxidant ability of OFFE and its antidepressant effects. The results indicate that OFFE can strengthen the ability to carry out antioxidation in MDP rats, and that the depression-like behavior of such rats can be decreased due to the antioxidant effect of OFFE.

Keyword: depression, osmanthus fragrans flower, maternally deprived rats, the hippocampus, the cerebral cortex, oxygen radical absorbance capacity, forced swim test

1. Introduction

Reactive oxygen species (ROS), such as superoxide radicals, are reactive chemical species generated during normal metabolic processes, and in excess these can damage lipids and proteins [1-3]. Under normal physiological conditions, there is a balance between the oxidative and antioxidative systems in an organism, with oxidative stress caused by an imbalance between these systems in favor of the former [1]. The causes of oxidative stress have been attributed to either increased generation of reactive oxygen species, or impaired enzymatic or nonenzymatic defenses against them. Oxidative stress is always detrimental to the proper functioning of the brain, and can adversely alter neuronal signaling and inhibit neurogenesis [4]. In recent years, oxidative stress has been shown to contribute to the etiology of depression [4], and it has been found that major depression is often accompanied by a decreased antioxidant status and by induction of oxidative pathways [5]. However, the evidence for the curative effects of antioxidants on depression is still limited, and this is one of the motivations for the current study.

Osmanthus fragrans, also known as sweet osmanthus of sweet olive, is a species of Osmanthus native to Asia, found from the eastern Himalaysa through southern China, and to Taiwan and to southern Japan [6, 7]. Previous reports have shown that the dried flowers of Osmanthus fragrans have neuroprotective, free radical scavenging and anti-oxidative effects [8, 9]. There is also evidence that the pulp of Osmanthus fragrans, which is often considered agricultural waste, may be a promising source of natural antioxidants [10]. In addition, tea made from the flowers of the plant is widely used in Asia for the treatment of menopathies [11]. However, the antioxidant effects of Osmanthus fragrans with regard to depression have received little attention by researchers.

The development of an appropriate animal model for use in the depression-related studies is essential. The treatment of maternal deprivation during early life is widely used to generate depression-like symptoms in animals [12, 13] and the 60-min maternal isolation protocol in early life is well established in our laboratory to achieve this [14,15]. Therefore, rates that underwent 60-min

maternal isolation in early life were used in the present study. In addition, the FST was carried out to evaluate the level of depression in rats, based on the index of the time spent immobile in the swimming test [16, 17].

The present study was carried out in order to assess the effects of OFFE on the depression, as well as to clarify the related mechanism in the antioxidant pathway.

2. Materials and methods
Animals

This study was conducted in conformity with the policies and procedures detailed in the "Guide for Animal Care and Use of Laboratory Animals". The animal experimental protocols were confirmed by the Institutional Animal Care and Use Committee (IACUC) of Chung-Hwa University of Medical Technology. Adult male Sprague-Dawley rats weighing 150-170g at the time of testing were housed at a constant room temperature ($22\pm1°C$) and humidity ($50\pm10\%$ RH) with a 12-h light/dark cycle. Food and water were available ad libitum.

The preparation for the reagent of Osmanthus fragrans

The original extract stock of Osmanthus fragrans was obtained from the Seng-Da cGMP pharmaceutical factory in Taiwan. The extract stock was dried and condensed in a freeze dryer for over 72 hrs, in order to keep it in an anhydrous condition. The extract sample was then collected and kept in frozen storage at -20℃.

Maternal deprivation in early life protocol

The maternal deprivation protocol in early life was used to produce rats with depression-like symptoms, as described in detail previously [15]. In brief, pregnant Sprague-Dawley rats arrived at the animal facility on gestational day 12. The pups were sexed and culled into litters of 8-10 male pups and randomly assigned to maternal deprivation for 60 min per day for 14 days. When all pups were weaned, the rats were maintained four per cage at a constant room temperature of $22\pm1\ ^{0}C$ in a 12-h light/dark cycle (light on at 6:00 A.M.) with free access to chow and water.

Oral administration of OFFE protocol

MDP rats were assigned into control and OFFE treated groups. After 28 days, the MDP rats were subjected to oral administration of OFFE. The extract was prepared at the doses of 0.01g/kg, 0.1g/kg, 1g/kg and 6g/kg. The MDP rats were then randomly assigned to oral administration of OFFE at various doses. From days 29 to 42, the rats were fed with OFFE via the feed trough once daily. The treated and untreated rats were then subjected to FST or antioxidant ability measurements.

Assay for oxygen radical absorbance capacity (ORAC)

Tissue excised from the rats was homogenized, and 15 μl of the homogenizer was dissolved with 100 μl of 0.1 μM β-phycoerythrin (Sigma) and 85μl of 75 mM AAPH. A ELISA reader was then used to estimate the ORAC of the tissue. The absorbance wavelength was set at 485nm, and the detection was carried out for120 min. The ORAC calculation formula is as follows:

"$S = (0.5+ f\,5 / f\,0 + f\,10 / f\,0 + f\,15 / f\,0 \ldots\ldots+ f\,65/ f\,0)*5$"

"ORAC value $(\mu M) = 20 * k * (S_{sample} - S_{blank}) / (S_{trolox} - S_{blank})$"

where k is the sample dilution factor

The measurement for the glutathione (GSH) content

Tissue excised from the rats was homogenized, and 150 ul of the homogenizer was added to a number of vials. The samples in each vial were dissolved using 450 μL of 5% TCA solution, and a soluble extract was then obtained after pelleting the crude membrane fraction by centrifugation (1000 rpm for 10 min, 4 ℃). 30ul of the supernatant dissolved with 140ul of 0.4 M TRIS buffer and 10ul of 0.01M DTNB was resolved in a 96-well detection plate. After 5-min rest, the ELISA reader (OD: 405nm) was used to measure the GSH content of the tissues.

Forced swimming test

MDP rats were immersed in plexiglass cylinders (diameter 18 cm, height 38 cm) filled to a depth of 25 cm with water at 25°C. The FST was carried out on two consecutive days. On the first experimental day, rats were gently placed in the water for a 15 min period of habituation. On removal from the water, they were placed in a plexiglass box under a 60W bulb for 30 min to dry. The next day, they were placed in the cylinders and observed for 5 min. During this period, the total time that spent immobile (i.e., making only the movements necessary to remain afloat) was measured, and the immobility time (IMT) was calculated as the immobility time / total testing time*100%. After a 5-min test, the rats were removed from the water and placed in a plexiglass box under a 60W bulb for 30 min to dry and rest.

Statistics

The results are expressed as mean ± SEM. Sample sizes are indicated by n.

Comparisons between groups were carried out with a one- or two-way analysis of variance (ANOVA). Differences between two groups were compared using the unpaired Student's t-test, with $p < 0.05$ considered statistically significant.

3.Results

Clarifying the antioxidant effects of OFFE on control MDP rats

After 14 days of OFFE oral treatment, 4-week-old MDP rats were sacrificed for organ tissue analysis with regard to ORAC and GSH. Specifically, the organ tissues, including the brain, heart, liver, spleen, lung and kidney, were obtained for analysis. In figure 1A, the data show that the organ tissues taken from 1g/kg OFFE treated MDP rats had no significant enhancement in ORAC, except for the brain and the liver (figure 1a , the brain: control, 0.02%±0.04; 1g/kg OFFE treated MDP, 1.80%±1.11 ; $p < 0.001$ compared to control; the liver: control, 1.76%±0.49; 1g/kg OFE treated MDP, 2.22%±0.78 ; $p < 0.05$ compared to control, n=6 in each group). However, all the organ tissues taken from 6g/kg OFFE treated MDP rats showed significant enhancement in ORAC (figure 1a , the brain, the liver, the lung and the kidney groups, $p < 0.001$ compared to control, n=6 in each group; the heart and the spleen groups; $p < 0.01$ compared to control, n=6 in each group). Figure 1b shows the results for the GSH content. The data showed that all the organ tissues taken from 1g/kg or 6g/kg OFFE treated MDP rats expressed a significant increase in the amount of GSH compared to the control MDP rats (figure 1b, the brain, the liver, the spleen, the lung and the kidney groups; $p < 0.001$ compared to control, n=6 in each group).

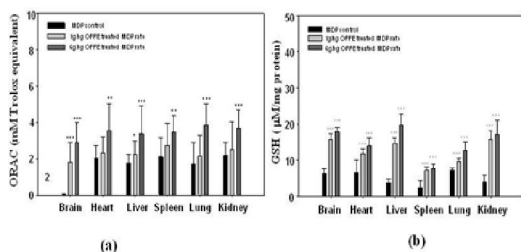
(a)   (b)

Figure 1. Estimation of the antioxidant effects of OFFE on the organs of MDP control rats

The MDP control rats treated with OFFE orally for 14 days. Then the rats were sacrificed and the organs (brain, heart, liver, spleen, lung, kidney) were taken out and homogenized for the measurement of ORAC

and GSH. (a) At the dose of 1g/kg OFFE treatment, the brain expressed a significant increase in ORAC (versus control, $p < 0.001$), and the liver also showed a lower, but still significant, increase in ORAC. At the dose of 6g/kg OFFE, all the screened organs expressed a significant increase in ORAC (versus control, $p < 0.001$). (b) The quantitative measurement of GSH in screened organ tissues was also carried out. Two doses, 1g/kg and 6g/kg of OFFE, were also examined here. The data showed that all the screened organ tissues produced significantly increased amounts of GSH at the two doses of 1g/kg and 6g/kg of OFFE (versus control, $p < 0.001$).

Estimation for the depression-like behavior of OFFE treated MDP rats

After 1g/kg and 6g/kg OFFE oral treatment for 14 days, MDP rats were subjected to the FST. The data showed that MDP rats treated with 1g/kg and 6g/kg OFFE has an obvious reduction in the IMT in FST (figure 2, naive, 126.2%±4.2; control, 191.5%±12.9; sham, 171.0%±14.7; 1g/kg OFFE treated MDP, 61.2%±16.9; 6g/kg OFE treated MDP, 55.5%±13.3 ; $p < 0.001$ compared to sham, n=6 in each group).
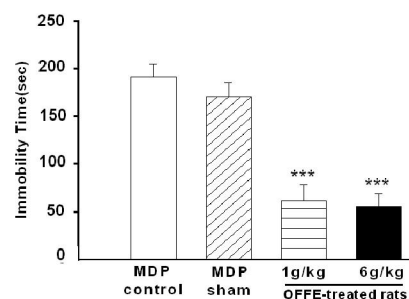
Figure 2. The depression-like behaviour of OFFE treated MDP rats was estimated by the forced swim test. MDP rats administered orally with OFFE at 1g/kg and 6g/kg for 14 days were subjected to the forced swim test. The data showed that MDP rats, treated with OFFE at 1g/kg and 6g/kg, produced significant and equivalent reductions in the immobility time in the FST.

Identifying the effects of OFFE on depression related brain regions based on the lower dose treatment

Based on the lower dose treatment, the sensitivity of the antioxidant response to OFFE in the depression related brain regions would reflect the correlation between the antioxidant effects and the anti-depression effects of OFFE. In figure 3, the data show that the depression related brain region tissues taken from 0.01g/kg, 0.1g/kg, and 1g/kg OFFE treated MDP rats expressed significant enhancement in ORAC (figure 3,

the whole brain, the cerebellum, the medulla, the hippocampus, the thalamus and the cerebral cortex groups; $p<0.001$ compared to control, n=6 in each group). Figure 4 shows the results for the amounts of GSH. The data show that the depression related brain region tissues (except for the cerebellum) taken from 0.01g/kg, 0.1g/kg, and 1g/kg OFFE treated MDP rats had a significant increase in the amount of GSH (figure 4, the whole brain, the medulla, the hippocampus, the thalamus and the cerebral cortex groups; $p<0.001$ compared to control; the cerebellum; $p>0.1$ compared to control, n=6 in each group).
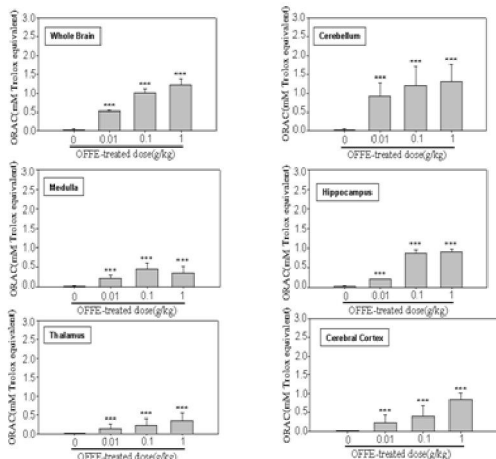
Figure 3. The estimation of the antioxidant effects of OFFE with regard to ORAC in depression related brain regions

MDP rats treated with OFFE at the doses of 0.01g/kg, 0.1g/kg and 1g/kg were sacrificed, and the depression related brain regions, the hippocampus, cerebral cortex, thalamus, cerebellum, medulla, and even the whole brain, were then dissected out. The antioxidant abilities of these brain regions were estimated by measuring the level of ORAC. The data showed that the OFFE extract could significantly increase the level of ORAC in the depression related brain regions at various doses.
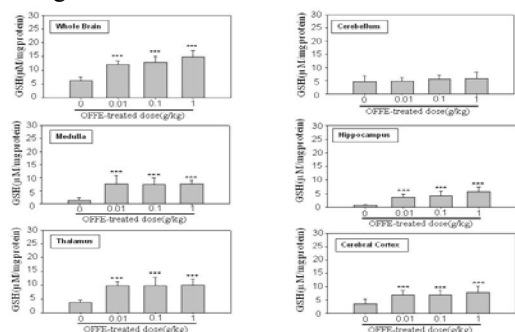
Figure 4. The estimation of the the antioxidant effect of OFFE with regard to the level of GSH in the depression related brain regions

MDP rats treated with OFFE at the doses of 0.01g/kg, 0.1g/kg and 1g/kg were sacrificed. , and the depression related brain regions, the hippocampus, cerebral cortex, thalamus, cerebellum, medulla, and even the whole brain, were then dissected out. The antioxidant abilities of these brain regions was estimated by measuring the amount of GSH. The data showed that the OFFE extract could significantly increase the amount of GSH in the depression related brain regions, except the cerebellum, at various doses.

Estimation for the effects of OFFE at lower doses on the depression-like behavior of MDP rats

The antioxidant effects of OFFE on depression related brain regions suggest some relationship may exists between the antioxidant and anti-depression effects of OFFE, and thus the depression-like behavior of the lower dose OFFE treated MDP rats was estimated. Rats treated with 0.01g/kg, 0.1g/kg, and 1g/kg OFFE orally for 14days were subjected to the FST. The data show that the MDP rats treated with 0.01g/kg and 0.1g/kg OFFE had a less significant reduction in IMT in the FST (figure 5, naive, 126.2%±4.2; control, 191.5%±12.9; sham, 171.0%±14.7; 0.01g/kg OFFE treated MDP, 129.3%±13.2; 0.1g/kg OFFE treated MDP, 131.6%±2.1; $p<0.05$ compared to sham, n=6 in each group). However, the rats treated with 1g/kg OFFE still had an obvious reduction in IMT in the FST (figure 4, sham, 171.0%±14.7; 1g/kg OFE treated MDP, 61.2%±16.9; $p<0.001$ compared to sham, n=6 in each group).
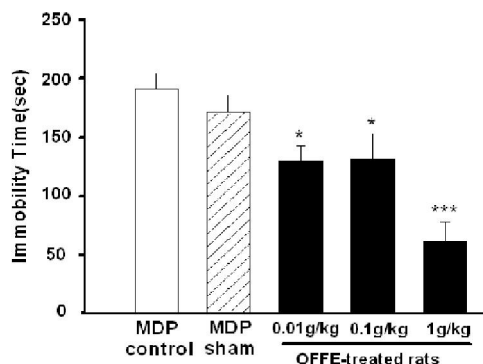

Figure 5. The effects of OFFE at the doses of 0.01g/kg, 0.1g/kg and 1g/kg on the depression-like behavior of MDP rats.

MDP rats were orally administered OFFE at 0.01g/kg, 0.1g/kg and 1g/kg respectively for 14 days and then subjected to the forced swim test. The data showed that MDP rats, treated with OFFE at various

doses, produced obvious reductions in IMT during the FST.

4. Discussion

The results of this study demonstrate that treatment with OFFE could significantly strengthen the antioxidation ability in the rats with depression-like symptoms. In addition, they show that the OFFE treatment reduced the depression-like behavior of the MDP rats. The results also suggest that this latter effect might be due to the increase in the amount of ORAC and GSH in the depression related brain regions of MDP.

Many studies have shown that the development of depression can be attributed to the damage caused to neurons by oxygen radical species (ORS)[1; 2; 4, 18]. However, whether antioxidant substrates are able to reduce depression has been unclear in the literature. Some evidence suggests that antioxidants could decrease depression-like behavior in animals, based on the results of indirect animal model experiments [19, 20]. In the present study, a more direct depression animal model, namely MDP rats, were used to assess the contribution of antioxidants to alleviating depression. The data showed that OFFE, an effective antioxidant [8, 9, 21, 22], can significantly increase the levels of ORAC and GSH in the depression related brain regions of MDP rats (figures 3 and 4). In addition, at the lower doses of OFFE treatment, the depression-like behavior of MDP rats was also significantly improved (figure 4). The results of this study thus provide convincing evidence for the contribution of antioxidants to the alleviation of depression.

