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Evaluation of consistency rate between clinical and histopathological diagnosis of oral soft tissue lesions

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Original Article

Abstract

BACKGROUND: Some of the oral lesions including malignant tumors of mesenchymal and epithelial origin have same clinical features. Most of them are white or red patches with undermined edge. Also, in some cases, the microscopic view of histopathologic examination is not diagnostic. So, the integration of clinical and pathological information leads to the correct diagnosis. The aim of this study was the evaluation of consistency rate between clinical and histopathological diagnosis of oral malignant tumors of mesenchymal and epithelial origin.

METHODS: This cross-sectional retrospective study was performed in four centers of oral pathology of Hamedan University of Medical Sciences, Hamedan, Iran, during January to June, 2016. The data were collected using the archived files of patients. Collected data from the files included age, sex, lesion location, lesion type, and first and second clinical and histopathologic diagnosis. Finally, histopathological findings were compared with the first and second clinical diagnosis. Data were analyzed using SPSS software.

RESULTS: Ninety-one and seventy-nine of studied files were related to men and women, respectively. Most frequent malignant lesion was related to squamous cell carcinoma (SCC) (52.9%), followed by melanoma (29.4%). The consistency rate of first and second clinical and histopathologic diagnosis was 68.2% and 15.2%, respectively. Higher consistency rate was observed in melanoma, SCC, and fibrosarcoma lesions.

CONCLUSION: High inconsistency rate between clinical and histopathological diagnosis was found in some cases which may have originated from low diagnostic knowledge of clinicians or their misconception from misdiagnosis. Therefore, the improvement of knowledge and awareness of clinicians by conducting retraining courses is necessary.

KEYWORDS: Clinical Laboratory Techniques, Histopathology, Oral Soft Tissue Lesions

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Introduction

Mucosal lesions of the mouth include a wide range of benign, malignant, and pre-cancerous lesions.[1] Oral malignancies include epithelial or mesenchymal lesions.[2] Based on epidemiologic studies, the epithelial lesions could lead to most malignancies.[2] When epithelial cells gain mesenchymal phenotype, they acquire motility and metastasis potential. This process is named epithelial-mesenchymal transition (EMT).[2] Oral cancer accounts for about 3% of malignancies and is the eighth and fifteenth most common cancer in men and women, respectively in the United States and the United Kingdom.[3] Also,

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oral cancer is a common malignancy among Iranian population.[4] In a study at the Cancer Institute in Iran, 2.9% of the cases were related to oral lesions.[5] Oral lesions have multiple complications and their early diagnosis has a significant role in reducing complications, successful treatment, and good prognosis.[6-8] Clinical diagnosis principles of oral diseases include medical history and patient main complaints evaluation and physical examinations.[9,10] Physical examinations of the oral cavity are performed using a set of principles such as inspection, palpation, percussion, and auscultation. In oral lesions, histopathologic examinations of biopsy specimens confirm the final results of clinical diagnosis.[4] An important issue for many clinicians is diagnosis of lesions with similar clinical features and those without known characteristics. Most of the oral lesions are white or red patches on the gums having a undermined edge, and pain is the most frequent presentation.[11]

So, clinical evidence alone is not sufficient for the final diagnosis. Microscopic view of lesions is often diagnostic, but in some cases the histopathologic criteria are not pathognomonic and the pathologist needs clinical evidence for ultimate diagnosis.[4] Therefore, proper collaboration between clinician and pathologist is a necessity for accurate diagnosis.[4]

Clinical findings establish the primary diagnosis and the final diagnosis is given by pathologic report.[12] Sometimes, the differences in primary (clinical) and final diagnosis (histopathological) lead to re-surgery or losing surgery chance. The relationship between clinical and histopathologic diagnosis has been a long-time favorite of physicians and dentists.[13] By assessing the relationship between clinical and histopathologic findings, a solution can be found to resolve inconsistency cases. So, the aim of this study was the evaluation of consistency rate between clinical and histopathologic diagnosis of oral malignant tumors.

Materials and Methods

This cross-sectional multi-central retrospective study was performed in Department of Oral Pathology, School of Dentistry, Shahid Beheshti, Farshchian, and Besat Hospitals of Hamedan University of Medical Sciences, Hamedan, Iran, from January to June, 2016. The data were collected through archived files. Sampling was done by census method and all files (from 1996 to 2016) in the archives of oral pathology department of dentistry school and listed hospitals were investigated. Since this study was conducted on existing data, patient information was collected and maintained confidentially. Patients with clinical and microscopic diagnosis of oral soft tissue lesions, epithelial or mesenchymal, verified by maxillofacial pathologist, were included in study. Files with incomplete or inadequate information were excluded from the study. Data collected from the files included age, sex, lesion location, lesion type, and first and second clinical and histopathologic diagnosis. The lesions were divided into various types of squamous cell carcinoma (SCC), melanoma, fibrosarcoma, rhabdomyosarcoma (RMS), liposarcoma, and leiomyosarcoma (LMS). Finally, histopathological findings were compared with the first and second clinical diagnosis. The expertise of physicians who performed the first and second clinical diagnosis and took biopsy was also extracted from the files. Patient information was available only for the researcher and such information was confidentially collected by patient's identification number (ID) without name.