It is of interest to consider whether as the antioxidation ability increases, this is accompanied by greater antidepressant effects. from the results of the current study show that the levels of ORAC in depression related brain regions show a dose-dependent increase when treated with OFFE (figure 3). Figure 4 also shows that the antidepressant effects of OFFE increase along with the treatment dose. In addition, the ceiling effect of OFFE treatment appears to be at a dose of 6g/kg, while the optimal dose is 1g/kg (figures 2 and 5). Taken together, these results suggest that the increased ability of antioxidation associated with OFFE can alleviate depression in MDP rats. In addition, the results of the lower dose treatment experiments also show a close association between the antioxidant ability of OFFE and the reduction in depression-like behavior in MDP rats. This is more evidence of the correlation between the antioxidant and antidepressant effects of OFFE, and it is likely that the antidepressant effects may be caused by the antioxidation effects.

5. Conclusions

The results of this work not only reveal the positive effects of OFFE with regard to increasing the antioxidant ability of MDP rats, but also the antidepressant effects of OFFE. Therefore, treatment with OFFE is likely to be an important candidate for the prevention or intervention of depression.

6. Acknowledgements

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11/10/2012

Relation between job satisfaction and depression of tonekabon township hygienic and re medical center of personnel

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Abstract: Job satisfaction as one of the most important element in increasing the efficiency and provides the positive lookout in individual with increasing job satisfaction , depression will decrease . Depression is a mood that deeply effects on individuals feeling thought ,behavior and health and they feel blue , hopelessness and empty and have no satisfaction of their jobs and other situation of their a life and every thing is indifferent for them . they deprecate whit their job ,environment ,coworkers ,with increasing the depression ,job satisfaction will decrease and with increasing the job satisfaction ,the depression will decrease .there is a meaningful linkage between depression and job satisfaction.The target of this research is finding the relation between job satisfaction with depression of personnel of hygienic and re medical center of tonekabon township which how many personnel of the re medical centers of Tonekabon township have depression and with the same proportion how many people a satisfied with their job .And wether the relationship between job satisfaction with depression is meaningful or not .so that with increasing the job satisfaction, depression will decrease and viceversa. The method of this research is solidarity type, therefore from 520 personal of Statistical society of Tonekabon hygienic and re medical. Centers, randomically 105 persons were chosen and fulled two questionnaire of Rant's job satisfaction and Back's depression. statistical datas were provided through spss statistical analysis of Spirman exam that has 99%(sij=0.000) confidence coefficient , that shows there is a meaningful relation between job satisfaction and depression . we result that there is a meaningful relationship between job satisfaction , depression will decrease and viceversa .

Key words: Job satisfaction ,depression ,rant's job satisfaction questionnaire ,back's depression questionnaire , personnel of hygienic and re medical centers .

Introduction:

Job satisfaction is one of the most important elements in increasing the efficiency and providing positive lookout in individual to his /her work . heresy and blanchard belive that job satisfaction is a function of organational prospects adjustment with individuals total nature needs - whenever both of them agree or conflict , synchronically behavior will comply with organization's prospects and individuals needs so that efficiency and satisfaction produce synchronically .(2003) .

Victoro room explains about job satisfaction : It is a kind of mental with drawl that individual has of his/her job and it's doing a kind of organizational behavior . so , satisfaction and implementing the work creat with completely different elements . (2002 ,Saatchi) .

So whenever personnel satisfy with the nature of their job and salary ,have suitable occasion for promotion and be satisfy with their coworkers and supervisors . job satisfaction demonstrate individual's feeling and job individuals like their values ,viewpoints and tendency and also work environment 's traits . job satisfaction is an effective factor on personnel's operation and organization exploitation .it effect on individual's satisfaction feeling of her/his life .

Kendal and haplin suggested five work dimension as follow work nature and salary, promotion opportunity of supervisor ,manager and coworkers, These dimensions are the most important work's

traits that individuals response effectively respect to them.(Nazari and A'zam Zadeh, 2005).Individuals' interests ,motivation viewpoint and personality is from one side , and work features like environment , organization dimension and culture and also management is from other side . if these factors endorse each other will cause a situation that person feel satisfaction of him/herself (sayeh,2010) .job satisfaction regard to the work and coworkers is result of personals impression that how their prospection's provide with their job (2003) .

When we say that a person has great job satisfaction , in fact we mean that he/she love his/her job so much , has positive feelings of it and satisfaction his/her needs   Through it .(2002)

There are three dimension of job satisfaction as below :

1.It is a sentiment response regard to job situation .

2.It specify in relation to complying the prospection and needs .

3 . It is created with some attached view points .job satisfaction is a kind of positive viewpoint regard to individual's job that is effected by some elements like work environment situation ,work organizational system ,environment relations and cultural factors and generally job satisfaction is a collection of feelings and sentiment that people have from their jobs .

In loans sight (2002) ,job's mental pressure is an agreeable reasons .to external situation that causes physical ,mental and manner al abnormality in organization members .mental pressure in job environment can have disadvantageing effects on personnel's physical and mental health and increases stress that impress in creation of depression with having no job satisfaction (tiswall2002,milvar 2005) .

Depression

Depression is the most current disease that every year about 10-15 % of population take it .

In today's society ,depression is a kind of and illness .this illness is one of the most current chronic illness and from every 10 out patients .

One get it .This disorder can manifestly decrease patients function in every job's fields ,social and family relationship and also causes not to enjoy and having emotional and mental pressure .Depression is a state that deeply his/her realization method will change him/her from himself /herself and environment . In fact depression create because of battle in personal tendency .

As the clinical depression report show , it is a health problem in the world that because of it s widely growth development is called cold .(2002)

Depression is one of the basic mental unorganization (mehryar, 2004)

Depression is a state that deeply effects on feelings , thought , behavior and physical health (salmi ,nebz ,translation by khalkhali zaviyeh, 2004)and how changes the realization of depression are depressed mood and lack of intrest and enjoy . a depressed person may propose that feels sorrow ,disappointing , empty and nothing . depressed mood has special model format for the patient that is different from common sadness .depressed patients sometimes complain for crying disability almost all the patient complain about reduction of energy and energy and disorder in work (Kaplan sadouk, p95)

At present the fourth current illness in the world is depression and based on the announced statistics from universal Hygienic organization ,three millions people suffer depression in the world and according to estimation that have been done , it's expected that his illness would be the second current one in the world until 2020 .

Depressed person does not have enough power and motivation for doing the routine activities and study and work function and relationship will be disordered . He /she is such sad and disappointed that can't find solution for her /his problems or decide for his /her life 's important problems or decide for his/her life's important problems and sometimes some of them that are sever depressed think about suicide .

Depression disorder can have negative effect on adhesion relationship .

Depression disorder has particular important in set of mental problems .(keras,kamp and koukeh) people who are more humorist explain their problems more easily ,and they try to reduce their sadness with support of other against the routine problems and therefor .they would enjoy more effectiveness (nezleck and darcks 2001) .

Depression is a kind of feeling angrier and wrath regard to others ,feeling vanity and empty about meaning of the life , and disability in gaining happiness and pleasure that involves a wide spectrum of human's negative tensions and a broad part of routine and common experiences like anger ,horror , sorrow and despondency (fitz Patrick and sherry 2004)

Theory

The assumption is that there is an that is an inverse relationship between job satisfaction and depression ,it means that with increasing job

satisfaction , depression will decreas and viceversa .

Method:
The research methods type is adhesional .there are 520 person in statistical society and 105 persons were chosen as sample .
71person (67.5%)of this 105 persons are men (32.5%),31 persons (29.5%) are single and 74 person (70.5%) are married .
There are 36 person (34.3%) with ages from 20 to 25 ,2person (1.9%) with age of 25 to 30 ,33 persons (31.4%) with age of 30 to 35 ,17 persons (16.2%)from 35 to 40 12 persons (11.4%) from 40 to 45 and 5 persons (4.8%) from 45 to 50 work background of 46 person is from is from 1 to 5 years , 8 persons from 5 to 10 ,12 persons from from 10 to 15 years and 4 person from . 15 to 20 years .

Tool:
Dant and his co workers   job   satisfaction questionnaire in format of two elemental theory of Herzberg has been provided in 1966 . This questionnaire was translated from English to Persian bay monavar mojarad zadeh in 1994 and in 2008 Fath abadi identified it s norms in Iram . this questionnaire has been accepted by us her professor and counselor .

In   postgraduate thesis with guidance of shafi'abadi this exequatur with the topic of job consulting effectiveness on job compatibility method and job satisfaction in creas of bus factory .
The questionnaire involves 36 phrase and there is a seven degree scale in front of every phrase . It asks the responsor to read the phrase carefully and then determine her/his agreement measure with degrees from one to seven . Degree one is the lowest degree of satisfaction and seven is the higher one .
Back depression questionnaire
This examination is used not only in recognizing the patients but also in natural population and has positive and more adhesion with other scales .This questionnaire was created by back in 1976 and there was a revision on it in 1979 . Its credibility has been certifiable .

Statistical analysis
Findings
55 persons (52.4%) with high job satisfaction ,2 persons (1.9%) with low job satisfaction ,48 persons (45.7%) with medium job satisfaction ,6 persons (5.7%) with low depression ,15 persons (4.3%) with depression possibility and 83 persons (79%)natural .
Finding   through spss statistical analysis of spearman examination are as below :

Depression	Satisfaction		
0.344	1.000	Correlation coefficients	Satisfaction
0.000		Sij	
105	105	N	
1.000	0.344	Correlation coefficients	depression
	0.000	Sij	
105	105	N	

This table shows that there is a meaningful relationship between job satisfaction and depression with 99% (sij=0.000) coefficient . this mean that there is a relationship between job satisfaction and depression so that with increasing the depression ,job satisfaction will decrease .

Discussion and resulting
The result show that the relationship between job satisfaction and depression meaningful , increases and viceversa will what ever job satisfaction reduces . having a successful life needs having

job   satisfaction , reliance to   God , avoiding disappointment and therefore depression .

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Characteristics of Online Education and Traditional Education

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Abstract: Distance education dictates changes in behavior for both the teacher and the learner. The successful student develops persistence and skills in self-directing work. The successful distance education teacher becomes conversant with new technology and develops new instructional styles, moving from creating instruction to managing resources and students and disseminating views. Administrative and faculty support for distance education are critical to the success of this instructional method. Administrators should take note that the implementation of a distance education program may allow access to a greater number of students. However, the time and work associated with teaching at a distance exceeds the normal requirements of campus-based instruction. Students in distance education settings perform as well or better on assignments, class activities, and exams when compared to campus-based students .Nevertheless, students must maintain persistence and a clear focus to succeed in a distance learning situation. Self-direction, a passion for learning, and strong individual responsibility are important influences on achievement. There are indications that distance education works best for more mature, motivated, well-organized, and already accomplished learners .

Introduction:

When the standardization and the requirements for training by the third millennium will be talking, unconscious form, design and construction to provide context and use tools and indicators to teaching the principles of community-based knowledge to the mind is centered. . No doubt these requirements and identify the correct tools and proper utilization of their functions according to accelerate the development expected in the knowledge-based information society will be effective. Such concerns and problems that any country in its development plans in motion to the information becoming a knowledge based society means a society would be faced with the centrality of knowledge, Dealing with existing tools and how these tools are used.

Led the way when dealing with those massive training programs available to speak to the technological tools that we expect to occur that planners and decision makers that planners and decision makers of large structures, especially university education according to the image Access to the development of community information are available on these tools are selected and used.

Massive wave of data produced in today's world it nicknamed the "information age" has all day and through various means of communication in the world will move on its size are added. Other hand, as we're not the world witnessed the development of the role of information communication devices transporting feedback fast and absorb the information around the world, we forget

Therefore, information and communication as the main lever or two important moves in developing wings, we learn. Meanwhile, proper utilization of the capacities of these two valuable and effective indexes in the general development concept for any society and the principles of a critical need is considered. With a view to clarifying this issue can be paid in the best way to create a platform for developing data standards and access to a knowledge based society, what really can be. To achieve a clear and practical answer in this area before all the existing definitions and indicators mentioned placed.

What is Distance Education?

Distance education is education designed for learners who live at a distance from the teaching institution or education provider. It is the enrollment and study with an educational institution that provides organized, formal learning opportunities for students. Presented in a sequential and logical order, the instruction is offered wholly or primarily by distance study, through virtually any media. Historically, its predominant medium of instruction has been printed materials, although non-print media is becoming more and more popular. It may also incorporate or make use of videotapes, CD or DVD ROM's, audio recordings, facsimiles, telephone communications, and the Internet through e-mail and Web-based delivery systems. When each lesson or segment is completed, the student makes available to the school the assigned work for correction, grading, comment, and subject matter guidance by qualified instructors. Corrected assignments are

returned to the student. This exchange fosters a personalized student-instructor relationship, which is the hallmark of distance education instruction. Historically, most distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, locksmithing, child day care management, yacht design, and many fascinating subjects. Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study. Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members.

Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. You receive individual attention, and you work at your own pace. In recent years, technology has played a significant role in transforming the traditional distance education school into a dynamic, interactive distance learning method using toll-free telephone lines, as well as a diverse array of personal computers, video devices, CD and DVD ROMs, online courses over the Internet, interactive devices, and other modern technological innovations. The future for distance study promises to be exciting!

Benefits of Distance Learning:
Benefits and opportunities that distance education provides, include:
- training a wide range of audiences.
- meet the needs of students and students who can not attend in place.
- Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Educational methods in distance learning:
Today, under the new system replaced the traditional systems of learning and learning week (ie tutoring methods, lectures) are:
Multimedia courses:
These courses and widely used elements of image, communication, graphics and simulated components, animation and communication elements for guidance and tips, and talk back on course and curriculum issues are held.
- **Enhanced communication mechanisms:**
The mechanism of any texts simultaneously, and asynchronous audio-visual communications to protect you. This case allows students to practice on topics learned will give.
- **Written test:**
 thus, question and test via a distributed communication network, are corrected and returned. These exams through video conferencing support and runs**.**
-Virtual Seminar:
thereby different groups of students in different geographical environments linked together makes.
- **Collaborative virtual laboratories:**
 the laboratory of the Group's activities are supported. Workshops such as software engineering.
-Smart academic factors:
academic factors that inform intelligent, support and guidance students pay.

 Remote educational tool:
distance learning tools and supplies various uses. These tools in four main courses are:
A - Audio Tools:
Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.
 B - Image tools:
including slides, films, video tapes and video conferences.
C - Data:
Computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.
Computer applications for distance education are varied and include the following:
1- Training to Computer Management.
 2 - Computer Assisted Instruction.
3 - through PCs.
4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.
D - Print:
The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Pros and Cons of Online Education

Nowadays it is possible to do almost anything online. Many different types of diplomas, certifications, and academic degrees are available from online learning institutions.

This article discusses both the advantages and the disadvantages of online education. The Internet has enhanced and changed every aspect of our life, and now it is making inroads into the world of education.

Online education and classes are not just a buzz; they are a new technology that is making a difference for teachers as well as students.

Online Education Pros

Of the many advantages and new possibilities of online education, here are some of the Strengths:

1. Greater flexibility

Online students have more freedom in choosing their programs and schedules. This allows many busy adults to adapt online courses to their already established everyday life of work and family.

For many, this is simply the only way they can study for that degree which will take them farther in their career and life.

2. Saves Time and Money

Online education saves an enormous amount of time and money which in traditional education is wasted on commuting. Commuting is also very tiring, while online education means you can study from home, in a comfortable environment with everything you need close at hand Tuition also costs less for most online institutions.

3. Logistics

Traditional education is restricted due to logistical issues; there is only this amount of students who can be in a place at a given time, whereas in online classes, there is no question of paucity of space. As long as the online classes have the necessary bandwidth, an unlimited number of students can study, all over the globe.

Then again, traditional classes would turn up expensive to maintain, because the educational institution needs to maintain a place and its facilities. When it comes to online education, all they need to do is to set up E-learning tools, an Internet connection and a website where people can learn. While this is not cheap too, but it is definitely cost less as compared to the costs of a place to carry on.

Online Education Cons:

To balance our view of online education, let's consider some of the disadvantages/Weaknesses:

1. Requires Self Discipline

The greater freedom of online classes requires greater self disciplines, but not everybody has it. The comfort of studying from home may also reflect negatively on your motivation to do your best.

Depending on your personality, home can provide as many distractions as traditional campus facilities (designed especially for studying).

2. How well have you learned

With online education, the students have a greater hold on the education process, and that is not always a good sign. For example, in online education, though the teachers set up the audio and video clips with the same dedication, it remains to be seen whether the students study it with the same dedication that they would in a classroom.

3. No Campus Life

Many people remember the college/university as the best time of their lives. Part of it is the campus life – During and after classes. One of the disadvantages of taking online education rather than traditional one, is that in online education you will not have the atmosphere of campus lawns, corridors and classrooms, huge libraries with real books you can hold. There will be no campus buddies and no campus culture.

4. Internet Connection

Another negative point of online education is that it entirely depends on the internet connection. Though many countries have a robust Internet connection and others are getting it soon, there are still countries, and areas in countries that do not have access to Internet and other enhanced technologies. It would be difficult to get online education in countries that have a limited online presence.

These are just some of the distinguishing points between online classes and traditional classes.

Online Education VS Traditional Education

This article reviews the differences and the pros and cons of online VS traditional education. Gone is the world where only traditional, campus-based education existed and you only had to choose the university or college you wanted to study in.

Someday, probably in the near future, Online Education will replace traditional institutions. At least, many degree programs will combine the on campus courses as well as online classes as a standard educational approach.