After data collection completion, they were analyzed via SPSS software (version 20, IBM Corporation, Armonk, NY, USA). Qualitative values were expressed as frequency and percentage. Statistical analyses were performed using chi-square test and Cohen's kappa coefficient (κ). $P < 0.050$ was considered

as a significant level.

Results

In this study, 170 patients including 91 men (53.53%) and 79 women (46.47%) with age range of 27-90 years were evaluated. Table 1 shows the frequency distribution of various lesions types that most abundant lesion (90 lesions) was related to SCC (52.9%).

Table 1. Frequency distribution of various malignant types of oral lesions

Lesion type	n (%)
SCC	90 (52.9)
Melanoma	50 (29.4)
Fibrosarcoma	11 (6.5)
RMS	9 (5.3)
LMS	6 (3.5)
Liposarcoma	4 (2.4)
Total	170 (100)

SCC: Squamous cell carcinoma; RMS: Rhabdomyosarcoma; LMS: Leiomyosarcoma

Sixty-seven lesions (39.4%) were related to dentistry school and 38 (22.4%), 36 (21.2%), and 29 (17.0%) lesions were related to Farshchian, Besat, and Shahid Beheshti Hospitals, respectively. Table 2 shows the distribution of lesions in terms of anatomical position and table 3 shows the age distribution of lesions.

Table 2. Anatomical distribution of malignant oral lesions

Anatomical position	n (%)
Lower lip	35 (20.6)
Palate	32 (18.8)
Buccal mucosa	26 (15.3)
Tongue	19 (11.2)
Upper ridge	14 (8.2)
Lower ridge	11 (6.5)
Gums	11 (6.5)
Upper lip	10 (5.9)
Tongue and palate	5 (3.0)
Lower lip and upper lips	4 (2.3)
Tongue and gums	3 (1.7)
Total	170 (100)

Table 3. Age distribution of malignant oral lesions

Age groups (year)	n (%)
27-34	9 (5.3)
35-42	10 (5.9)
43-50	12 (7.1)
51-58	28 (16.5)
59-66	34 (20.0)
67-74	48 (28.2)
75-82	25 (14.7)
83-90	4 (2.3)
Total	170 (100)

Table 4 shows that distribution of different lesions between men and women was not statistically significant (P = 0.733).

Table 4. Distribution of different lesions between men and women

Lesion type	Sex Frequency (%)		P
	Male	Female	
SCC	51	39	0.733
RMS	5	4	
Fibrosarcoma	7	4	
Liposarcoma	1	3	
LMS	3	3	
Melanoma	24	26	
Total	91	79	

SCC: Squamous cell carcinoma; RMS: Rhabdomyosarcoma; LMS: Leiomyosarcoma

The present study findings showed that oral lesions frequency generally increased with age (except for the age group of 75 to 90 years). SCC in age group of 59-74 years (48.88%), RMS and fibrosarcoma in 27-42 years age group (88.88% and 90.90%, respectively), liposarcoma and LMS in 51-58 years age group (50.00% and 33.33%, respectively) and melanoma in 67-74 years age group (48.00%) were the most frequent lesions. The results of the statistical test showed that the distribution of different lesions in the age groups was significant (P = 0.001).

Anatomically, the most lesions were in the lower lip (20.6%), palate (18.8%), and buccal mucosa (15.3%), respectively. The findings also showed that SCC lesions in the lower lip (33.33%), RMS and LMS in upper ridge (33.33% and 66.66%, respectively), fibrosarcoma and melanoma in palate (45.45%

Table 5. Consistency rate of first clinical and histopathologic diagnosis

Pathology center	Consistency rate*	κ	P
Dentistry school**	92.5	0.645	0.001
Besat hospital£	55.6	0.401	< 0.001
Shahid Beheshti hospital£	48.3	0.341	< 0.001
Farshchian hospital£	52.6	0.351	< 0.001

* Consistency rate = the number of same diagnosis/total number; ** Clinical diagnosis done by endodontist and periodontist; £ Clinical diagnosis done by oral maxillofacial surgeon

and 34.00%, respectively) and liposarcoma in the tongue (50.00%) were the most frequent lesions. The distribution of different lesions in terms of anatomical position showed a statistically significant difference (P = 0.003).

The first clinical diagnosis had 68.2% consistency with histopathology report. All cases of clinical agreement with pathology report were related to melanoma (90.0%) and SCC (78.9%). The consistency of histopathologic diagnosis with first clinical diagnosis of melanoma and SCC lesions was statistically significant (κ = 0.531, P < 0.001). Table 5 shows that highest consistency rate between the first clinical and histopathologic diagnosis was related to dentistry school.