But for now, the future student has to decide first whether he/she wants to study online or on a campus degree. Here are some points to consider the pros and cons of online and traditional institutions:

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11/10/2012

The effect of breastfeeding educational program on breastfeeding condition

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Abstract: Breastfeeding has long been recognized as the preferred method of feeding in the first year of life and W.H.O has recommended exclusive breastfeeding for 6 months. Despite the clear benefits of breastfeeding to mother and infant, breastfeeding rates today continue to remain below of recommended level in many countries. Research has shown that mothers' information about advantages of breastfeeding may be one of the predictor factors affecting breastfeeding, so this study has been done with objective of determination the effect of breastfeeding educational program on breastfeeding condition. A Quasi-Experimental study design was used to test the effect of breastfeeding educational program on exclusive breastfeeding duration. A convenience sample of 120 pregnant women referred to health centers of Ahvaz were selected and divided randomly in two groups. All women were primiparus and indicated their intent to breastfeed their infant. In their last month of pregnancy case group received breastfeeding educational program. Six month after delivery breastfeeding condition in two groups was determined by researchers. Findings of this study showed that the difference between means of exclusive breastfeeding duration between the two groups was statistically significant. The mean duration of exclusive breastfeeding was 5.2 month in case group compared to 2.05 for control group. The results of this study suggested that breastfeeding education in last trimester of pregnancy may increase the duration of breastfeeding and it seems that compilation of educational program in prenatal care of pregnant women is necessary.
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Key word: education/ breastfeeding/pregnant women

Introduction:

Breastfeeding is one of the most important methods in children's health improvement and a basic strategy in providing children's survival and growth in society. The positive effects of breastfeeding on children's growth and development, as well as on mothers' health, are known for many years and it is noticed by the world health organization, UNICEF, and all scientific communities in the world. (1, 2)

The world health organization recommends that children should continue exclusive breastfeeding during the first six months of their lives and then, along with complementary nutrition, continue it for 2 years. (3, 4)

Different statistics show that in developing countries, due to not using mother's milk, the infant mortality rate is one child every 30 seconds and 1.5 million children every year. In these countries, 70 percent of infant mortality is due to not using mother's milk.

Although the evidences show that the advantages of breastfeeding for human infant increases by increasing the duration of breastfeeding and exclusive breastfeeding, most women stop breastfeeding while only a few of them do that because of physical problems (6). With regard to the importance of breastfeeding in disease prevention and its advantages for mother and child, stopping breastfeeding, especially in first six months of the child's life, will be disadvantageous for the mother, the child, and the society. Many studies are done about exclusive breastfeeding, all of which show that breastfeeding rates and exclusive breastfeeding are still way far from fulfilling the world health organization's recommendations (7). Despite the fact that 96 percent of the mothers tended to breastfeed their children, the recent study in Japan showed that only 44 percent of them had exclusive breastfeeding for the first

four weeks after childbirth and also less than 35 percent of Canadian mothers and 29 percent of American mothers had exclusive breastfeeding for 4 months (6).

Although the ministry of health and medical education in Iran considers the promotion of breastfeeding as one of the important strategies for children's survival and growth and took some effective steps in that field, the prevalence of exclusive breastfeeding is very low. According to the last study done in Iran and titled "Reviewing the Characteristics of Population Indicators in year 2002", the indicator of exclusive breastfeeding, until the child was 6 months old, was reported to be 23/1 percent in the whole country and 19/5 percent in the city of Ahvaz (8).

The study done by Torabizadeh et al, shows that in most of the cases, stopping breastfeeding was due to the unawareness of women and the people around them (9). The studies done in different places of the world show that mother's awareness of the advantages of breastfeeding, her attitude towards breastfeeding, marriage age, increasing the level of education, family income, supports received from the family, decision making to breastfeed during pregnancy, the experiences related to the first breastfeeding, and her self-confidence during breastfeeding, were effective factors in the continuation of breastfeeding (10). Moreover, factors such as false beliefs in breastfeeding are the important reasons for stopping breastfeeding and interfere with breastfeeding. They are also important in feeding with powdered milk (11).

Since women's awareness about breastfeeding is one of the effective factors on breastfeeding condition, and according to the low rate of exclusive breastfeeding in the city of Ahvaz, we decided to do the present study which aims to identify the effect of breastfeeding educational program on breastfeeding condition in the city of Ahvaz.

Methodology:
This study is a semi-experimental study that aims to review the effect of breastfeeding educational program on breastfeeding condition among the mothers who referred to health centers of Ahvaz in year 2010.

In this study, all those women who were pregnant for more than 36 weeks and referred to health centers of Ahvaz for prenatal care formed the research population. The study inclusion criteria were: first pregnancy, gestational age of over 36 weeks, over 18 years of age, wish to breastfeed, no systemic disease (according to the mother stating it by herself), no breast abnormalities in mother, and having the minimum literacy level of guidance school. If the mothers changed their minds about participating in the study or an infant died, they were excluded from the study.

In this study, the data collection instrument was a questionnaire consisting of two sections: the first section was related to personal-social characteristics of research samples and the second section was related to the women's breastfeeding condition in the sixth month after childbirth. The breastfeeding condition was divided into five columns: mother's milk (breast milk) only, consuming mother's milk in addition to other liquids, consuming mother's milk and less than a bottle of powdered milk per day, consuming mother's milk and a bottle (or more than a bottle) of powdered milk per day, and infant's feeding without using mother's milk.

To achieve scientific validity of the instrument, content validity method was used and the instrument was analyzed by ten faculty members of the school of nursing and midwifery and their comments and suggestions were applied to the questionnaire. In order to achieve scientific reliability of the instrument, test-retest method was used.

In this study, 120 pregnant women who referred to health centers of Ahvaz for prenatal care were selected based on study inclusion criteria. Then, after obtaining written consent from the mothers and completing the first section of the questionnaire, they were randomly divided into two groups: case group and control group. The members of the control group received only routine prenatal care while for the members of the intervention group, 2 sessions of breastfeeding education within 2 days were held and each session lasted 2 hours. In these sessions, a handbook of breastfeeding, which was already compiled by the researcher, was also given to the pregnant women. It is worth mentioning that the handbook included an introduction about breastfeeding, the advantages of mother's milk for the child, the mother, the society and the proper breastfeeding position, mother's condition, child's condition, proper way of sucking, mother's breastfeeding conditions and actions that guaranteed mother's success in breastfeeding. In the first month after childbirth, the mothers in intervention group were given a call to be encouraged in breastfeeding and guided, if they had any problems. The researcher's phone number was given to the mothers so that if there was any problem in breastfeeding, they could call the researcher. Finally, the questionnaire related to breastfeeding condition 6 months after childbirth was given to the mothers to be completed. After the end of the sessions and completing the questionnaires, the final results among the mothers in case and control groups were analyzed by SPSS software and descriptive and inferential statistics.

Results: the research findings showed that the age range of the research samples was between 18 to 39 years old, average age was 26/6 years old and its standard deviation was 5/5. The average age of marriage was 23/7 with a standard deviation of 5/2. The women participating in the study were all pregnant for 36 to 42 weeks and the average age of pregnancy was 38/06 with a standard deviation of 1/78. Most of the research

samples had secondary education (high school diploma) and their monthly earnings was between 200,000 to 500,000 tomans. Moreover, most of them were housewives and 47/5 percent of them were highly provided with emotional supports of their husbands and only 6/7 percent of them stated that the emotional supports of their husbands were very low (Table 1). The results of the chi-square test and T-test show that there is no significant difference in personal-social characteristics of the studied variables in case group and control group.

Table 2 shows mothers' breastfeeding condition 6 months after childbirth in intervention group and control group.

Independent T-test showed that there is a significant difference between the average duration of exclusive breastfeeding in case group and control group (Table 3).

Table 1: Personal-social characteristics of the mothers who referred to health centers of Ahvaz

Test Results	Case		Control		Group		
	Percent	Numbers	Percent	Numbers	Variable		
x^2=3/56 df=3 P>0/05	11/7	7	16/7	10	Middle (guidanc	**Education**	
	25	15	31/5	19	Secondary schoo		
	46/7	28	30/1	18	Diploma		
	16/6	10	21/7	13	College		
	100	60	100	60	Total		
X^2=3/2 df=2 P>0/05	76/7	46	86/7	52	Housekeeper	**Occupation**	
	23/3	14	13/3	8	Working		
	100	60	100	60	Total		
Test Results	**MD±SD**		**MD±SD**		Variable		
t=./3 df=118 P>0/05	26/8±5/7		26/04±5/4		Age		
t=./66 df=118 P>0/05	24±5/4		23/4±4/9		Marriage Age		
t=./54 df=118 P>0/05	38±1/4		38±2		Pregnancy Age (week)		

Table 2: Comparison of breastfeeding condition 6 months after childbirth in control group and case group

Case		Control		Group / Variable
Percent	Numbers	Percent	Numbers	
38/3	23	16/5	10	Mother's milk only
28/3	17	25	15	Mother's milk in addition to other liquids
18/3	11	16/7	10	Mother's milk and less than a bottle of powdered milk
10	6	23/4	14	Mother's milk and a bottle (or more than a bottle) of powdered milk
5	3	18/3	11	Infant's feeding without using mother's milk
100	60	100	60	Total

Table 3: Comparison of the duration of breastfeeding in case group and control group in health centers of Ahvaz

Test Results			Case		Control		Group / Variable
T	Df	pvalue	Standard Deviation	Average	Standard Deviation	Average	
2/84	53	P<0/05	1/66	5/03	1/69	2/73	Duration of exclusive breastfeeding

Discussion: This study was done to identify the effect of a breastfeeding educational program on breastfeeding condition of the mothers who referred to health centers of Ahvaz. The findings of the study showed that most of the participants of the intervention group began breastfeeding immediately after the childbirth and continued it up to the sixth month after the childbirth. The present study indicates that exclusive breastfeeding duration among the mothers who received educational program, compared to the mothers of control group, increased significantly (5/03 in 2/73 months). Moreover, the ratio of people who breast-fed their children using mother's (breast) milk and less powdered milk and other liquids, was higher in intervention group. This shows the effect of education on breastfeeding condition. It could also indicate that increasing information in mothers before childbirth and postpartum follow-ups could affect mothers' breastfeeding behaviors.

The study done by Forster in Melbourne about breastfeeding face-to-face education on 972 women with primiparous pregnancy and during weeks 18-20 of pregnancy, showed that, compared to control group, education would increase the beginning of breastfeeding and the continuation of breastfeeding 6 months after childbirth by 10 percent, which was consistent with our study (12).

The results of the study done by Heirdarnia et al, (2007) in Iran, showed that on the whole, using health educational programs had significant effects on increasing the awareness, attitude and performance of the research samples in breastfeeding children. Moreover, the study done by Sharifi Ra'ad et al. (2010)

in Arak showed that breastfeeding educational program had a positive effect on mothers' breastfeeding behavior. The results of both studies are consistent with ours.

A lot of studies about exclusive breastfeeding are done, all of which show that the rate of exclusive breastfeeding is still way far from fulfilling the world health organization's recommendations. While pregnant, mothers receive sparse information about exclusive breastfeeding, but since basic education is not sufficient, cultural and social beliefs affect breastfeeding success. In developed countries and for mothers to success more in breastfeeding, the education begins before birth and resourceful and interested people carefully prepare mothers for successful breastfeeding (13). It is hoped that the results of this study will encourage the country's esteemed health authorities to develop a proper educational program (curriculum) for pregnant and nursing women and make mothers more successful in exclusive breastfeeding.

Conclusion: the basic role of breastfeeding in children's health, growth and development, have been known for years. Almost all women are capable of breastfeeding, yet most infants are deprived of exclusive breastfeeding. Promoting the level of breastfeeding throughout the society, without women's help and support, is not possible and health care workers play a key role in this. Thus, holding educational sessions and encouraging parents to participate in these classes seem necessary in prenatal care.

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On investigation between psychologies hardeners and resilience In N.A people

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Abstract: Understanding all background factors and comses of addiction lead to planning prevention, identi fying , treatment and p.following manners by haring goals. present research for analizing relation between psychologic hardiness and resilence in N.A people of Gilan county. This descriptive research is a correative one.participants in this research are 100 people of unknown addicted gooups that are selected by sampling metod . for data collecting , Ahvaz psychohogic hardiness qyestionaire cah1 and daridson _ Qunor resilense questionaire (CD _ RIS) are used. for data analizing regression analize are used and is done by SPSS 16 software. data analyzing indicates that resilience has meaningful relation with psychologies hardiness , but can describe it's changes. obtained F form regression analyze hn (p < 00001) is meaningful. reaction between psychotic hardiness and resilence in NA people is meaningful and prediction variable (resilience) has serions effect on dependent variable (hardeiness)

introduction

Disuse and dependence on matterial is a progressive and chyonic disorder and afficets on person from physial,mental and intellectual aspeets . in despite of developed treatment methods in addication field,and that's why addiction is a disorder , addiction treatment is disordered behaviours removing in one hand and normal behaviours replacing in other hand goal of tceatment is living menney maintainavnee with materals and helping to performance increasing in different aspect of the life and meterial usage prevention one of ecovered addicted groups (self _ helping) is an independence group which doesn,t have any dependance on governmentul organ,and it,s manner and activities are determined by it,s members.

One of this groups is unknown addicted group CAN , which is an international nonprofit organ contains recovering addicteal persons and it,s membership precondition is unusing any matters and be cleaning of them and includes 12 steps for treatment and acts as a biolgic _ mental _ social _ intellect ual model for addiction treatment . (Wallas, 2003 , by Mirza Nikouzadeh, 1388).

In 12 steeps , each person is responsible for his/her behaviour and problem . but for changing , he/she needs to a better power or intellectval belife which recommends on friend ship . intimacy,god importance , a better power , prayment , intellectual awareness and power reling for addiction confronting .treatment goal is intellectual awarenss which obtained by 12 traditon acceptance on 12 steeps. (Lamat et al, 2004, by Mirza

Nikouzadeh, 1388) self helping groups vaus are not axaggerated .addicted people need to listen to another addicted pople , speaially of persons who have and conflict and who act better them him/her .they can hehl and support them because addicted people feel a powerful relation between themselves and persons who have similar life .(Qamari, 1385)

Recovery in this manner needs to give personal power to a better power and by this people can get health .in fact it,s hidden that addicted person doesn,t have ability to mind,excitement ,behaviour change and only treatment for him/her is submission and disability acceptance against matterial and condition and giving person,s control to a infra power 12 steps model has a problem and matter using is a unhealthy responal to intelleetual vaccum.treatment aim is intellectual awareness and is obtained by 12 traditions on 2 steps (Blum, 2005 ; by Mirza Nikouzadeh, 1388).

By early los opinion of many psychohogie researchs was that stressful vents such as ethical exeiting have important role in psychologic problems.in addition,later psychologic studies indicatad that there are a adjusting factors between stressful events and mental problems which leads to different effects on people in this field, Qubasa innovateal hardiness personality concept and studied it as a interfacing variable for adjustment relation between stress and physical and mental disorders, and indicated that hard people even have high degree stress ,will not be disorder (Qubasa, 1979; by Shakerynia, 1389).

These people of hardiness asoeet are different of persons who will be disorder in stress full conditions. By Qubasa and et al opinion, psycho logic hardiness is composition of beliefs of world and nature and has three components: commitment, control and challenge (Qubasa, 1983; by Shakerynia, 1389).

A person has high commitment believes to what activity is performed and meaning of who is he/she .they have relation with many aspects of their life such as job , family and inter personal relations. people who are strong in control component,

Know life as preditable and controllable and believe that they can affcet on thir around by their efforts. people who have high challenge ,know positive and negative conditions which need to renewed adaption as a oppatunity for learning and more growth rather then threan to thir relaxation and safety (Qubasa 1998 ,madai 1990,by shirbim 1388).belief to change life morement and this view that each event isn,t a threaten to human,s to stressful event and fuzzy conditions.madi and et al noted that psychologic hardiness characteristics such as considerable curiosity feeling trend to meaningful and interestiny enperiences ,self dedaration,high powering ,and belief that change in the life is a normal manner ,can be effective in person,s adaption with life conflicting events (Madi, 1996)

Researehes indicate thate hardiness has a positive relation with mental and physical health and readuces negative effects of stress as a resource of internal resistance and prevents mental and physical problems. (Qubasa, 1979; Florin, 1995; bruke, 2003; by Shakerynia, 1389).

Qubasa in hardiness discription noted that psycholog: e hardiness is a personality characteristic and people who have it ,can solve challenges and stresses effectively and use it as a bumper against events.

After Qubasa, reseachers studied psycho logic hardiness. (Navid, 1387, Sharifi, 1384; Veisi, 1379; Qorbani, 1373) and indicated that psycho logic hardiness adguste relation between stress and disorder as a personality characteristic .

Garmazy and matsen (1991) defind resiliency as a process, ability or successful adaption result with treatened conditions.

In the other words ,resilency is a positive adaption in relation to unfavorate situations.rater (1990) defined resilency as personal difference against to difficult condition by more positive manner and knows him/her self able to it,s exposing.

Of course,resileney isn,t just stability against injuries and threatened conditions and isn,t reactive sense against dangerious conditions, but is active participation in it,s environment htcan be said that resilency is person,s ability for biologic _ mental balance in dangerious conditions.(Kaner and Davidson 2003, by Mahmodi, 1390).

Further more ,researcher believed that resilency is a kind of renovation by positive excitmental ,moral and cognition results .(Karmezi, 1991; maten 2001; rater, 1999).

Kampfer (1999) believed that resilency is retum to primary balance or receiving to higher level of balance cin treatenrd condition) and that's why leads to successful adation in life he also pointed that positive adaption with the life can be considered as a result.of resilency and as a event can lead to higher level of resilency.he defined this problem as result of cpmplexity of that and processing look at resilency.

Some resrarchers belived that positive exitments are important psychologic resourees and help the people that use of better competition methods against mental pressures.there fore people who experience positive excitments more then otheres ,are more resistant against difficult events and there fore are more resilent.

Mahmodi, S (1390) research findings are indicator of impotanse of pasitive morals optimism for campetition increasing against difficult problems and indicater that resilent persons are more optimist.

At ahh,resilency word is said to factors and lead to adoptive results.resilency in a simple term is positive adoption in reaction to pathetic condition (Waller, 2003; by Jafari, 1389).

Research history about resiliency indicates that copetition skills and their components are important factors of resiliency .in different researches it,s obvious that competition skills have an effective ole in resiliency increasing. (Jafari, 1389)

Psycho logic hardiness and self resiliency are some variables which can adjust unfavoraite results some researches also indicate negative and meanigless reaction between resiliency and hardiness and indicate that resilient persons can cope on unfavoriate effects (Enzlechet, Erenson, Good, Mckey, 2006)

Samani (1386) reported a direat and meaningful relation between resiliency and satisfaction of the life and then Veisi and et al (1379) indicatd that in stressful events,people who have higher hardiness, have mental health.hardiness and resilencey are interpersonal resources and can adjust disability and stress levels in difficult condition and make colorless negative effects of stress (Veisi and et al, 1379). Aim of this research is investigation the relation between hardiness and resilency amony NA persons in gilan county.hypothesis and question of researech is: there is a position and meanigful relation between resilency and hardiness.

Methods and materials:
Statist: cal souety of this researeh is NA persons in Gilan county which 100 persons are selected random for the research.for this quetionaire is a self reporting scale of 27 matters .domain of score is to 81 upper score indicates high psychologic hardiness in persom in

Kiamarsi and et al research (1377), chronbach alpha coffecients are 0.16 for totall test and 0.74 for female test and 0.76 for male test.

Final cofficients of retestiny method for total is 0.84 and is computed as 0.76 in chronbach alpha method. vernosphadre Kamali and Nouri (1387) truth bof this test is computed by synchronic truth of three scales, anxiety, deppressment questionnqire and self actualization .obtained coffecients were respectively 0.65 , 0.67 and 0.62 and all coffecients in p<0.0001 are meaningfuh. Furthermore, synchronic truth by psychohogic hardiness definition was also computed which was satisfactory.

2) Qunor and Davidson (CD - RIS) resiliency scale this questionnaire has 25 index which are scored in liker scale between (always true) and (completely false). maximum is 100 and minimum is investiogation psychologic characteristics of this scale was performed in 6 publis population groups as: client of primary care seetion, psychologic sandal patients, patients with general anexity problems ,and two groups of patients with stress problems after the shock.thise scale makers

belived that this questionnaire can separate resilent persons of disresilent ones in clinical and unclinical groups and can usa of them in researeh and clinic casas. this scale in Iran was normaled by Mohammad (1384).for truth determining of this scale ,the fint unity of each index was computed with total score and then factor analize method was used.unity of each score with total score except index 3 indicated coffeaients between 0.41 to 0.64 then scaled indexes were analyzed by main components method.before factore extractin based on unity matrix indexes , two indexs,kmo and kerdit bartlet were computed .kmo was 0.84 and k2 in bartlel test was sss 6.28 and both indicated factor analyzing for stabilhty determining of Qunor and davidson resilency scale ,chronbach alpha method was used and it,s coffeeient was 0.89 (Mohammadi , 1384)

Findings :
This study was done by 100 persons of unknown addicted people who were trained.

Table 1) summary of linareaty regression model or synchonic input model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.547a	.299	.292	8.382

a. Predictors: (Constant), tabavari

As seen in table 1, adjusted square R indicates that used model takes account 0.292 of the change in predictive variable.

Table 2) variance analyzing index ANOVA for investigation meaningful being the total regression model

ANOVAb

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2905.359	1	2905.359	41.354	.000a
	Residual	6814.823	97	70.256		
	Total	9720.182	98			

a. Predictors: (Constant), tabavari

b. Dependent Variable: sarsakhti

In table (2) as seen ,meaningful level (p < 0.0001) indicates that regression model is meaningful.

Table 3) linearity regression analyze index

Coefficients_a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.847	4.218		5.417	.000
	tabavari	.433	.067	.547	6.431	.000

a. Dependent Variable: sarsakhti

Table 3 : indicate rusult of regression analyze which by enter method , a meaningful model was obtained (adjusted square R = 0.292, p $<$ 0.0001 , $F_{1,97}$ = 41.354)
Data of tables indicate resilency variable is meaningful and predictive.
Variable (resilency) has serious effect on hardiness. (p $<$ 0.0001 Beta = 0.547)

Conclusion :
In present research a meaningful relatiom between test score of hardiness and resilency.for this reason , it can be said that by hardine increasing research in NA persons is increased .findings of present research about relation between hardiness and resilency indicate that psychologic hardiness can predit resilency.in analyzing the findinges it can be said that there us many overlap between hardiness and resilency variables.thus it can be said that amony mental and hygenic elements hardiness is indi cated as resistant behaviour against mental pressures.
In discription havdiness effects on mental health (Tataski, 1993; by Rahimian, Bugar, 1387) belived that hardiness enhances people's ability for competition and help them against stress. Qubasa (1979) also believed that hardiness enhances people,s abihity for conditim control ,commitment to duties and ficing to events .it may be said that resilent persons aginst problems usa an active problem _ solving , means a method which convert mental pressures to a safe experience and therefore anexity and danger feeling level in hard people in diffcult events are so low.
The hypotheis was supported which told there is a positive relation between hardiness and resilency in NA people of Gilan county.obtained results of this research is in line with other researches result (Enzelichet et al, 2006, Matsen 2001, Friberg et al 2006).these researches said that people with high hardiness and resilency in stressful and difficult events keep their psychologic health and have psychologic adoption and by this manner, lead to efficiency incresing and satisficatim of the works which are done.
Matsen (2001) defined resilency as ability factor for difficult results changing toward positive feeling and health keeping. Friberg and et al (2006) also believed that resilency enhaces Capauty and ability of people irrespected to threatened dangers. Enzelehit and et al (2006) also defined hardiness andresilency as a factor

for deppressing and anexity decerasing based on ther opinion hard and resihent persons cope on difficult result and physical and moral fatigues and keep their mental healyh.totully it can be said that hardiness components by adaptive resolution such as problem considered resolutions and understanding increase against stress lead to tolerance increasing against mental and physical temptation and results of addiction abandonment and finally mental and physical temptation and results of addiction abandon man and finally mental health .findings of present research about hardiness is consonant with other findings (Shakernia, 1389; Sharifi, 1384; Hoseini, 1388; Shirbim, 1388; Qorbani, 1371; Navid, 1387; Haghighi, 1378) and indicate that hardiness has positive and meaningful relating with mental health for problem solving ,mental streets ,jab stress ,ethical disturbance and job fatigue and leads to analyze positive and controllable events. this evaluation caused that person doesn't suffer of disturbance and d concentration against the problems and uses of more effective and suitable strategies against pressures and converts them to positive results. Researches about resiliency (Jafari, 1388; Samani, 1386; Mahmoudi, 1390; Narimani 1388) also indicate that relative between mental healths and indicate importance of hardiness is consonant with other findings which indicate importance of hardiness and resiliency in NA people.

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Association between Quality of Life and Spiritual Well-Being in Community Dwelling Elderly

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Abstract: Spiritual Well-Being is one of the influencing factors on quality of life. The current study has been carried out to assess the relationship between quality of life and Spiritual Well-Being among elderly living at homes. A descriptive - analytical study was conducted on 200 community dwelling elderly in north of Iran. Data was collected using Demographic, quality of life and Spiritual Well-Being questionnaires. The average quality of life and Spiritual Well-Being were 53.52± 19.38 and 94.40±14.03, respectively. The Pearson correlation coefficient showed a significant positive association between Spiritual Well-Being scores and quality of life of the elderly (P=0.003, r=0.21). In addition, all aspects of quality of life had significant relationship with the Spiritual Well-Being, except the physical functioning and general health domains. Therefore, it is crucial for health care providers to notice to the importance of spiritual aspects of life in elderly and attempt to improve it. However, further studies on the relationship between different aspects of quality of life and Spiritual Well-Being seem to be essential.

Introduction

According to Hudson (1999), who declared that in 2000 the population of people over 60 would be 35 million people and noted that in 2030 this number would reach 21% of the total world population(Strydom, 2005). A census in the United State in 1998 predicted a 20 percent increase in people aged over 65years by 2050 AD(Bryant, Corbett, & Kutner, 2001). In England, it was estimated that by the year 2036, the population of people over 70 years old will be up to 10.9 million and 2.1 million people will be over 85 years old(Shin, Kim, & Kim, 2003). In addition, according to estimations, about the year 1410 in Iran, aging explosion phenomenon will occur and 20- 25% of population will be over aged 60 years(Foroughan, 2001).

Aging and the aging process is often associated with increase of chronic diseases and a wide range of complications, symptoms and harmful challenges for health status and welfare. It seems that inactivity and general weakness are parts of the aging process. Most of these difficulties lead to other problems such as social isolation, disability, functional loss, economic loss and depression(Easley & Schaller, 2003); this period of life is associated with chronic stress and increase of needs(Caldas & Bertero, 2007).

The results of a study revealed that as elderly spend the aging process, they experience loss of confidence, feeling of isolation, alienation, worthlessness, and progressive physical, mental, psycho- social and spiritual problems(Chung et al., 2008). Furthermore, researchers in a study expressed perception of insufficient income, low religiosity, Spiritual Well-Being, functional ability and loneliness are the barriers to manage the elderly stress and ultimately to achieve a successful aging and a good quality life (Traynor, 2005). Therefore, the above mentioned factors can lead to changes in various aspects of health and low Quality of Life (QOL) in the elderly.

Health, as defined by World Health Organization is composed of physical, mental, social and spiritual dimensions. Some authors believe that spiritual dimension of health is the most important one and requires serious attention. Some studies indicate that without Spiritual Well-Being, other biological

aspects of life such as psychological and social cannot act properly or may not reach to their maximum capacity and the highest level of QOL will not be accessible(Omidvari, 2008). QOL is a criterion for measuring of the best energy or force that makes a person tolerate challenging situations successfully(Jadidi, Farahaninia, Janmohammadi, & Haghani, 2011). In order to pass this period of life, elderly apply a series of problem-oriented and emotion-oriented strategies. One of these emotion-oriented coping strategies is attention to spirituality and Spiritual Well-Being (SWB). Thus, SWB is a result of using adaptive coping skills, which help the elderly to spend a good QOL in this period(Bagheri-Nesami, Rafii, & Oskouie, 2010).

According to the results of several studies, spirituality and practice of faith has been developed with the process of aging in the elderly (Ravanipour, Salehi, Taleghani, Abedi, Schuurmans et al., 2008; Roelofs, 1999; Shin et al., 2003; Tornstam & T¨ornqvist, 2000; Vaillant & Mukamal, 2001). Thus, trust in God and saying prayers is an emotion-oriented strategy used in the same direction of spirituality, helping elderly in coping with changes of aging process(Bagheri-Nesami et al., 2010). Based on findings of previous studies, aging provides more opportunities for attention to spirituality (Bagheri-Nesami et al., 2010; Habibi Sola, Nikpour, Sohbatzadeh, & Haghani, 2008; Ravanipour, Salehi, Taleghani, Abedi, Schuurmans et al., 2008; Roelofs, 1999; Shin et al., 2003). Furthermore, the results of some studies indicated a decrease of QOL in elderly as well (Habibi Sola et al., 2008; Heydari, Khani, & Shahhosseini, 2012; Jadidi et al., 2011; Jafarzade, Behnam Vashani, & Vahedian Shahroudi, 2010). Since one of the most important factors influencing QOL is SWB and limited available database about relationship between QOL and SWB in elderly, the current study aims to evaluate the relationship between QOL and Spiritual Well-Being in the elderly living at homes. We hope that the results of this study could provide teaching strategies to increase the SWB and improves the QOL of elderly to achieve a successful aging.

Material and methods

The current descriptive - analytical study was conducted on 200 communities dwelling elderly resident at homes in Sari, Iran. Initially, a list of elderly was provided by 20 health care centers in the city and stratified random sampling method was used. After obtaining the permission from the ethic committee of Mazandaran University of Medical Sciences and in coordination with each health care official authors and obtaining necessary licenses, based on the number of households, the researchers referred to homes of the elderly; after obtaining written consent from the participants, they completed the questionnaires. Those who were

unwilling to participate in the study were excluded and the nearest household's number was selected to complete the questionnaires. Demographic information was recorded in a questionnaire. Short form questionnaire (SF-36) of QOL and SWB questionnaire designed by Ellison and Paloutzian has been used. SF36 is a standard short questionnaire, which is very suitable for the elderly living in the community(Haywood, Garratt, & Fitzpatrick, 2005). The SF36 is a questionnaire with 36 items, measuring eight multi-item variables including general health, physical functioning, role limitations due to physical problems, role limitations due to emotional problems, social functioning, pain, mental health and vitality. The scores were ranged from minimum score of 0 (worst possible health state) to the maximum of 100 (best possible health state). Likert scale (very high, high, moderate, modest and not at all) was used to measure the responses. In positive questions score 1 indicates an unfavorable condition and score five was an ideal condition. In negative questions, scoring system was reversed. Then all scores were summed. Validity and reliability of the questionnaire was confirmed. Validity was confirmed by known and Convergent groups and reliability by internal reliability and Cronbach's Alpha equal to 0.90-0.77 in all aspects of QOL, except for vitality, which was equal to 0.65(Montazeri, Goshtasebi, Vahdaninia, & Gandek, 2005). The SWB Scale, developed by Paloutzian and Ellison, measures religious well-being (RWB), which is the individual's beliefs and relationship with God, and existential well-being (EWB), being individual's sense of meaning and purpose in life. Each of these 2 subscales contains 10 items, individually measured on a 6-point Likert scale, ranging from "strongly agree" to "strongly disagree". The items are scored from 1 to 6, with 6 indicating a greater well-being. Possible SWB scores range from 20 to 120. The total scores can be classified as follows; Low spiritual well-being scores 20-40 and scores of 41-99 and 100-120 indicates moderate to high spiritual well-being, respectively. Ellison and Paloutzian reported Cronbach's alpha coefficient equal to 0.93 for the total scale. AllahBakhshian et al., has reported the alpha coefficient of 0.82 for the Farsi translated version of SWB scale and validity of the questionnaire was confirmed by content validity study(Allahbakhshian, Jaffarpour, Parvizy, & Haghani, 2010). Collected data were analyzed using SPSS 16 statistical software and descriptive statistics tests, ANOVA, T-independent, Pearson correlation coefficient and chi-square tests.

Results

Among 200 elderly participants, 61% were female. Sixty-six percent were married, 1.5% divorced, 1% single, and 31.5% were widowed. Fifteen percent

were literate, 36.5% illiterate, 22.5% primary education, 8.5% were in high school education levels and 5.5% had higher education level. In addition, 57.5% were retired, 8.5% worker, 4.5% businessman, 12% unemployed and 17.5% were employed.

The Mean of QOL was 53.52 ± 19.38. The mean and standard deviation of various aspects of QOL are presented in Table 1. The average of all dimensions of QOL expect general health and limitations to play an emotional role were more than 50. Social function and general health aspects of QOL had the highest and lowest average, respectively.

The Average of SWB score of elderly was 94.40 ± 14.03. None of elderly had SWB scores lower than 20-40, but moderate SWB namely scored between 41 to 99 was seen in age groups; 60-64, 65-69, 70-74 and ≥75 years old and high SWB scored between 100 -120 observed in age groups; 60-64, 65-69, 70-74 and ≥75 years old are summarized in Table 2. There was no significant relationship between SWB in age groups, gender, education, marital status and occupation (P> 0.05). Mean of SWB of elderly based on all domains of QOL has been shown in Table 3. Pearson correlation coefficient has shown a significant association between SWB scores and total score of the elderly QOL (P=0.003, r=0.21). Except physical function and general health domains, Pearson correlation coefficient has shown significant association between other domains of QOL and SWB (Table 4).

Discussion

According to the results of the present study, the average QOL of elderly people in the community was moderate. Similarly, in another study conducted on 410 elderly in Iran, the QOL was expressed moderate using Short Form (SF12) questionnaire(Habibi Sola et al., 2008). In addition, the results of study performed on 1,920 Korean elderly showed that the QOL was at moderate levels(Orfila et al., 2006). However, the studies were reported lower QOL in elderly(Jafarzade et al., 2010). These differences could be due to differences in sample size.

In the current study, expect in the domains of general health and emotional role limitations, the elderly had average more than 50 in other aspects of QOL. In a similar study(Jafarzade et al., 2010) on 304 elderly patients with the standardized questionnaire SF-36, the lowest QOL was reported in general health domain (39.2±19.7). It seems that, low general health scores could be due to more development of chronic diseases and more involvement with conflicts of common stressors in the elderly. However, these factors can also affect other aspects of their QOL (Chen, 2003; Eliopoulos, 2010; Fiksenbaum, Greenglass, &

Eaton, 2006; Proctor, Hasche, Morrow-Howell, Shumway, & Snell, 2008; Wadensten & Carlsson, 2003). The current study has found that among all domains of QOL, social functioning had the highest averages. Nevertheless, Jafarzade et al., reported the highest QOL to be related to vitality, power and energy (50.6±0.5)(Jafarzade et al., 2010). It seems that the higher social function domain is more related to cultural structure in northern Iran, which there is more social and family relationships among the peoples.

Similar to previous studies, the QOL of elderly in our study was significantly associated with gender(Jadidi et al., 2011; Orfila et al., 2006). In this regard, other studies showed that physical pain was significant difference between elderly men and women, as pain in women was reported to be more than men(Jafarzade et al., 2010; Ordu Gokkaya et al., 2011).

In the present study, the mean of SWB in elderly was 94.40 ± 14.03. None of the elderly had SWB lower than 20-40. Similarly, the results of another study showed that the average of SWB domain of elderly people in nursing homes was 96.26±17.93. Moreover, they have reported none of the elderly having lower SWB domain(Jadidi et al., 2011). This issue can be due to religiosity of Iranians that religion and spirituality play an important role in all stages of their life including aging. Several studies have also emphasized the role of spirituality in this period of life (Bryant et al., 2001; Easley & Schaller, 2003; Wadensten & Carlsson, 2003).