In the second clinical diagnosis, 15.2% of cases had agreement with pathology report. All cases of clinical diagnosis agreement with pathology report were related to fibrosarcoma (70.0%) and SCC (11.8%). The consistency of histopathologic diagnosis with first clinical diagnosis of fibrosarcoma and SCC lesions was statistically significant (κ = 0.235, P < 0.001). Table 6 shows that highest consistency rate between second clinical and histopathologic diagnosis was observed in Shahid Beheshti Hospital.

Discussion

The accurate diagnosis is the key of successful treatment.[8] Accurate diagnosis depends on good consistency between clinical and histopathologic diagnosis.[14] The aim of this study was the evaluation of consistency rate between clinical and histopathologic diagnosis of oral malignant tumors.

Based on our findings, SCC, RMS, and fibrosarcoma were more common in men compared to women. On the other hand, melanoma, LMS, and liposarcoma were more common in women compared to men. Along with our study, Lopez-Graniel et al. reported higher incidence of malignant melanoma in women[15] and Hollows et al. reported a higher incidence of SCC in men.[16] In contrast to the present study, Nascimento et al. reported a higher incidence of liposarcoma in men[17] and Yan et al. reported the incidence of primary oral LMS in men.[18]

In the present study, the most common place of SCC, RMS, fibrosarcoma, liposarcoma, LMS, and melanoma was lower lip, upper ridge, palate, tongue, upper ridge, and palate, respectively.

Table 6. Consistency rate of second clinical and histopathologic diagnosis

Pathology center	Consistency rate*	κ	P
Dentistry school**	5.7	-0.129	0.081
Besat hospital£	15.4	0.176	0.010
Shahid Beheshti hospital£	28.6	0.298	< 0.001
Farshchian hospital£	23.8	0.268	< 0.001

* Consistency rate = the number of same diagnosis/total number; ** Clinical diagnosis done by endodontist and periodontist; £ Clinical diagnosis done by oral maxillofacial surgeon

According to Lopez-Graniel et al.[15] study, hard palate was the most commonly occurring place for intraoral melanoma, which is consistent with our study results.

In contrast to our study, Fowler et al. reported frequent incidence of fibrosarcoma in buccal and tongue mucus.[19] The most common place for RMS occurrence in Peters et al.[20] study was upper alveolar ridge and maxillary sinus, in Nascimento et al.[17] study was tongue, and in Yan et al.[18] study was maxilla and mandible. These studies were consistent with our study.

The highest incidence age (90 years) was related to SCC and the lowest incidence age (27 years) was related to fibrosarcoma lesions. According to Neville et al. study, fibrosarcoma is more common in young adults and children, but SCC and melanoma are seen in the elderly.[21]

In our study, the highest consistency rate of the first clinical and histopathologic diagnosis was related to melanoma and SCC, and physicians were unable to diagnose other lesions, because of difficult detection and rare nature of these lesions. The high correct diagnosis of melanoma lesions may be due to the typical appearance of this lesion, usually as a brown to black-colored macula with irregular edges.[21,22] In addition, four out of five oral melanoma cases are found on the hard palate and maxillary alveolus,[21] which can help physicians and dentists to diagnose this lesion more accurately and quickly.

The highest consistency rate between second clinical and histopathologic diagnosis was related to fibrosarcoma and SCC. These lesions are often in the form of tumors that grow slowly and sometimes reach to a significant size even before pain.[16] Such symptoms make it easier for physicians and surgeons to recognize this lesion compared to other lesions.[21] Musavi et al. showed that the agreement between the clinical and histopathologic diagnosis in all lesions other than peripheral ossifying fibroma (POF) and pemphigus was more than 70%.[12]

In Saghravanian et al. study, the overall consistency rate between clinical diagnosis and histopathology report in oral cavity lesions was 69.3%.[9] This measure in Hashemipoor et al. study was 65%[23] and in the other similar study by Deyhimi and Ferdowsi was 57%.[24] In our study, there was 21.1% inconsistency (78.9% consistency) between the first clinical diagnosis and histopathology report of SCC that the most common cause of this inconsistency was the diagnosis of verrucous carcinoma (VC) instead of SCC. In some cases, the VC lesion was transformed into SCC due to the late referral of the patient after clinical diagnosis. VC usually is observed in men over 50 years old and is a low-grade type of SCC. But in areas where women are the main consumers of chewing tobacco, the incidence of VC in older women may be higher.[4]

In this study, we performed a multi-central research. An important study limitation was the incomplete recording of some patients' information. According to our findings, more information, accuracy, education, and careful physical examination are necessary. Physicians must be stimulated to cautiously explore oral lesions to decrease inconsistency rates between clinical and histopathologic diagnosis.

Conclusion

In this study, a high rate of inconsistency was found between clinical and histopathologic diagnosis in cases of fibrosarcoma, RMS, LMS, and liposarcoma lesions. These results indicate two important points: 1) the lack of adequate clinical diagnostic information in clinicians and 2) inadequate understanding of clinicians about the importance of clinical findings. Therefore, it is necessary to raise the awareness of doctors and dentists about the consequences of misdiagnosis. Conducting courses for retraining also can be helpful in raising diagnostic knowledge of clinicians.