According to the results of a similar study(Jadidi et al., 2011), we found no significant relationship between SWB and other demographic variables such as gender, marital status, education and occupation, which could be due to the small sample size in both studies. Age range in elderly is one of these demographic variables, which does not have any relationship with SWB. However, the average of SWB in older age groups was higher, but the difference was not significant. The results of our study are supported by recent theories of aging known as Gerotranscendental theory that was initially expressed in 1994 by Tornstam. According to this theory, the term Gerotranscendental refers to changing in elderly view and a shift in meta-perspective, from a materialistic and rational view to a more cosmic and transcendent one. Gerotranscendental vision proposes transcend developmental dynamic perspective in elderly(Eliopoulos, 2010; Mauk, 2006). In contrast to materialist theory, this theory believes that people have less attention to material aspects of life by increasing age and become more interested to spirituality, meaningful life and more willing to communicate with others(Eliopoulos, 2010). According to this theory, all people are prone to be wise and mature and crises of life speeds the evolution of gerotranscendental. The Tornstam

theory has new insights related to aging changes. In this theory, cultural values, expectations and attitudes in community have been stated as facilitator or inhibitor agents in Gerotranscendental process. Tornstam has stated Western culture is one of these obstacles (Tornstam & T¨ornqvist, 2000; Wadensten & Carlsson, 2001).

In the current study, similar to other studies(Elizabeth Rippentrop, Altmaier, Chen, Found, & Keffala, 2005; Jadidi et al., 2011), there was a significant relationship between score of SWB and total scores of all domains of QOL of elderly. In addition, there was a significant relationship between SWB and all aspects of QOL expect for physical function and general health dimensions. In a similar study(Jadidi et al., 2011) with the exception of physical function and mental health, a significant association was reported between SWB and other aspects of QOL. However, the result of one study has shown that SWB is concerned with all aspects of quality of life(Johnson et al., 2007). Based on the results of a study, SWB can be an important indicator of QOL(Daaleman & Frey, 2004). Moreover, results of a study had indicated that spirituality help to an adaptive coping and preparation for the Hereafter in elderly. In addition, religion and prayers helps self-report and higher QOL including physical, psychological and social health(Williams, Keigher, & Williams, 2012).

Furthermore, another research finding has indicated that the three dimensions of physical, mental and spirituality are for healthy and successful ageing. They also reported that positive attitude and adaptive strategies are often used to compensate the physical injuries. In addition, in the former study, the elderly had much emphasis on psycho- social factors as a key element of successful aging, while had less emphasis on genetic factors, life expectancy, lack of disease, disability and employment(Reichstadt, Depp, Palinkas, Folsom, & Jeste, 2007). It seems that contrary to most of studies, this study has also emphasized the psychological health aspect of aging and mentioned it as an integrated part of successful aging and QOL. However, further studies on the relationship between QOL and SWB seem to be necessary.

Some studies have also shown that in addition to be a factor for integrating and meaningful life, spirituality and religion are expressed as a factor for mental and physical health, and the requisite of life satisfaction and successful ageing(Nagalingam, 2007). Paying attention to spirituality and religion are supporting and welfare factors for aging life continuity(McCann Mortimer, Ward, & Winefield, 2008). In addition, it was reported that religiosity decreases fear of death and future and makes geriatric accept death easier (Caldas & Bertero, 2007; McCann Mortimer et al., 2008). Another study has expressed spirituality is a supportive system and a power factor for elderly(Ravanipour, Salehi, Taleghani, Abedi, & Schuurmans, 2008). Similarly, the results of a qualitative study announced that one of coping methods used by African American older adults is relying on God(Loeb, 2006). Therefore, spirituality and spiritual health lead to better acceptance of challenges of life and improve the QOL.

In the present study, possessing of SWB in elderly and its relationship with QOL indicates that this component can improve QOL and is effective on coping with problems of aging period. Therefore, it is necessary for health care providers to consider \ the importance of the spiritual dimension of elderly life and try to promote it.

Conclusion

The findings of the current study added to the knowledge of gerontology. Presenting these findings to physicians, nurses, Policy makers, psychiatrics, psychologist and other health care providers help to these in elderly management. Comparsion of association between quality of life and Spiritual Well-Being in community dwelling elderly is needed through cross-cultural researches.

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Table 1: Mean±SD of all domains of quality of life

QOL Domains	PF	RP	RE	EF	MH	SF	BP	GH
Mean	51.62	48.50	57.70	47.27	52.18	66.75	56.10	48.07
SD	29.73	41.45	43.74	14.99	14.47	23.25	26.25	18.54

PF (Physical Function); RP (Physical Role); RE (Vitality); EF (Emotional Role); MH (Mental Health); SF (Social Functioning); BP (Bodily pain); GH (General Health)

Table 2: Mean±SD of spiritual well- being based on age groups

age groups	SWB	
	Mean	SD
60-64	91.73	13.67
65-70	96.28	14.88
71-75	93.08	13.49
>75	94.55	13.76
Total	94.40	14.03

Table 3: Mean±SD of spiritual well- being based on different domains of quality of life

QOL Domains	SWB	N	Mean	SD	t-test	P-value
PF	2.0*	123	49.91	29.16	1.02	.30
	3.00**	77	54.35	30.63		
RP	2.00	123	42.88	40.68	2.45	.01
	3.00	77	57.46	41.37		
RE	2.00	123	54.26	42.69	1.41	.16
	3.00	77	63.20	45.10		
EF	2.00	123	46.17	14.43	-1.30	.19
	3.00	77	49.02	15.79		
MH	2.00	123	50.76	13.08	1.75	.08
	3.00	77	54.44	16.28		
SF	2.00	123	62.19	24.03	3.60	.000
	3.00	77	74.02	20.04		.
PAIN	2.00	123	55.16	27.13	.63	.52
	3.00	77	57.59	24.87		
GH	2.00	123	47.03	18.26	1.0	.31
	3.00	77	49.74	18.98		

Table 4: The relationship between elderly spiritual well- being and different domains of quality of life

SWB	QOL Domains	PF	RP	RE	EF	MH	SF	BP	GH
r		.03	.16	.14	.15	.19	.29	.14	.13
P-Value Sig. (2-tailed)		.59	.02	.03	.02	.006	.000	.04	.06

PF (Physical Function); RP (physical Role); RE (Vitality); EF (emotional Role); MH (Mental health); SF (Social Functioning); BP (Bodily pain); GH (General Health)

The Relationship between General Health and Religious Coping in Elderly Residing at Homes

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Abstract: Aging is usually defined as gradual and general functional impairment in adaptive responses to reduce stress, coupled with the risk of developing age-related diseases. An elderly clearly needs coping skills to deal with life changes and stress. Since only a few studies have been published in this area, the current study aimed to examine the relationship between general health and religious coping skills of elderly people residing at homes. A descriptive-analytic study was conducted on 200 elderly residents at home in Sari, northern Iran. A stratified random sampling method was used and eligible elderly were selected from different health centers of the city. Demographic characteristics such as gender, age, educational level and marital status were recorded. GHQ28 questionnaire was used to assess general health and elderly religious coping skills were assessed by religious coping questionnaire. Descriptive and inferential statistics were used to collect the data. For data analysis ANOVA and Pearson correlation coefficient were used in SPSS Version 17. The mean of Religious coping was 102.11 ± 15.74 and the mean of general health was 25.89 ± 10.62. A significant relationship was found between general health and various aspects of physical symptoms such as anxiety, social dysfunction and depression (P <0.0001). Pearson correlation test revealed no significant relationship between general health and religious coping (r= -0.12, P= 0.08). There was a negative relationship between religious coping and depression in the dimension of general health (r = -0.17, P = 0.01). ANOVA test revealed no significant relationship between the aspects of general health and religious coping skills of poor (97 or less), average (107 to 98) and good (108 or more) (F = 0.44, P = 0.64).The present study found a relationship between general health depression and religious coping skills. Thereby, caregivers should focus more on religion and enhance religious coping skills of elderly people. Further studies should be carried out to investigate the relationship between public health and religious coping skills in different cultures and religions.
[Jabar Heydari Fard and Masoumeh Bagheri-Nesami . **The Relationship between General Health and Religious Coping in Elderly Residing at Homes.** *Life Sci J* 2012;9(4):3205-3210]. (ISSN: 1097-8135). http://www.lifesciencesite.com. 471

Keywords: General health, religious coping, elderly, home residents

Introduction

One of the major changes in 20th century is aging population which is estimated to rise from 600 million in 2000 to two billion by 2050. This phenomenon is more troublesome in developing countries since such nations cannot easily adapt to the consequences of this phenomenon. Population aging occurs in Iran as well as other countries. It is believed that the mean age of population will increase by 10 years during 2006-2026. Proportion of elderly people in Iran doubled 2.27 times within the last 50 years, which will reach 26 million in 2050 and that is 26% of the total population[1]. Aging is usually defined as gradual and general functional impairment in adaptive response to reduce stress, associated with the risk of developing age-related diseases. Elderly is a period of life that is accompanied with great challenges, acute stress and increased levels

of different physical and psychological requirements[2]. In a study carried out by Traynor, 2005 it was emerged that obstacles such as perception of insufficient income, poor religious believes, poor functional ability to cope with stress and loneliness are the main causes of failure in managing the stress among elderly people. For older adults with physical disabilities who regularly compare themselves with others, finding new meaning in life and applying appropriate coping strategies results in better acceptance of changes[3]. According to psychology, successful aging is attributed with the ability to cope with physical, psychological and social changes in order to achieve happiness, dignity, comfort and satisfaction in life. Since patterns of life are inevitably changing during lifetime, elderly individuals require flexible coping skills to deal with life changes[4]. A meta-analysis study revealed that proper

coping strategies in elderly influence their health status[5]. Stowell *et* al. 2001 indicated an effect of coping strategies on immune response and increased level of leukocytes among elderly people[6]. It was also found that efficient coping skills improved the health status of older adults compared to that of the younger individuals[7]. Coping skills help reducing the vulnerability associated with health problems in elderly. Due to many reasons old age people are more vulnerable than young people; therefore, the need for coping skills is greater among this age group. By increase in the number of old people the rate of chronic illnesses will rise. Optimal aging also concerns chronic health issues. Attempts to understand the cognitive-behavioral efforts is called coping, which will lead to better management in this situation. Another reason could be higher vulnerability of elderly people compared to young individuals exposed to stress that is associated with impairment of various organs of the body, including hypothalamus - pituitary – adrenal, which could result in chronic diseases. Furthermore, elderly people experience difficult times due to experiencing decease of others, which could expose them to psycho- social stress[8]. Some studies showed that older populations are able to continue a normal life if they achieve a correct perception of aging and also benefiting from the belief that healthy aging is a period of well adapting to new situation[4, 9, 10]. According to these, researchers consider one of necessary condition of aging phenomenon as a successful coping[8, 11-14]. On of the coping strategies include attention to religious and spiritual, which are the products of coping skills in a way that makes personal adjustment in old age[4]. Other scholars believe that more attention on religious coping could act as a support system and power for the elder[15]. Similarly, results of a qualitative study found relying on God as the coping style among American Indian older population[16]. Religion makes life more meaningful and is essential for physical and mental health, life satisfaction and successful aging[17]. Considering spiritual and religious issues helps elderly to satisfy a happy life and support[14]. A study has also shown that attention to religion in elderly makes acceptance of death easier and reduces the fear of death and the future [2, 14]. Some studies found a relationship between religious attendance and health; however, their data did not indicate that the effect of religious attendance on religious coping is associated with health or social participation and presence in groups[18].

Few researches have been conducted on the probable relationship between religious coping skills and general health of the elderly. Religious coping strategy and its role in promoting mental, physical, and social health made the authors to answer the following question: Is

there any relationship between public health and religious coping skills?

Materials and Methods

A descriptive – analytic study was performed on 200 elderly residents at home in Sari, Iran. A stratified random sampling method was used and eligible subjects were selected from different health centers. First the ethics committee of Mazandaran University of Medical sciences approval was obtained. Then, the researchers completed the study questionnaires by referring to homes of the elderly after obtaining written consent from the participants. Those who were unwilling to participate in the study were excluded and the nearest household's number was selected to complete the questionnaires. The obtained data included demographic characteristics, gender, age, educational level and marital status. General Health Questionnaire (GHQ28) was also used to assess the general health. This international standard questionnaire contains four subscales including somatic symptoms (7 questions), anxiety (7 questions), depression (7 questions), and social functioning (7 questions). If the total score is higher than 23 it indicates a problem in public health. In addition, if the score achieved for each dimension is more than 14 it shows general health impairments[19]. Noorbala et al explained the validity and reliability of the questionnaire of all sub-components of two-scale questionnaire between GHQ28 and Scl-90 showed a significant correlation (P> 0.001). Test-retest reliability of the questionnaire was r= 0.85 [20]. Religious coping skills were measured by religious coping questionnaire designed by Azimi et al that investigates the virtual aspects which helps people in understanding different situations, receiving supports and problem solving in everyday life. Reliability of the questionnaire was determined by test-retest (r=0.88), then by split half test (0.88) and Cronbach's alpha (90%). This scale has 31 questions, each with five options which are scored according to Likert method of scoring (0-4). The mean and standard deviations of scores are ranked on three levels of low (97 or less), moderate (107 to 98) and high (108 or more)[21]. The data was analyzed using SPSS, ANOVA and Pearson correlation coefficient.

Results

The study was done by recruiting 200 elderly aged from 61 to 85 years old. The participants included 61% females of whom 66% were married, 1% single, 1.5% divorced and 31.5% widowed. The respondents included retired (57.5%), workers (8.5%), business man (4.5%), unemployed (12%) and self-employed (17.5%). Levels of education in 36.6% of participants was illiterate, 15% were able to read and write, 22.5% had primary education, 8.5% of the interviewees educated until junior high school, 12% had diploma and 5.5% had

university degrees. Chronic physical illnesses were seen among 68% of the elderly. The mean of religious coping skills and general Health was 1.2.11±15.74 and 25.89±10.62, respectively. The mean and the standard deviation of general health are shown in Table 1. As it can be seen, all aspects of general health scores were lower than 14. In the dimension of general health social functioning had the highest average, while depression had the lowest average. Higher score in general health indicates lower general health. Pearson correlation test showed no significant relationship between general health and religious coping (r = -0.12, P = 0.08). In contrast a significant relationship was found between religious coping and depression in the domain of general health (r = -0.17, P = 0.01). There is also a significant relationship between general health and its various aspect (somatic symptoms, anxiety, social dysfunction and depression)(P <0/0001). The data are summarized in Table 2. In present study the highest average of general health (26.74±10.77) belonged to the low religious skill's group and the lowest mean general health was related to high religious skill's group

(24.72±11.05). Since higher rating of general health is presence of health disorders, thus, in this study, promoting the religious coping, the general health was being increased (Table 3). However, the lowest mean was related to depression of the general health and strong religious skill's group. The ANOVA showed no significant relationship between the four dimensions of general health and three dimensions of religious including: poor coping skills (97 or less), moderate (107 to 98) and high (108 or more) (F = 0.44, P = 0.64) (diagram 1).

Table 1: *Mean and standard deviation of various aspects of general health and total scores of GHQ28*

variable	Mean	Std. Deviation
Somatic symptom	7.48	3.80
anxiety	7.48	3.88
Social function	7.96	2.65
depression	2.96	3.61
total score of GHQ28	25.89	10.62

Table 2: *The relationship between different aspects of general health and religious coping*

Religious coping	GHQ domains	Somatic symptom	anxiety	Social function	depression
r		-.11	-.07	-.03	-.12
P-Value, Sig. (2-tailed)		.11	.30	.62	.04

Table 3: *Mean and standard deviation of various aspects of general health in terms of poor, medium and strong religious coping*

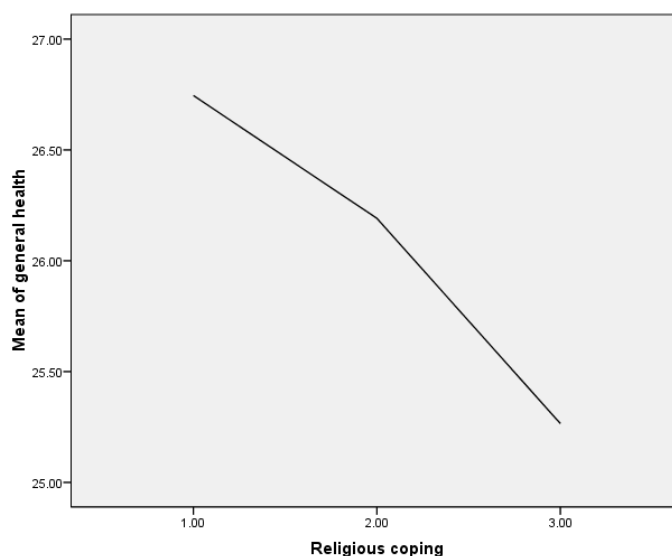| Religious coping	N	Mean of GHQ	Std. Deviation
(≥97)	55	26.74	10.07
(98-107)	101	25.93	10.77
(≤108)	44	24.72	11.05

Diagram 1*: The relationship between different aspects of general health based on poor, medium and strong religious coping*

Discussion

Based on the results of present study, the average of general health among elderly was 25.89±10.62. Since the studied elderly were rated higher than 23 scores, thus, they are suspected to disorders in general health. The elderly scores of general health in all dimensions were below 14. It means that the elderly had no problems in dimensions of general heath and their scores were the normal range. The highest average related to depression. Since low score of GHQ instrument is along with better general health, so this study elderly in depression dimension had better condition.

In accordance with the results of other studies of elderly, spouse decease and loneliness[22-25], Social Isolation[22, 26, 27], menopause [22, 28], failure to perform the activities and several diseases [22, 27, 29-31]experienced depression and depressive symptoms such as sadness and suffering are seen as a part of their life[26]. However, it must be said, depression is an illness that affects one-in-four to one-in-five elderly people in the community and will lead to reduced quality of life, physical deterioration, functional dependence, and a lot of medical expenses[27]. Most elderly lose their spouses or close friends, and they are subject to experience bereavement, grief and sorrow[22]. Fortunately, in present study, this domain of the general health is considered normal. It seems lower rates of depression in Iranian elderly is to be due to social and cultural context. The results of other studies also show that there are many psychosocial problems associated with depression symptoms. The symptoms associated with neglect, grief, economic pressures, concerns, home, life and the pressures of social separation[26]. Results of the study indicated a strong association between depression and social, interpersonal, socio - economic, familial, and environmental co- incidence[27]. It can be said that depression is one of the several factors that affect general health and aging process and aging changes are not the causes; however, it is created in the context of physical, psychological, social, economic, cultural and spiritual life of each person. In addition, there was significant correlation between the four main general health aspects of somatic symptoms, anxiety, depression, and social functioning in the present study. The religious coping could be one of the factors that affect the mental health and consequently on other aspects of health[32].

In the current study, religious coping skills of older people in the study averaged 102.11, which means moderate and there was no significant correlation between total score of general health and religious coping. However, there was an inversely significant correlation between religious coping and depression domain of general health. As a response to increasing skills, depression declined. Study results also suggest a similar relationship between religious coping and depression domain of general health[33]. In one study, the data analysis regressions showed that prayer help spiritual health and predicted mental health, subjective well-being, physical symptoms and depression[34]. Similarly, in a qualitative study of the lived experiences of 20 elderly depressed women, using ethnography interviews, the results showed that according to elderly religious beliefs prevent the onset of depression. One elderly expressed depression due to illness, loneliness and bad memories, which he believed that a talented person can overcome it. Elderly believes that depression is

associated with pain and sadness that usually occurs after a life of poverty. They prayed for help for these problems. According to their religious beliefs, their way of relieving depression and negative situations improved and made them strong to endure problems[26]. Other studies have also expressed a relationship between depression and religious coping skills[32, 33]. The use of coping strategies has variety of outcomes in different people[8]. Among the coping strategies used in elderly, only functional coping strategies has a positive impact on human health[13, 35, 36]. Religion and spirituality are the common effective strategies that are especially used by the elderly and help them to improve their psychological well-being. In an elderly study, researchers identified components of successful aging. One of the variables which were examined in this study was seniors' religiosity and their role in successful aging. In this study, successful aging was identified using two measures of life satisfaction and general health questionnaire and religious orientation test was used to identify the role of religiosity. Statistically significant results indicated that successful elderly tend to have more religious trust[37].

As previously mentioned, old age is associated with many common stressors in elderly life that may be normal variation of aging such as impaired physical function, impaired activity, appearance and disability caused by chronic diseases[27, 35, 38-40], psycho-social lacks, loss of earnings, loss of ability to play the role and the previous activities[35, 39, 41-43] and the death of loved ones[24, 44-46]. Moreover, the researchers found that as elders spend the aging process, they experience loss of confidence, feelings of isolation, alienation and worthlessness and move towards the problems of physical, mental, emotional - social and spiritual experience[12]. Although in this study there was an inverse significant relationship only between religious coping skills and depression in general health, many expressed the mental – emotional, socio- cultural and economic deprivations which are results of different ways of lifestyle may occur under conditions of confounding variables, and they are as well considered the factors influencing physical dysfunction. Therefore, there is a constantly vicious cycle of deprivations between physical dysfunction - psychological, emotional, social - cultural and economic deprivations[4, 22, 35, 38, 47, 48]. It can be said that health is considered a two-way interaction; on one hand it is a product of selection and use of effective and appropriate coping with change and stress, and on the other hand it is pavement to a healthy psychological environment, which makes diagnosis of a coping strategy possible, in the light of true knowledge and assessment of stressful situations[49]. It seems referring to spirituality and religion is one of the most important strategies for coping with aging events.

With regard to the results of the current study and other studies, it can be concluded that religious coping skills can influence general health of elderly. However, more studies in different cultures and religions are recommended.

Acknowledgements

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Ecotourism Role in Tourism Improvement

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Abstract: At the recent years echo-tourism category have been considered in a different cycles of tourism industry so that it will advocated to itself such an special setting as an improvement indices at the future time. Echo-tourism is also a kind of tourism and it is a kind of functional practice that is using as a part of zoom and natural sources in the non-consuming form. And it could be provides land employment people and economic welfare by way of keeping and supporting of bare natures area. Among tourism branches, echo-tourism improvement called in such a way that is named echo-tourism century, twenty first century, on 1998 according to the forecast of W.T.O. but it is expected, general growth of tourism industry increase in 4.3-6.7 percent by 2020, and it is increased more in echo-tourism and it is assumed to be about 10-30 percent according to the applied investments.

Introduction

Human beings have enjoyed from observing nature. Trip in natural area and visiting of natural attractions is not only cases for satisfying spiritual and mental needs and presenting an answer to human curious. In the echo-tourism necessity satisfaction must be increased by trying into management decision making and appropriate programming and also by recognizing land people cultures attractions and increasing tourism attraction within creating revenue for the local people. (Hoseini, 1385, echo-tourism role in tourism improvement).

Tourism activity improvement within geographical spaces in view of developing and value-making of natural, historical, technological, and cultural heritage and keeping its improvements is an important discussion of tourism improvements. attention to tourism affaires within national and regional spaces and specially creating green and natural attractions were an influenced factor of creating regional and national advantages, that is finally result in stimuli of publicly cooperation sense and creating social, economic , and environmental advantages and also is obtaining to a relative appropriate conditions that is due to factors in order to increasing mental sanitation level, growth and creative, cooperative mentality and improving family bases and vesting publicly consciousness, increase of environmental sanitation and social welfare and finally obtaining to a social beliefs and leaving from pressures and stress of mental, social crisis and even reducing crimes. (fachri, 1383, wishful view on tourism role in revenue-making of Iran country)

Echo-tourism relationship with tourism industry

At the present era within technology development and life automobile, it is appeared to trip human beings on a natural areas and bare communities. Leaving from crowding urbane areas and saving beside nature considered as an important rates that is designed in tourism discussions as echo-tourism or tourism. (chabazi and his collaborators, 1385, tourism acceptability setting in the north-west area of Iran like ajab-shir).

Echo-tourism provides considerable opportunities for improving a kind of tourism industry. Some of them related to echo-tourism. It is including such advantages for local communities and in fact it is considered as a complex and stable tourism. Relationship and approaches of natural tourism with other kinds of tourism have providing necessity cases for successful presenting of

tourism products and tourism improvements. (Hoseini, 1385, echo-tourism role in tourism improvement).

Eco-tourism is a kind of tourism that is originated so many opportunities for rural development, tourism, management and sources office of kept areas around the world. (monshizadeh and his collaborators, 1380, p. 15)

It is result in close relationship of passengers that is searching to keep and under keeping environments that have a need to help of others. Echo-tourists have a considerable role as tourists and interested on a nature and they are searching to trade off with the host community so that they could help to stable developments. The local community also increase their expectations for obtaining management and playing the role I area tourism. (ranjbar, 1387, p. 11-12)

Ecotourism and echo tourists' characteristics
By increasing people consciousness of advantages and positive effects of direct nature, it is considered important.(zahedi, 1385, p. 19)
The following characteristics include:
1. It is depend on observing and visiting of natural areas.
2. Stable tourism directions presented the best applying solutions.
3. It is including a set of opportunities and appropriate situations in order to recognizing and understanding natural areas.
4. It has a stable, structure and influencing share in land community improvements.
5. It is paid on recognizing and interpreting of different area culture and shows on sensitivity.
6. It is applied on assuming compatible method within customer's expectations. (oladi gadiclai, 1385, p. 66).
On the surveyed researches, echo tourist community TES 2002 announced the following features:
1. They preferred group tripping upper than 60 percent.
2. The mean time of many of them considered in 8-14 days.
3. Sex complexity of echo tourists considered in 50 to 50 and they have no special complexity.
4.eco tourists mostly consumes the money of other countries, since they have trip costs(about 1000-500 dollar) other costs such as buying gifts, Killed animals and flying, paying additional costs to providing dress and local feed, guidance and …. .

5. They have classified in two groups in respect of age:
A. groups that is searching to adventurousness, visiting bare lands and sport tourism that is considered under the 40 years old.
B. groups that are searching to enjoyment of nature and visiting of zoom and ….. And they are place on 35- 45years old.

Ecotourism programming and tourists developments
Tourism is a multidimensional category that is related to many factors. Ecotourism also is considered as a subordinate of tourism industry and it is include the called rate and it influences of many factors and mutually effect on them. The influence and mutual of it, that is making twofold necessity of programming within ecotourism. If it is leaving on itself, non-programming and controlling infects other sections and increasing negative influences and unwanted results. Therefore programming within ecotourism in reason of complex and multi-aspects communications of the industry with other economical, social, cultural section especially in reason of environment is of important necessity. Programming is a multidimensional activity that is deal with past, current and future and it is taken advantages from the past experiences, and it is resulted from the facts of the current time and by considering expected situation on the future, it is recognizing and determining the aims and the ways. (zahedi, 1385, p. 133)

As we know, information is an important factor of ecotourism development. By considering complex trade off between ecotourism and various factors of economic, social and cultures and environments it can be obtained by aiming in fact information and in time. For programming ecotourism, we need various information about different topics. Some of them included in the following rates:
1. Ecotourits attractions (like mountains, forests, sea, lakes and such a cases).
2. Ecotourists (various interest and different stimuli of ecotourism, bearing of them to the tripping problems, and their expectations …).
3. Economic factor (economic infrastructures, transportation communication nets, banks and assurance institutions and credits).
4. Publicly factors (rules and regulation s related to ecotourism's enter and exit and the special phenomenon and ….).

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5. Servicing factors (passenger agencies, hotels, guest-accepting, ecotourism's home).

6. Environmental factors (natural source situations, natural source bearing capacity in ratio to use of human being, variety of environment in area, spices extinction severity and …).

7. Cultural and social factors (available situation in the community, norms and beliefs, acceptable behaviors and values, customs and cultures and …). . 8. Management factors (human source complexity, official and non-official structures related to the topic, systems, applied methods and styles and …).

9. Interested groups (attitudes, tendencies and preference of interested groups to such a non-governmental forms, organizations, land people and pressure groups). (haman, p. 137-138) .

Therefore, ecotourism is searching on add of opportunities and reduce of threads. If the opportunity is recognized, it is conveyed into the advantage and if it isn't avoid of threads, conveyed into the costs. There is no automatic advantage within ecotourism. Its successful depends on controlling and programming as well as.

Programming with the lack of correction and weak performance on ecotourism projects, it is conveyed into the common tourist projects within negative impacts. (ranjbar, 1387, p. 37)

Negative and positive influences of ecotourism activities

For improving ecotourism, it must be focused on attractions and this is possible to be on a local parks or prevented areas. (ranjbar, 1387, p. 57)

Some of the authors focused on positive dimensions of ecotourism activities and in this reason they offered its non-obstacles improvements. Some of the also implied on its negative dimensions and they are believe that positive cases is dominant on negative one. So, we must prevent its improvements. (zahedi, 1385, p. 56)

Their positive influences included in the following texts

1. Prevention from national sources and natural heritage for people and tourists.
2. Creating more mutual understanding in result of contacts between people.
3. Creating employment facility.
4. Increase of revenue.
5. Increase of life standards and improving levels.

6. Creating new appliance of lands in order to preventing natural sources.
7. Exchange of culture.

Negative influences of the called activities included on the following texts

1. Demolition of environment in reason of building and hotels.
2. Disturbing and attack to local animals.
3. Increasing expectation of economics' people.
4. non-considering of governmental, local investment and in some cases.
5. Reducing environmental various.
6. Pressure on environment.
7. non-considering of land application.
8. Production according to the needs of tourists to land and local needs. (Jihad monthly letter, 1383, p. 80)

It is considerable to decide about improving ecotourism places by attention to negative and positive influences and it is also possible to forecast about limited solutions of activities in field of spreading.

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The relationship of combined oral contraceptive pills with serum fat soluble antioxidant in reproductive aged women

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Abstract : The effect of combined oral contraceptive pills (COCP) on fat soluble antioxidant remain a dilemma. The aim of this study was to determine relationship between combined oral contraceptive pills (COCP) and fat soluble antioxidant (alpha tocopherol and beta carotene). This was a cross-sectional study which 31 COCP users and 31 non users recruited randomly in Ramhormoz Health Clinic No: 3 in Iran. COCP users should have taken low dose COCP for at least one year. A questionnaire for socio-demographic and a 50 items food frequency questionnaire were used for gathering data. Five ml fasting blood sample has taken and used for measuring fat soluble antioxidant using HPLC method. Results showed that the mean of alpha tocopherol was 7.48 □g/ml and 8.59 □g/ml and mean of serum beta carotene was 18.25 □g/dl and 20.41□g/dl in COCP users and non users (p>0.05). However in this study combined oral contraceptive pills did not have any relationship with serum fat soluble antioxidant, further studies with bigger sample size is recommended .

Introduction

Combined oral contraceptive pills (COCP) often referred to the birth-control pill are a very popular form of birth control. They are currently used by more than 100 million women worldwide and by almost 12 million women in the United States (1). According to the latest statistics in Iran, 50% of women used birth control methods, which 40% of them are COCP users (2).

COCPs were developed to prevent ovulation by suppressing the release of gonadotropins. COCPs inhibit follicular development and prevent ovulation as their primary mechanism of action (1). Beside of birth control, COCPs have some metabolic and nutritional effects (3). Some researchers showed that the level of trace minerals and biochemical change with taking COCP. The alteration reported in blood levels are generally believed to be related to changes in levels of specific transport proteins induced primarily by estrogen (4, 6).

Some fat soluble vitamins are potentiates to neutralize free radicals and reduce the risk of cancer, heart disease and many chronic diseases (7). Although oxidation reactions are crucial for life, they can also be damaging; hence, plants and animals maintain complex systems of multiple types of antioxidants, such as glutathione, vitamin C, and vitamin E as well as enzymes such as catalase, superoxide dismutase and various peroxidases (8). The imbalance between reactive oxygen species and the defentic antioxidant can cause the oxidative stress condition. Oxidative stress is thought to contribute to the development of a wide range of diseases including; cancer, atherosclerosis, cardiovascular disease, cataract, arthritis, inflammation and some types of Alzheimers (9).

Some researchers showed that estrogen can decrease reactive oxygen species and oxidative stress in vivo and vitro (10-11). In contrast some researchers showed that COCPs could reduce the serum beta carotene levels (12-13).

Because antioxidants have protective role in some chronic diseases, assessment of effect of COCPs on antioxidant levels is an important mean to recognizing women with reduced antioxidant who need supplement. The primary aim of this study was to assess the relationship between COCP and fat soluble antioxidant (alpha tocopherol and beta carotene) level in reproductive aged women in Ramhormoz- Iran.

Material and Methods

This was a cross-sectional study that carried in Ramhormoz-Iran on 2010. Samples included 62 women (31 COCP users and 31 non COCP users) who were recruited randomly among 200 women who had exclusion/inclusion criteria of the study. Inclusion criteria were including; age 18-40, using low dose COCP (contains 0.03mg ethinyl estradiol and 0.15mg levonorgestrel) for at least one year or using other non hormonal birth control (for control group), body mass index 20-25kg/m^2. The exclusion criteria were consisted of pregnancy, lactation, alcohol abuse, smoking, systemic diseases and using of supplements. This study approved by Ethics Committee of Ahvaz Jundishapur University of Medical Science. All participants signed an informed consent prior to the study. All participants completed a socio-demographic and a 50 items food frequency questionnaire according to the Iranian food composition table. Screening was done on 200 women according to inclusion/ exclusion criteria in Ramhormoze city (located in the Khuzestan province-Iran). One hundred ten women were eligible for study, which 100 of them had consent to participate in this study (50 COCP users and 50 non users). Sixty two women have chosen randomly, 31 who were COCP users and 31 who used other non hormonal birth control (condom or tubal ligation). Socio-demographic and food frequency consumption of participants gathered through interview. Five ml fasting blood sample was taken from every participant. Blood samples kept in the cold box and sent to the one reference laboratory for blood centrifuge. Alpha tocopherol and beta carotene were measured using the HPLC (HPLC Brand Yl9100, made by Younglin company) method.

Data entering and analyzing were done using SPSS version 16. The descriptive statistics (mean, SD) and univariate statistics (Independent t-test, Chi-Square and Logistic Regression) were used for statistical purposes. The p-value less than 0.05 considered as significant.

Results

The mean age of two study groups was 29.8 and 31.3 in the COCP users and non users respectively. The mean BMI was 24.8 and 24.2 in two groups. There was not any significant difference between two groups regarding socio-demographic characteristics (Table 1). Two groups did not have any statistical difference regarding foods contains beta carotene and alpha tocopherol.

The mean of alpha tocopherol was 7.48 □g/ml and 8.59 □g/ml in two groups respectively.

The mean of serum beta carotene was 18.25 □g/dl and 20.41□g/dl in two groups.

According to the Independent t- test there was not any significant difference between two groups regarding beta carotene and alpha tocopherol (p>0.05) (Table 2). Table 3 is presenting results of Logistic Regression for some variables e.g. age, marriage age, alpha tocopherol, beta carotene and BMI with OCP. There was not any significant relationship between these variables and COCP.

Discussion

In this study we examined the relationship of OCP with serum fat soluble antioxidant. All women were in the reproductive age and had normal BMI. We excluded overweight and obese women. Some studies showed that serum alpha tocopherol is lower in people with higher BMI (14). In a study researcher found that with 10% increase in the BMI; alpha tocopherol will decrease by 1% (15).