Conflict of Interests

Authors have no conflict of interests.

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Lifestyle and hypertension in rural population of Tangestan town, Iran

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Original Article

Abstract

BACKGROUND: Hypertension is an important health problem in developed countries and the risk factors of this complication are related to the individuals' lifestyle, with most of them being modifiable. The present study was conducted with the aim to investigate the relationship between lifestyle and primary hypertension among the people referring to health centers of Tangestan Town, Iran, in 2017.

METHODS: This study was a case-control study carried out on 100 patients with hypertension and 100 subjects as the control group living in the villages of Tangestan who had a health record in health centers. Data were collected through the international health promoting behaviors (HPLP-II) questionnaire and were analyzed using descriptive and analytical statistics in SPSS software.

RESULTS: The mean and standard deviation (SD) of the body mass index (BMI) scores were 26.27 ± 4.09 and 26.20 ± 4.30 in the case and control groups, respectively, and there was no significance difference between the two groups (P > 0.050). The mean total score of overall health promotion behavior in the case and control groups was respectively 133.27 ± 29.72 and 135.84 ± 29.39 out of 208. In the case and control groups, the highest and lowest scores in the subgroups were associated with the nutritional status and physical activity, respectively. However, there was no significant difference between the lifestyle dimensions of the two groups (P > 0.050).

CONCLUSION: Regarding overweight and lack of activity among the studied participants, it is necessary to perform the intervention based on psychological principles for the people prone to hypertension, especially those having positive history among their family members.

KEYWORDS: Hypertension, Lifestyle, Risk Factors, Behavior, Health

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Introduction

Hypertension is a chronic problem in the global health field[1] requiring a significant global responsibility in developed and developing countries.[2] It is also related directly to cardiovascular diseases (CVDs) leading to death. Moreover, hypertension is known as one of the causes of physical disabilities due to its connection to CVDs.[1]

The incidence risk of CVDs, cardiac failure, and cerebrovascular stroke in the patients with hypertension is respectively two, four, and seven times more than that in the healthy people.[3] According to the statistical figures issued by the Ministry of Health, Treatment, and Medical Education, 20 out of 100 thousand adult individuals suffer from hypertension, with half of them being unaware of their disease and only five of these people receive treatments. In other words, 75% of individuals with hypertension do not receive any

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treatment and this is not limited to Iran, rather it is the case even in developing countries.[4] However, the burden of this disease is more prominent in the countries with low and average income and in middle age period.[5] Todays, most of health problems such as obesity, cancers, hypertension, and the resulting mortality are caused by the changes in lifestyles and, consequently, made by the people's behaviors.[6]

In Iran, in recent decades, the socioeconomic changes and lifestyle modification have led to high prevalence of CVDs' risk factors such as smoking, hyperlipidemia, and hypertension, so that the mortality caused by CVDs have increased drastically.[7] High salt consumption, imbalance in taking calorie and its subsequent obesity are called as hypertension's risk factors, which can deteriorate the situation towards death when it is accompanied by smoking and high calorie food consumption.[8]

Since most of these risk factors are related to the lifestyle and hypertension can be modified,[9] changing the factors associated with the lifestyle is known as the best way to control and prevent this disease.[10] So, precise recognition of this connection results in taking effective measures to manage this disease.[11] Regarding the importance of lifestyle modification and its role in health promotion and preventing hypertension, this study was performed to investigate the relation between lifestyle and primary hypertension among the people referring to health centers of Tangestan town.

Materials and Methods

This is a case-control study which was carried out in 2017 on 100 patients suffering from hypertension (case group) and 100 people as control group living in Tangestan town with a health chart in the health centers. The multi-stage random sampling method was used to select the samples, so that ten health centers in the region was selected randomly and, then, ten records of the patients with hypertension were chosen randomly. It should be noted that if the selected record was not accessible or did not dissatisfy the researcher, another patient was replaced randomly.

The inclusion criteria of the case group included having a blood pressure of 140/90 or higher and affirmation of the disease by the doctor, receiving medicines reducing blood pressure, an age of more than 30 years old, and lack of suffering from kidney disease, CVDs, and diabetes mellitus (DM). In addition, 100 people from the same village were selected as the control group members and both groups were the same in respect of age, gender, and place of living. They were supposed not to consume any blood pressure reducing medicines or have blood pressure less than 140/90.

An experienced and trained interviewer collected the data using the health promoting behaviors (HPLP-II) questionnaire by direct referring to health centers and patients' homes after receiving oral consent from the participants. The questionnaire included two parts. The first part consisted of demographic information and general characteristics with 30 questions including age, gender, marital status, education level, occupation, income, weight and height, smoking, physical activity, nutrition circumstance, mood situation, and the history of hypertension.

The second part was the HPLP-II questionnaire containing 52 questions and 6 dimensions including health accountability (9 questions), spiritual development (9 questions), physical activity (8 questions), nutrition (9 questions), interpersonal communication (9 questions), and stress management (8 questions). The questionnaire was set by the Likert-type scale. The scores 1, 2, 3, and 4 were defined as never, sometimes, often, and always options, respectively. The total score of the dimensions was obtained summing up of all scores. Therefore, the range of the health promotion behavior total score

was between 52 to 208.

The sub-scales of nutrition, responsibility, spiritual excellence, and interpersonal relationships were possible from a minimum of 9 to a maximum of 36, and the two sub-scales of physical activity and stress control were possible within the range of 8 to 32 scores. The sub-scales were categorized into three classes of poor, moderate, and good with score ranges of less than 18, 19 to 27, and above 27, respectively.[12]

Regarding the lifestyle score range, the scores below 100, 100 to 150, and 150 to 208 indicated a poor, moderate, and good lifestyle, respectively.

Higher scores represented better health condition. Although the validity and reliability of the questionnaire has been confirmed by Morvati Sharifabad et al.[13] (Cronbach's alpha coefficient = 0.87), its reliability was measured by the internal consistency or Cronbach's alpha coefficient (0.75) among 20 cases of the studied population before starting the main project. This was performed due to the lack of use of the original questionnaire among the people living in Bushehr province, Iran. Data were analyzed using descriptive and analytical statistics such as t-test and chi-square in the SPSS software (version 20, IBM Corporation, Armonk, NY, USA).

Results

The mean and SD of age was 52.70 ± 11.23 and 51.60 ± 10.53 in the case and control groups, respectively. Moreover, 61 (61%) cases from each of the case and control groups were women. Both the studied groups were the same in terms of demographic characteristic including age, gender, marital status, and occupation. No significant difference was observed between the two groups regarding the mentioned variables (Table 1).

The mean weight of the cases in the case and control groups were 71.24 ± 11.28 and 70.21 ± 11.69 kg, respectively. The mean body mass index (BMI) of the cases in the two groups was 26.27 ± 4.09 and 26.20 ± 4.30, respectively. There was no significant difference between the two groups in terms of the afore-mentioned variables (P > 0.050).

Statistical tests showed no significant difference between the two studied groups about the factors related to blood pressure such as smoking, physical activity, and fat intake (P > 0.050). However, there was a significant difference between the two groups regarding salt intake and mood condition (P < 0.050) (Table 2).

Table 1. Frequency distribution of data of the variables studied among the case and control groups

Variable		Case group Frequency (%)	Control group Frequency (%)	P
Sex	Male	37 (37)	39 (39)	0.880
	Female	63 (63)	61 (61)	
Age group (years)	30-40	15 (15)	17 (17)	0.940
	40-50	27 (27)	28 (28)	
	50-60	28 (28)	29 (29)	
	≥ 60	30 (30)	26 (26)	
Marital status	single	6 (6)	4 (4)	0.120
	Married	79 (79)	85 (85)	
	Divorced	15 (15)	13 (13)	
Educational level	Illiterate	35 (35)	16 (16)	0.001
	Elementary education	33 (33)	28 (28)	
	High school	23 (23)	22 (22)	
	Diploma	3 (3)	23 (23)	
Occupation	Employed	96 (96)	95 (95)	0.370
	Unemployed	4 (4)	5 (5)	

Table 2. Frequency distribution of data of the demographic variables studied among the case and control groups

Variable		Case group Frequency (%)	Control group Frequency (%)	P
Smoking	Yes	25 (25.2)	22 (22.0)	0.590
	No	74 (74.8)	78 (78.0)	
Physical activity	Yes	43 (43.0)	54 (54.0)	0.199
	No	56 (56.0)	46 (46.0)	
Salt intake	None	31 (31.0)	10 (10.0)	0.001
	A little	34 (34.0)	22 (22.0)	
	Normal	29 (29.0)	58 (58.0)	
	High	6 (6.0)	10 (10.0)	
Fat intake	Low	50 (50.0)	35 (35.4)	0.214
	Normal	37 (37.0)	49 (49.5)	
	High	13 (13.0)	15 (15.1)	
Family history of hypertension	Yes	59 (59.0)	35 (35.0)	0.001
	No	41 (41.0)	65 (65.0)	
Mood condition	Calm	35 (35.0)	52 (52.0)	0.018
	Occasionally tempered	58 (58.0)	38 (38.0)	
	Frequently tempered	7 (7.0)	10 (10)	

Table 3 compares the mean level of agreement between the HPLP-II subscales of health promotion, physical activity, nutrition, spiritual growth, interpersonal communication, and stress management. The mean total score of overall health promotion behavior in the case and control groups was 133.27 ± 29.72 and 135.84 ± 29.39 out of 208, respectively. In the case group, the highest and lowest scores in the subgroups were associated with the nutritional status and physical activity, respectively. Furthermore, in the control group, the highest and lowest scores in the subgroups were associated with the nutritional status and physical activity, respectively. According to table 3, none of the dimensions of lifestyle were different significantly in the two studied groups ($P > 0.050$).