In the present study there was not any significant difference between two groups regarding serum alpha tocopherol. Results of other studies are in agreement with our study. In a study there was not any significant difference between OCP users and non users about alpha tocopherol (16). A study has done by Wu et al, also showed that there was not any significant difference between postmenopausal women who used hormone replacement therapy and women who did not regarding serum level of vitamin E (17). Some researches propose that with taking COCP the serum lipoproteins will increase and it can cause increase in the serum level of vitamin E (18-19). In Mahdavi et al's study, they could not establish a relationship between serum vitamin E level and COCP (20).

Although the serum beta carotene level in the COCP users was lower (18.25µg vs 20.41µg), it was not statistically different. Other studies are in agreement with the present study (7, 21). Some studies showed that OCP can increase plasma level of vitamin A. In Yeung and Chan's study results showed that; in women who used COCP for at least one month, the plasma level of vitamin A was higher (19). In Ahmed's study also COCP users had significantly higher plasma level of vitamin A (22). Increase in the vitamin A level may because of increasing in the retinol binding protein level

in the serum (23). In the Geroot et al's study the beta carotene level in the COCP users was significantly lower compared to the non users (16). This decrease may result from the effect of estrogen in the COCP that improve the retinol binding protein activity and change the ratio of beta carotene to retinol (15). Also the plasma level of retinol has increase with using COCP in some studies (24-25).

In this study vegetable and fruit intake of all participants were enough according to the food frequency questionnaire, this may contribute to that why fat soluble antioxidant did not reduce significantly in the COCP users. Diets high in fruit and vegetables, which are high in antioxidants, promote health and reduce the effects of aging; however antioxidant vitamin supplementation has no detectable effect on the aging process (26).

Conclusion
 According to the findings of this study it appears that oral contraceptive pills do not have any relationship with serum fat soluble antioxidant. Study in this area, particularly in our country is very few and further studies with bigger sample size are recommended.

Acknowledgement

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Table 1: Socio-demographic characteristics of participants

Characteristics	COCP users n=31 Mean (SD)	COCP non users n=31 Mean (SD)	P value
Age	29.8(4.7)	31.3(4.9)	0.24
Marriage age	18.7(2.8)	19.8(3.1)	0.17
Number of children	2.1(1.1)	2.03(0.8)	0.52
Body mass index (Kg/m^2)	24.8(1.9)	24.2(2.2)	0.3
Use of birth control method (year)	6.77(3.8)	6.3 (4.09)	0.7
Education N(%)			
Illiterate	3(9.7)	2(6.5)	
Primary education	12(38.7)	15(48.4)	
High school	9(29)	2(6.5)	0.08
Secondary high school	7(22.6)	9(29)	
University education	0	3(9.7)	

Table 2: The serum level of alpha tocopherol and beta carotene in two study groups

Characteristics	COCP users n=31 Mean (SD)	COCP non users n=31 Mean(SD)	P value
Alpha tocopherol (µg/ml)	7.48(3.9)	8.59(5.01)	0.33
Beta carotene (µg/dl)	18.2(7.05)	20.4(7.3)	0.24

Table 3: Correlation of some variables with COCP using Logistic Regression

Characteristics	Odds-Ratio	P value
Age	1.14	0.73
Marriage age	1.08	0.37
Alpha tocopherol	1.05	0.55
Beta carotene	1.04	0.41
Body mass index	0.76	0.09

The role of ICT in adult education

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Abstract: Challenges which faced the early users of distance education are still with us today. If distance education is to play a greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well. Teachers must be involved in planning the systems, trained to use the tools they provide, and given the flexibility to revise their teaching. Federal and state regulations will need revision to ensure a more flexible and effective use of technology. Connections have been established across geographic, instructional, and institutional boundaries which provide opportunities for collaboration and resource sharing among many groups In the pooling of students and teachers, distance learning reconfigures the classroom which no longer is bounded by the physical space of the school, district, state or nation.

Introduction:

The background of distance education to mid-nineteenth century dates. Pioneers in America and Europe of the best distance learning technologies for training that day, took advantage. For example: mailing system for creating educational opportunities for those able to go to regular schools were not interested in science education, but had been used. Of course at that time most of those who took advantage of this type of Physically Handicapped facilities, women allowed to attend the classes along with men who did not have a. Location is N. There was a school; were. One of the pioneers in this field English personal name was Isaac Pitman. His short-term training through correspondence and the correspondence began in 1840 in England. Students were required to read the Bible a part of written questions and answers raised by Pittman to get a good score should return by mail.

But distance education in America and for the first time at the University of Illinois Veslin was implemented in 1874. In 1900, university education through correspondence, face became more public. National Association of Home Education in 1926 and led the establishment of distance education and related programs in universities and schools, and more important aspect to find drivers. Education in 1920 invented the radio and TV appearance in 1940 led to important new techniques in communications that the nature of the field of distance education also created dramatic changes.

Trainers using these new technologies were successful educational programs to millions seek learning opportunities and thereby reach out to the educational spaces, training centers to expand. With the development of long-distance telephone system in the early twentieth century method of capacity and distance learning methods for students to access educational opportunities in the world increased Translation. But until the invention of mobile tele conference ever in the 80 and 90 and the main role in the concept of distance education did not play. Telemetry system, allowing for teachers conference provided that without the slightest delay at a time when your students can listen to them talk and sometimes they see.

Expansion of computer networks in the decade 1990 and connect millions of people through lines to the telephone networks made it possible to simply distance learning via computers and computer conferences around the world is possible (a) and Today with the development of control technology in science and technology around the world are.

WHAT IS DISTANCE EDUCATION?

Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. It may be used on its own, or in conjunction with other forms of education, including face-to-face instruction. In any distance education process there must be a teacher, one or more students, and a course or curriculum that the teacher is capable of teaching and the student is trying to learn. The contract between teacher and learner, whether in a traditional classroom or distance education, requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case, it is accomplished in the physical absence of

the teacher in distance education. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

Benefits of Distance Learning:
   Benefits and opportunities that distance education provides, include:
 - training a wide range of audiences.
 - meet the needs of students and students who can not attend in place.
 - Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Remote educational tool:
 distance learning tools and supplies various uses. These tools in four main courses are:
A - Audio Tools:
Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.
 B - Image tools:
including slides, films, video tapes and video conferences.
C - Data:
computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.
Computer applications for distance education are varied and include the following:
1- Training to Computer Management.
 2 - Computer Assisted Instruction.
3 - through PCs.
4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.
D - Print:
The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Key factors in the process of distance education:
 the process of remote training, the following factors contribute:
- Students:
Regardless of educational content, role and main element in the learning process students are responsible.
- Coaches and Teachers:
Success depends on a lot of educational activities the ability, skills and knowledge are the coaches and professors.
- Facilitators of communication:
Facilitator bases, as the bridge between students and mentors are. Must base expectations of teachers and educational needs of students and service coordination and communication to create.
- Support staff:
 One of the important pillars of any development of distance education programs, by development group finds. Operational support staff such as student registration, copy and distribute their resources, order textbooks, security and copyright, and are responsible for the report.
- Management:
 The group decision makers, builders and judges are considered to be educational and should be considered among the factors above, establish the correct relationship formation.

Types of Distance Education Programs:
   There are two types of programs offered by distance education schools: synchronous learning programs and asynchronous learning programs. With synchronous learning, distance education students must log on to the school's website at a set time. Often, they interact with their peers and professors via group chats, web seminars, video conferencing, and phone call-ins. With asynchronous learning, distance education students complete all coursework on their own time. They often learn via assignment sheets, message boards, email, pre-recorded video lectures, mp3s, and traditional mail correspondence.
   Distance education began for the delivery of courses to students who live in remote areas. Over the years, though, this form of education has become the preferred method for learning outside of the classroom.
   Distance Education is now undertaken by people with busy schedules, hectic lifestyles, special needs, and also those living in isolated areas. What's more, with such flexible learning options you can choose to study at any time and from any location you like.
   There are a number of different **forms of distance education** and it's important to know which method you prefer:
- **Correspondence learning:** your course materials are printed and sent out to you by mail/courier. The advantages are that you have a printed set of reference materials, you can study anywhere and you are not reliant on a computer, you can learn for long periods of time.
- **eLearning:** your course materials are provided to you in multimedia format; that is, on CD/DVD. In this way you can choose to take your study materials within you and learn anywhere in the world with just a laptop.
- **Online learning:** no materials are sent to you and you do all your learning online. The limitation is that you need to be logged onto a computer (though you may be able to

download and print some of your materials yourself, though this can cost you more in ink), there is a limit to how much you can absorb and do online, and most people's attention span on-screen is limited to 20 minutes (your eyes get tired after that).

- **Broadcast learning:** where you tune into a series of television, radio or Internet broadcasts (e.g. podcast, YouTube, etc.).
- **Teleconferencing:** where your lessons are conducted in real time through an Internet connection. Limitations are that streaming can be slow, connections can cause problems (students and teachers generally need to be computer literate) and there can be delays in talk-time, depending on software, hardware and connection capabilities.

Conclusion:

Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology.

Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be.

Technology transports information, not people. Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one

technology is best for all situations and applications. Different technologies have different capabilities and limitations, and effective implementation will depend on matching technological capabilities to education needs.

Distance education places students and their instructors in separate locations using some form of technology to communicate and interact. The student may be located in the classroom, home, office or learning center. The instructor may be located in a media classroom, studio, office or home.

The student may receive information via satellite, microwave, or fiber optic cable, television (broadcast, cable or Instructional Television Fixed Services (ITFS), video cassette or disk, telephone - audio conferencing bridge or direct phone line, audio cassette, printed materials - text, study guide, or handout, computer - modem or floppy disk, and compressed video. Recent rapid development of technology has resulted in systems that are powerful, flexible, and increasingly affordable. The base of available information technology resources is increasing with dramatic speed. Much has been learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections.

Interactivity is accomplished via telephone (one-way video and two-way audio), two-way video or graphics interactivity, two-way computer hookups, two-way audio. Interactivity may be delayed but interaction provided by teacher telephone office hours when students can call or through time with on-site facilitators. Classes with large numbers of students have a limited amount of interactivity. Much of the activity on computer networks is on a delayed basis as well. Possibilities for audio and visual interaction are increasingly wide.

In the earlier days of distance learning, it was most common to see distance learning used for rural students who were at a distance from an educational institution. The student might watch a telecourse on a television stations, read texts, mail in assignments and then travel to the local college to take an exam. This model is still in use, but as the technology has become more sophisticated and the cost of distance learning dropped as equipment prices dropped, the use of distance education has increased.

High front-end costs prevented an early widespread adoption of electronically mediated learning. Distance learning has been aggressively adopted in many areas because it can meet specific educational needs. As the concept of accountability became accepted and laws required certain courses in high school in order for students to be admitted to state

colleges, telecommunications was examined as a way to provide student access to the required courses. Many rural school districts could not afford the special teachers to conduct required courses. Distance education met this need by providing courses in schools where teachers were not available or were too costly to provide for a few students. It also fulfilled a need for teacher training and staff development in locations where experts and resources were difficult to obtain. These systems link learner communities with each other and bring a wide array of experts and information to the classroom.

Challenges which faced the early users of distance education are still with us today. If distance education is to play a greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well. Teachers must be involved in planning the systems, trained to use the tools they provide, and given the flexibility to revise their teaching. Federal and state regulations will need revision to ensure a more flexible and effective use of technology. Connections have been established across geographic, instructional, and institutional boundaries which provide opportunities for collaboration and resource sharing among many groups In the pooling of students and teachers, distance learning reconfigures the classroom which no longer is bounded by the physical space of the school, district, state or nation.

The key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching which is actually exacerbated in distance education applications. When skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their classroom.

Teachers need training in the system's technical aspects and in the educational applications of the technology. Areas for assistance include the amount of time needed to prepare and teach courses, how to establish and maintain effective communication with students, strategies for adding visual components to audio courses, ways to increase interaction between students and faculty, planning and management of organizational details, and strategies for group cohesion and student motivation.

The interchange of ideas requires different communication methods than in conventional classrooms: information technologies are predominantly visual media, rather than the textual and auditory environment of the conventional classroom, the affective content of mediated messages is muted compared to face-to-face interaction, and complex cognitive content can be conveyed more readily in electronic form because multiple representations of material (e.g., animations, text, verbal descriptions, and visual images) can be presented to give learners many ways of understanding the fundamental concept.

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8/25/2012

Advantages and Disadvantages of E-learning in adult education

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Abstract: Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. It may be used on its own, or in conjunction with other forms of education, including face-to-face instruction. In any distance education process there must be a teacher, one or more students, and a course or curriculum that the teacher is capable of teaching and the student is trying to learn. The contract between teacher and learner, whether in a traditional classroom or distance education, requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case, it is accomplished in the physical absence of the teacher in distance education. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

Keywords: E-learning, distance education

Introduction:

When the standardization and the requirements for training by the third millennium will be talking, unconscious form, design and construction to provide context and use tools and indicators to teaching the principles of community-based knowledge to the mind is centered. . No doubt these requirements and identify the correct tools and proper utilization of their functions according to accelerate the development expected in the knowledge-based information society will be effective. Such concerns and problems that any country in its development plans in motion to the information becoming a knowledge based society means a society would be faced with the centrality of knowledge, Dealing with existing tools and how these tools are used.

Led the way when dealing with those massive training programs available to speak to the technological tools that we expect to occur that planners and decision makers that planners and decision makers of large structures, especially university education according to the image Access to the development of community information are available on these tools are selected and used.

Massive wave of data produced in today's world it nicknamed the "information age" has all day and through various means of communication in the world will move on its size are added. Other hand, as we're not the world witnessed the development of the role of information communication devices transporting feedback fast and absorb the information around the world, we forget.

Therefore, information and communication as the main lever or two important move in developing wings, we learn. Meanwhile, proper utilization of the capacities of these two valuable and effective indexes in the general development concept for any society and the principles of a critical need is considered. With a view to clarifying this issue can be paid in the best way to create a platform for developing data standards and access to a knowledge based society, what really can be. To achieve a clear and practical answer in this area before all the existing definitions and indicators mentioned placed.

What is Distance Education?

Distance education is education designed for learners who live at a distance from the teaching institution or education provider. It is the enrollment and study with an educational institution that provides organized, formal learning opportunities for students. Presented in a sequential and logical order, the instruction is offered wholly or primarily by distance study, through virtually any media. Historically, its predominant medium of instruction has been printed materials, although non-print media is becoming more and more popular. It may also incorporate or make use of videotapes, CD or DVD ROM's, audio recordings, facsimiles, telephone communications, and the Internet through e-mail and Web-based delivery systems. When each lesson or segment is completed, the student makes available to the school the assigned work for correction, grading, comment, and subject matter guidance by qualified instructors. Corrected assignments are returned to the student. This exchange fosters a personalized student-instructor relationship, which is the hallmark of distance education instruction. Historically, most

distance education courses were vocational in nature, but today courses are offered for academic, professional, and avocational purposes for students of all ages. There are numerous specialized programs, such as those for blind persons and for parents of small children with hearing impairments. Distance education is available in practically any field, from accounting to zoology. Courses are offered in gemology, high school diploma, journalism, locksmithing, child day care management, yacht design, and many fascinating subjects.

Distance education courses also vary greatly in scope, level, and length. Some have a few assignments and require only a few months to complete, while others have a hundred or more lesson assignments requiring three or four years of conscientious study.

Since 1890, more than 130 million Americans have studied at DETC member institutions, including Franklin D. Roosevelt, Walter P. Chrysler, Walter Cronkite, Barry Goldwater, Charles Schulz, and many other distinguished alumni of DETC members.

Unlike most distance education courses offered by traditional colleges and universities that are semester and classroom oriented, with courses offered by most of the DETC-accredited institutions you can study any time and anywhere. Distance education is especially suited for busy people who wish to increase their knowledge and skills without giving up their jobs, leaving home, or losing income. You learn while you earn. Many courses provide complete vocational training; others prepare you for upgrading in your present job, without losing wages, experience or seniority. You receive individual attention, and you work at your own pace.

Benefits of Distance Learning:
Benefits and opportunities that distance education provides, include:
- training a wide range of audiences.
- meet the needs of students and students who can not attend in place.
- Possible connection between students and students with cultures, beliefs and experiences are different.
- Benefiting from coaches and speakers who do not live in the country.

Educational methods in distance learning:
Today, under the new system replaced the traditional systems of learning and learning week (ie tutoring methods, lectures) are:

Multimedia courses:
These courses and widely used elements of image, communication, graphics and simulated components, animation and communication

elements for guidance and tips, and talk back on course and curriculum issues are held.

Enhanced communication mechanisms:
The mechanism of any texts simultaneously, and asynchronous audio-visual communications to protect you. This case allows students to practice on topics learned will give.

Written test:
thus, question and test via a distributed communication network, are corrected and returned. These exams through video conferencing support and runs**.**

Virtual Seminar:
thereby different groups of students in different geographical environments linked together makes.

Collaborative virtual laboratories:
the laboratory of the Group's activities are supported. Workshops such as software engineering.

Smart academic factors:
academic factors that inform intelligent, support and guidance students pay.

Remote educational tool:
distance learning tools and supplies various uses. These tools in four main courses are:

A - Audio Tools:
Audio tools include training such as two-way interactive telephone, video conference, shortwave radio and a strain of tools such as audio tape and radio.

B - Image tools:
including slides, films, video tapes and video conferences.

C - Data:
computers as electronic data are sent and received. Because the data word description for a wide range of educational tools is used.
Computer applications for distance education are varied and include the following:
1- Training to Computer Management.
2 - Computer Assisted Instruction.
3 - through PCs.
4 - e-mail, telegraph, computer conference and the World Wide Web simultaneously.