Discussion

This study was performed in order to determine the relationship between health promoting lifestyle and hypertension disease. Most of the cases were older than 50 years and aging was considered as a risk factor for hypertension in the present study, which confirms the results of other studies.[14-17] Accordingly, training to prevent high blood pressure since the young ages seems necessary. As mentioned before, no significant difference was found among the demographic characteristics between two groups and a precise consistency was observed between the two groups.

Table 3. Six dimensions and the total score of health promotion behaviors in both case and control groups

Subscales	Score range	Case group Mean ± SD	Control group Mean ± SD	P
Health responsibility	9-36	23.79 ± 4.76	23.66 ± 4.78	0.840
Physical activity	8-32	16.58 ± 5.25	16.88 ± 6.29	0.740
Nutrition	9-36	25.20 ± 5.21	26.41 ± 4.04	0.070
Spiritual development	9-36	24.08 ± 4.91	24.63 ± 4.60	0.410
Interpersonal communication	9-36	24.07 ± 5.21	24.65 ± 4.78	0.410
Stress management	8-32	19.55 ± 4.46	19.61 ± 4.86	0.920
Total sum score of health promotion behaviors	52-208	133.27 ± 7.29	135.84 ± 35.29	0.420

SD: Standard deviation

The number of illiterate people was twice more than the cases in the control group. In addition, there was a significant relationship regarding the education level between the control group cases and their counterparts in the case group. The importance of literacy and its role is prominent in disease prevention and control. Vakili et al studied 320 patients with hypertension among rural population over 30 years old in Islamabad Gharb city, Iran and found that the illiteracy level was high among them and concluded that health literacy was associated with the education level.[18] Eftekhar Ardebili et al. showed in a study that educational programs for blood pressure control were effective. They also regarded training the individuals based on health education models to be necessary for the hypertension prevention and control.[19] These findings show the need for self-care planning and blood pressure management for literate and illiterate people.

35 and 59% of the subjects in the control and case groups reported the history of hypertension in their family, respectively. This is in line with the studies by Mansoorian et al.[11] and Shayesteh et al.[14] Moreover, the history of the afore-mentioned disease was higher among the fathers of the control group's cases.

22 and 52.2% of the subjects in the control and case groups were smoking and used hookah, respectively, and there was no significant difference between them. It should be noted that tobacco is planted in the villages of Tangestan town and this point must be taken into account in present study.

Since smoking is a major contributor to CVDs and stroke, the incidence of stroke and coronary artery diseases (CADs) in patients with hypertension is two to three times higher than that of a non-smoking patient with hypertension, and smoking cessation reduces this risk.[20]

65% of the case group consumed no or lower salt and there was a significant difference between the case and control groups. This represented regarding of the nutritional points by the patients in present study.

The occasionally tempered mood was more seen among the case group subjects in comparison to the control group in present study. However, no significance difference was observed between the two groups in terms of stress management and interpersonal communication, which could be affected by behavioral manner of the subjects. No significant difference was found between the two groups regarding the total mean scores of all dimensions of the questionnaire. Nevertheless, Mansoorian et al. showed that behavioral habits related to nutrition, stress, and physical activity of the patients suffering from hypertension are more prevalent in rural population of Gorgan, Iran.[11]

The mean BMI of patients in the case and control groups were respectively 26.27 and 26.20, which are near the overweight boundary. This is consistent with the studies by Aghamolaei et al.,[21] Najar et al.,[22] and Ba et al.,[23] as well as the studies by Songc and Dai in China.[24] It seems that encouraging patients to lose weight and interventions for weight loss seem to be necessary for hypertension reduction. On the other hand, half of the people do not have regular physical activity as a factor of hypertension reduction. This is in agreement with the investigations by Shayesteh et al.,[14] Najar et al.,[22] Sadeghi et al.,[25] Madani et al.[26] and Ahmadi[20]. The first mentioned study indicated that this inactivity among rural population is associated with urban lifestyle and hence it is necessary to modify it among the rural people.

Limitations of the study included the lack of generalizability of the study findings. Besides, the cross-sectional design of the study limited any causal interpretation of the relationships between health promotion activities and hypertension.

Conclusion

In General, the health-promoting lifestyle in patients with hypertension was in a medium level, but the physical activity scale was in the weak level. Therefore, educational interventions and promotion to provide a suitable basis for physical activity for people with hypertension to control their weight can be an effective step in improving the health level in these patients.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

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The frequency of substance abuse tendency and its related factors among high school students in Divandarreh City, Iran, in year 2018

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Original Article

Abstract

BACKGROUND: Adolescence is the most risky part of life for beginning of substance abuse. Substance use in adolescence can affect the rest of the person's life in addition to his youth. The purpose of this study was to determine the frequency of substance abuse and its related factors among high school students in the city of Divandarreh, Kurdistan Province, Iran, in 2018.