D - Print:
The main element of distance education programs, particularly in the exchange and delivery system information tools are considered.

Key factors in the process of distance education:
the process of remote training, the following factors contribute:
Students:
Regardless of educational content, role and main element in the learning process students are responsible.
Coaches and Teachers:

Success depends on a lot of educational activities the ability, skills and knowledge are the coaches and professors.

Facilitators of communication:

Facilitator bases, as the bridge between students and mentors are. Must base expectations of teachers and educational needs of students and service coordination and communication to create.

Support staff:

One of the important pillars of any development of distance education programs, by development group finds. Operational support staff such as student registration, copy and distribute their resources, order textbooks, security and copyright, and are responsible for the report.

Management:

The group decision makers, builders and judges are considered to be educational and should be considered among the factors above, establish the correct relationship formation.

Advantages of E-Learning: Benefits of E-Learning
What are the e-Learning advantages and what are the disadvantages?

This is an important question to consider before making a final decision whether to enroll online learning or not.

It is known that Online Education with its e-learning software tools offers a new experience but does it work for everyone?

This experience may not be for everyone, professionally and personally, however it does have its strong point, advantages, and unique feature worth knowing. This article reviews and discusses the best features it provides –

ELearning Benefits – E-Learning Advantages:
1. Accessibility

Online classes are very attractive to some people because of their unprecedented accessibility: virtual classes in any online institution can be accessed from anywhere on the planet. The internet also allows much greater time flexibility, though it does not mean an absolute absence of submission and exam dates. For many, online education means – being able to study an advanced degree during breaks at work or at night from home.

2. Geographic diversity – Ease of accessibility

Many universities are renowned for their diversity. But online institutions create unprecedented possibilities in this area. The e-learning technology they use enables accessing classes online – It is possible for any person on the planet to study in any online course (and online school/university) without the need to travel and reside abroad. For this reason diversity can be far greater than in any traditional university.

3. Classroom Size and Manageability

Traditional education cannot afford to have very large classes, especially in advanced degrees. Then e-learning means and tools answer this need – Online education allows a greater number of students to be accepted to their desired courses since managing students online is easier.

4. Self-Paced Studies

The internet allows an unprecedented degree of freedom in pacing and spacing one's studies. This is a great appeal to those who like a lot of freedom and have learning rhythms which do not align with traditional campus life.

5. Learning tools and means

e-Learning offers different learning experience – It is a new technology based on standard means and tools such as – videos, e-books, online interactive means and activities. One may even select instructional material and work their own way/level to their degree.

6. Asynchronous Communication

Another advantage of e-learning methods is the use of asynchronous communication. Asynchronous communication is a communication through such online technology as email and online message boards.

Communicating online is easier for those who cannot express themselves face to face. It also allows time to think before responding, which you do not really have in a classroom discussion.

7. Biased Interactions

There tends to be less bias online, because the setting is less direct and intimate. For many, this is another great plus.

Conclusion:

Technology transports information, not people. Distances between teachers and students are bridged with an array of familiar technology as well as new information age equipment. What sets today's distance education efforts apart from previous efforts is the possibility of an interactive capacity that provides learner and teacher with needed feedback, including the opportunity to dialogue, clarify, or assess. Advances in digital compression technology may greatly expand the number of channels that can be sent over any transmission medium, doubling or even tripling channel capacity. Technologies for learning at a distance are also enlarging our definition of how students learn, where they learn, and who teaches them. No one technology is best for all situations and applications. Different technologies have different capabilities and limitations, and

effective implementation will depend on matching technological capabilities to education needs.

Distance education places students and their instructors in separate locations using some form of technology to communicate and interact. The student may be located in the classroom, home, office or learning center. The instructor may be located in a media classroom, studio, office or home.

The student may receive information via satellite, microwave, or fiber optic cable, television (broadcast, cable or Instructional Television Fixed Services (ITFS), video cassette or disk, telephone - audio conferencing bridge or direct phone line, audio cassette, printed materials - text, study guide, or handout, computer - modem or floppy disk, and compressed video. Recent rapid development of technology has resulted in systems that are powerful, flexible, and increasingly affordable. The base of available information technology resources is increasing with dramatic speed. Much has been learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite, ITFS, microwave, cable, fiber optic, and computer connections.

Interactivity is accomplished via telephone (one-way video and two-way audio), two-way video or graphics interactivity, two-way computer hookups, two-way audio. Interactivity may be delayed but interaction provided by teacher telephone office hours when students can call or through time with on-site facilitators. Classes with large numbers of students have a limited amount of interactivity. Much of the activity on computer networks is on a delayed basis as well. Possibilities for audio and visual interaction are increasingly wide.

In the earlier days of distance learning, it was most common to see distance learning used for rural students who were at a distance from an educational institution. The student might watch a telecourse on a television stations, read texts, mail in assignments and then travel to the local college to take an exam. This model is still in use, but as the technology has become more sophisticated and the cost of distance learning dropped as equipment prices dropped, the use of distance education has increased.

High front-end costs prevented an early widespread adoption of electronically mediated learning. Distance learning has been aggressively adopted in many areas because it can meet specific educational needs. As the concept of accountability became accepted and laws required certain courses in high school in order for students to be admitted to state colleges, telecommunications was examined as a way to provide student access to the required courses. Many rural school districts could not afford the special teachers to conduct required courses. Distance education met this need by providing courses in schools where teachers were not available or were too costly to provide for a few students. It also fulfilled a need for teacher training and staff development in locations where experts and resources were difficult to obtain. These systems link learner communities with each other and bring a wide array of experts and information to the classroom.

The key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching which is actually exacerbated in distance education applications. When skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their classroom.

Teachers need training in the system's technical aspects and in the educational applications of the technology. Areas for assistance include the amount of time needed to prepare and teach courses, how to establish and maintain effective communication with students, strategies for adding visual components to audio courses, ways to increase interaction between students and faculty, planning and management of organizational details, and strategies for group cohesion and student motivation.

The interchange of ideas requires different communication methods than in conventional classrooms: information technologies are predominantly visual media, rather than the textual and auditory environment of the conventional classroom, the affective content of mediated messages is muted compared to face-to-face interaction, and complex cognitive content can be conveyed more readily in electronic form because multiple representations of material (e.g., animations, text, verbal descriptions, and visual images) can be presented to give learners many ways of understanding the fundamental concept.

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8/25/2012

Advantages and Disadvantages of Online Education

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Abstract: Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology. Distance learning is expanding and examples of it are increasing dramatically. Fewer than 10 states were using distance learning in 1987; today, virtually all states have an interest or effort in distance education. Distance learning systems connect the teacher with the students when physical face-to-face interaction is not possible. Telecommunications systems carry instruction, moving information instead of people. The technology at distant locations are important and affect how interaction takes place, what information resources are used, and how effective the system is likely to be.

Keywords: Online Education, distance education

Introduction:

Distance education delivers classes (live or pre-taped) to students in their home, office, or classroom. It is used by K-12, higher education, continuing education and business. As the cost of delivering quality education increases, institutions find that limited resources prevent them from building facilities, hiring faculty, or expanding curricula. They are using distance education to maximize resources and are combining their assets with others to produce programming. Distance education is offered internationally, nationally, regionally, and locally over all forms of conferencing technology.

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Distance education places students and their instructors in separate locations using some form of technology to communicate and interact. The student may be located in the classroom, home, office or learning center. The instructor may be located in a media classroom, studio, office or home.

The student may receive information via satellite, microwave, or fiber optic cable, television (broadcast, cable or Instructional Television Fixed Services (ITFS), video cassette or disk, telephone - audio conferencing bridge or direct phone line, audio cassette, printed materials - text, study guide, or handout, computer - modem or floppy disk, and compressed video. Recent rapid development of technology has resulted in systems that are powerful, flexible, and increasingly affordable. The base of available information technology resources is increasing with dramatic speed. Much has been learned about connecting various forms of technology into systems, so that the ability to link systems is growing. Most distance learning systems are hybrids, combining several technologies, such as satellite,

ITFS, microwave, cable, fiber optic, and computer connections.

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In the earlier days of distance learning, it was most common to see distance learning used for rural students who were at a distance from an educational institution. The student might watch a telecourse on a television stations, read texts, mail in assignments and then travel to the local college to take an exam. This model is still in use, but as the technology has become more sophisticated and the cost of distance learning dropped as equipment prices dropped, the use of distance education has increased.

High front-end costs prevented an early widespread adoption of electronically mediated learning. Distance learning has been aggressively adopted in many areas because it can meet specific educational needs. As the concept of accountability became accepted and laws required certain courses in high school in order for students to be admitted to state colleges, telecommunications was examined as a way to provide student access to the required courses. Many rural school districts could not afford the special teachers to conduct required courses. Distance education met this need by providing courses in schools where teachers were not available or were too costly to provide for a few students. It also fulfilled a need for teacher training and staff development in locations where experts and resources were difficult to obtain. These systems link learner communities with each other and bring a wide array of experts and information to the classroom.

Challenges which faced the early users of distance education are still with us today. If distance education is to play a greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well. Teachers must be involved in planning the systems, trained to use the tools they provide, and given the flexibility to revise their teaching. Federal and state regulations will need revision to ensure a more flexible and effective use of technology. Connections have been established across geographic, instructional, and institutional boundaries which provide opportunities for collaboration and resource sharing among many groups In the pooling of students and teachers, distance learning reconfigures the classroom which no longer is bounded by the physical space of the school, district, state or nation.

The key to success in distance learning is the teacher. If the teacher is good, the technology can become almost transparent. No technology can overcome poor teaching which is actually exacerbated in distance education applications. When skilled teachers are involved, enthusiasm, expertise, and creative use of the media can enrich students beyond the four walls of their classroom.

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WHAT IS DISTANCE EDUCATION?

Distance education is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. It may be used on its own, or in conjunction with other forms of education, including face-to-face instruction. In any distance education process there must be a teacher, one or more students, and a course or curriculum that the teacher is capable of teaching and the student is trying to learn. The contract between teacher and learner, whether in a traditional classroom or distance education, requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case, it is accomplished in the physical absence of the teacher in distance education. Where distance teaching materials are provided to learners, they are structured in ways that facilitate learning at a distance.

EFFECTIVE TEACHING AND LEARNING WITH DISTANCE EDUCATION

Distance education dictates changes in behavior for both the teacher and the learner. The successful student develops persistence and skills in self-directing work. The successful distance education teacher becomes conversant with new technology and develops new instructional styles, moving from creating instruction to managing resources and students and disseminating views (Strain, 1987). Administrative and faculty support for distance education are critical to the success of this instructional method. Administrators should take note that the implementation of a distance education program may allow access to a greater number of students. However, the time and work associated with teaching at a distance exceeds the normal requirements of campus-based instruction.

Students in distance education settings perform as well or better on assignments, class activities, and exams when compared to campus-based students (St. Pierre, 1998). Nevertheless, students must maintain persistence and a clear focus to succeed in a distance learning situation. Self-direction, a passion for learning, and strong individual responsibility are important influences on achievement. There are indications that distance education works best for more mature, motivated, well-organized, and already accomplished learners (Rintala, 1998).

Garrels (1997) describes five critical elements for successful teaching at a distance:

1. Instructor enthusiasm. This requires animation and comfort in front of the camera, or with the technology utilized. Faculty support and interest are critical to the success of distance learning endeavors.

2. Organization. Teaching materials must be prepared in advance; timing, variation, and smooth transitions must be planned. Instructors should allocate from 3 to 5 hours of preparation for each hour of distance instruction. Great attention to detail is required long before the actual classroom activity occurs (Summers, 1997).

3. Strong commitment to student interaction. Whatever the modality used to teach at a distance, the instructor must encourage and facilitate ongoing communication between the students and the instructor.

4. Familiarity with the technology used in the class format. Faculty development is important before beginning any distance activities, and instructors should be trained in video use, computer use, or other forms of instructional technology used.

5. Critical support personnel. Production staff, graphic designers, and technical staff members will help the instructional setting produce successful teaching at a distance.

Distance education is any type of schooling that takes place away from a physical campus. Distance education is also known as:

- distance learning
- virtual learning
- online learning
- e-learning
- online education
- web-based training

Online Education Pros

Of the many advantages and new possibilities of online education, here are some of the Strengths:

1. Greater flexibility

Online students have more freedom in choosing their programs and schedules. This allows many busy adults to adapt online courses to their already established everyday life of work and family. For many, this is simply the only way they can study for that degree which will take them farther in their career and life.

2. Saves Time and Money

Online education saves an enormous amount of time and money which in traditional education is wasted on commuting. Commuting is also very tiring, while online education means you can study from home, in a comfortable environment with everything you need close at hand.Tuition also costs less for most online institutions.

3. Logistics

Traditional education is restricted due to logistical issues; there is only this amount of students who can be in a place at a given time, whereas in online classes, there is no question of paucity of space. As long as the online classes have the necessary bandwidth, an unlimited number of students can study, all over the globe. Then again, traditional classes would turn up expensive to maintain, because the educational institution needs to maintain a place and its facilities. When it comes to online education, all they need to do is to set up E-learning tools, an Internet connection and a website where people can learn. While this is not cheap too, but it is definitely cost less as compared to the costs of a place to carry on.

Online Education Cons

To balance our view of online education, let's consider some of the disadvantages/Weaknesses:

1. Requires Self Discipline

The greater freedom of online classes requires greater self disciplines, but not everybody has it. The comfort of studying from home may also reflect negatively on your motivation to do your best.

Depending on your personality, home can provide as many distractions as traditional campus facilities (designed especially for studying).

2. How well have you learned

With online education, the students have a greater hold on the education process, and that is not always a good sign. For example, in online education, though the teachers set up the audio and video clips with the same dedication, it remains to be seen whether the students study it with the same dedication that they would in a classroom.

3. No Campus Life

Many people remember the college/university as the best time of their lives. Part of it is the campus life – During and after classes. One of the disadvantages of taking online education rather than traditional one, is that in online education you will not have the atmosphere of campus lawns, corridors and classrooms, huge libraries with real books you can hold. There will be no campus buddies and no campus culture.

4. Internet Connection

Another negative point of online education is that it entirely depends on the internet connection. Though many countries have a robust Internet connection and others are getting it soon, there are still countries, and areas in countries that do not have access to Internet and other enhanced technologies. It would be difficult to get online education in countries that have a limited online presence.

Online Education VS Traditional Education

This article reviews the differences and the pros and cons of online VS traditional education. Gone is the world where only traditional, campus-based education existed and you only had to choose the university or college you wanted to study in.

Someday, probably in the near future, Online Education will replace traditional institutions. At least, many degree programs will combine the on campus courses as well as online classes as a standard educational approach.

But for now, the future student has to decide first whether he/she wants to study online or on a campus degree. Here are some points to consider the pros and cons of online and traditional institutions:

Differences between Online and Traditional Education; Comparison

1. Convenience

One of the most striking, innovative, and unprecedented features of online education is their convenience for almost anyone. Persons busy with careers or families will be able to compose their schedules so that they fit their individual time constraints. This is possible because courses are delivered in the form of electronic-based modules online. It is also convenient because it requires no

commuting, saving a great deal of time and money. It allows to study from home, with the only requirement being the possession of an adequate computer and internet connection. Basic computer skills only are required to acquire higher education online.

2. Expenses

Tuition costs less for most online institutions. Online education also eliminates the additional expenses usually entailed by traditional "campus life", commuting, and the purchase of study materials.

3. Feedback

Feedback is somewhat better in traditional education. Students can interact directly face to face with both classmates and teachers, which makes feedback easier to understand and faster to get. Some online institutions do offer chat rooms and video/audio meetings.

4. Accreditation

The credit of online education depends on its purpose and context. If you only have online degree(s) and are just trying to find work, employers may prefer traditionally educated candidates. If you are already an employed and valuable professional, online learning will be seen favorable as a way to improve your skills, expand your professional knowledge, and thus contribute more at work.

5. Ecology

Online education has obvious positive effect on the environment. It may not be measurable now, but if online education largely replaces traditional institutions in the near future it will mean that less paper will be used for books and writing material and fewer campuses will be built while the number of students and employed teachers will only increase radically.

Conclusion:

In general, new methods of educational systems to countries around the world as a necessity and need for learning and training opportunities to study in areas with different climatic features and conditions of learning and education according to their gender and cultures, has been. Each method is mentioned with regard to changes in features and creates an education system, and evaluation is used. Judgement of distance education in an educational way, first as a necessity to eliminate barriers to educational climate and geographical areas, age and gender restrictions learners began their work And more in a death education system, especially in the philosophy and goals based on theories of learning theories have evolved to find and promote professional growth. Approach to distance education with regard to the necessity of education in countries formed.

Emergence and development of information societies is the consequences of industrialization.

Despite the diversity of information in various forms of media in local, national and international, access, exchange and use of various information easier than last time is. Information society, a member of your buddies know that open information system in terms of geographical location and the last 25 years, organizational development, are limited. Distance learning faster than other forms of training has been. Growth factor in the economic interests of this type of educational approach, flexibility and remove the distance can be named. The methods of distance education, required for building physical education is not providing services. Teachers and trainers in this method - compared with traditional methods - and have more opportunities to more people than are being trained. In this type of teaching style of each person in each academic field, and each job can be arbitrary in time and space, trained without having to leave the house for work or business is education. This method requires that students are dispersed over long distances provides. Distance learning advantages of distance education in comparison with traditional education, the need for physical locations and training programs limited to no specific time period. In this type of teaching style, learning for life without possibility of spatial and temporal constraints for each individual there. In distance education, problems related to lack of qualified teachers and appropriate educational environment - as it posed in the traditional method of M is - is resolved. In this way the use of advanced features in digital libraries and search the various sites during the study, time and cost savings are.

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11/10/2012

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ISSN 1097-8135

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