METHODS: This was a cross-sectional study. The statistical population consisted of all high school students (16-18 years old) in Divandarreh City in 2018. The sample size was 386. The instruments of this study were demographic information and Zargar et al. addiction questionnaires. Data were entered into SPSS software and chi-square test was used to evaluate the analytical data.

RESULTS: According to the results, 279 (75%) of students had low addiction tendency, 66 (17%) had moderate addiction tendency, and 25 (6%) tended to severe addiction. 117 students (31%) had at least one experience of using alcohol, smoking, drugs, and other substances and 53 (15%) claimed daily consumption of substances and drugs. There was a significant relationship between sex (P = 0.001), father's education (P = 0.028), mother's education (P = 0.011), father's job (P = 0.001), educational grade (P = 0.002), economic status (P < 0.001), and average of study (P = 0.019) with substance abuse tendency.

CONCLUSION: According to the results of this study, providing a quiet and full of confidence environment for adolescents should be one of the fundamental priorities of each family. In addition to this result, parents' educational growth leads to less willingness of children to addiction.

KEYWORDS: Substance Abuse, Substance-Related Disorders, Mental Disorders, Students

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Introduction

Substance abuse is considered as one of the major concerns for global health.[1] According to the World Health Organization (WHO), smoking is among the 20 most common causes of death in the world.[2] According to a research, the annual mortality rate from tobacco abuse is estimated at 4 million people, and it is estimated to increase to 10 million in 2030 and about 70% in developing countries.[3] This is while the rising trend of drug use in developed countries has declined.[4] Substance abuse and health problems are considered as a global concern and one of the serious behaviors that threatens teenagers and young people.[5]

Iran now has one of the youngest populations in the world, and since addiction mainly threatens the younger generation of any society, according to the demographic structure of our country, about 44 million of the Iranian populations are at risk.[6]

Substance abuse among young people is

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one of the health problems facing the world today, which has a direct impact on their health.[7] There is also evidence that anti-social and aggressive behaviors in early childhood are one of the most effective and most important risk factors for drug use. In fact, there are ways to diagnose people at risk of substance abuse and having anti-social and aggressive behaviors in childhood and adolescence.[8] On the other hand, parenting styles are one of the factors that tend to encourage a person to aggression and using cigarettes and substance. As the level of aggression and addiction tendency in children from families with an authoritative parenting style is less than other children.[9]

On the other hand, child abuse causes aggression in children, causing a tendency to the substance and cigarette use in them.[10]

Substance abuse begins in many people from high school, so one of the most important ways to reduce drug use in adulthood is to control it at the same age.[11] For most people working with adolescents, the most important danger that threatens this group is that they are responding to frequent occurrences in inappropriate situations such as feeling insecure, pressure, psychological disturbances, feelings of humiliation, rejection and alienation, and conflict with parents in case of using drugs.[12]

It should be noted that behavioral disorders during childhood and adolescence are less considered and are considered only at the adult level and in the form of antitrust disorder or borderline personality disorder (BPD). It is very important to know that if this disorder is not treated and preventive interventions are not taken, it can often lead to substance abuse disorder and other major psychiatric disorders in adolescence and adulthood.[13]

There has been widespread research on juvenile substance abuse, but the rate of abuse remains high in the country, and new forms of it are constantly emerging. Although scholars and scientific-political organizations have special attention to addiction and adult addiction has been widely studied in the country, addiction in children and adolescents is less at the center of attention.

The purpose of this study was to determine the prevalence of substance abuse and its factors among high school students in Divandarreh City, Kurdistan Province, Iran, in 2018.

Materials and Methods

This was a cross-sectional study of analytical type. The statistical population consisted of all high school students (16-18 years old) in Divandarreh City in 2018. The sampling was done using cluster sampling method and subjects were randomly selected in each cluster. The sample size was 386 according to Cochran formula. The inclusion criteria included willingness and informed consent as well as complete, correct, and accurate questionnaires, and exit criteria included personal unwillingness or incomplete questionnaires. After obtaining a license from the Education Department of the Kurdistan Province and the approval of the school administrators, researchers met the students, inviting them to participate in this study as well as to preserve the entire information about them.

Trained instructors attended schools according to a pre-determined schedule in one of the classes, and asked the students to mark the answers in the questionnaire; one of the interviewers answered questions that might be asked. The instruments of this study were demographic information questionnaire (including age, gender, educational background, household economic status, parental occupation, parents' education level, history of smoking, having specific disease, parents' addiction, and having other occupations for the student) and Zargar et al. addiction questionnaire. This questionnaire is the Iranian version of Addiction Potential Scale (IAPS) which according to the psychosocial

condition of the Iranian society was created by Zargar et al.[14] The questionnaire consists of two factors, 36 items, and 5 lie detector items.

The questionnaire is a combination of both active and passive readiness. Active readiness is related to antisocial behaviors, desire to use drugs, positive attitude towards drugs, depression, and excitement. In the second factor (passive readiness), the highest number of items are related to the lack of self-expression and depression, scoring each question on a continuum from zero (totally disagree) to 3 (totally agree). Of course, this grading method will be reversed in questions 6, 12, 15, and 21. This questionnaire is a polygraph operating agent, which includes questions 12, 13, 15, 21, and 33. In order to obtain the general score of the questionnaire, the sum of the points of each single question should be combined. This score will range from 0 to 108. Higher scores mean more readiness of the respondent for addiction. A score between 0 and 36 indicates a low level of readiness for addiction, a score of 36 to 54 indicates an average readiness for addiction, and a score higher than 54 indicates a high level of person's readiness for addiction. In the research of Zargar et al., the reliability of the questionnaire was calculated as 90% using Cronbach's alpha,[14] which is optimal.

Data were analyzed using SPSS software (version 21, IBM Corporation, Armonk, NY, USA). Chi-square test was also used for statistical analysis. For all tests, the significance level was as $P < 0.050$.

Results

In this study, 370 high school students entered the study. 53.5% (198) were boys and 46.5% (172) were girls. Mean and SD of the students' age was 16.80 ± 0.71.

140 students (37.8%) were at the 10th grade, 177 (47.9%) at 11th grade, and 53 (14.3%) at 12th grade.

9 students lacked father and 2 of them had no mother. The mean and SD of the addiction tendency score was 39 ± 18.

The demographic characteristics of the students is showed in table 1.

Table 1. Frequency and percentage of demographic variables in high school students in Divandarreh City, Iran, in 2018

Variable	Group	n (%)
Father's education	Illiterate	8.2
	Under diploma	63.3
	Diploma	15.5
	Academic	13.0
Mother's education	Illiterate	42.8
	Under diploma	43.6
	Diploma	7.3
	Academic	6.3
Father's job	Unemployed	1.3
	Self-employed	39.8
	Farmer	29.3
	Employee	20.5
	Worker	9.1
Mother's job	Housewife	91.6
	Self-employed	0.8
	Farmer	0.8
	Employee	6.8
History of smoking	Yes	31.6
	No	68.4
Having another job	Yes	9.8
	No	90.2
History of the disease	Yes	7.3
	No	92.7
Parental addiction	Yes	11.1
	No	88.9

117 (31%) of students had at least one experience of smoking, alcohol, cigarette, or narcotics, of which 53 (15%) students were addicted to daily smoking, alcohol, or drug.

On the other hand, 279 (75.4%) of students had low addiction tendency, 66 (17.8%) had moderate tendency to addiction, and 25 (6.8%) pointed to severe addiction.

There was statistically significant relationship between sex ($P = 0.001$), father's education ($P = 0.028$), mother's education ($P = 0.011$), father's occupation ($P = 0.001$), smoking history ($P < 0.001$), educational grade ($P = 0.002$), economic status ($P = 0.233$), average of study ($P = 0.019$), having or not having a job ($P < 0.001$), and having or not having a disease ($P < 0.001$) with a tendency to substance abuse (Table 2).

Table 2. Relationship between demographic variables and addiction tendency among high school students in Divandarreh City, Iran, in 2018

Variable		Addiction			Total	P
		Low	Moderate	Severe		
Gender	Boy	151 (76)	26 (13)	21 (11)	198 (100)	0.001
	Girl	128 (74)	40 (23)	4 (23)	172 (100)	
Total		279 (100)	66 (100)	25 (100)	370 (100)	
Mother's education	Illiterate	114 (73)	34 (22)	9 (5)	157 (100)	0.011
	Under diploma	120 (75)	30 (19)	10 (6)	160 (100)	
	Diploma	20 (74)	2 (7)	5 (19)	27 (100)	
	Academic	23 (100)	0 (0)	0 (0)	23 (100)	
Total		277 (75)	66 (18)	24 (7)	367 (100)	
Father's education	Illiterate	27 (90)	1 (3)	2 (6)	30 (100)	0.028
	Under diploma	167 (73)	51 (23)	11 (4)	229 (100)	
	Diploma	39 (70)	11 (19)	6 (11)	56 (100)	
	Academic	40 (85)	3 (6)	4 (9)	47 (100)	
Total		273 (75)	66 (19)	23 (6)	362 (100)	
Father's job	Unemployed	2 (40)	3 (60)	0 (0)	5 (100)	0.001
	Self-employed	106 (74)	26 (18)	12 (8)	144 (100)	
	Farmer	82 (77)	17 (17)	7 (6)	106 (100)	
	Employee	65 (88)	6 (8)	3 (4)	74 (100)	
	Worker	18 (55)	14 (42)	1 (3)	33 (100)	
Total		273 (75)	66 (18)	23 (7)	362 (100)	
Mother's job	Housewife	251 (74)	61 (18)	25 (8)	337 (100)	0.136
	Self-employed	2 (66)	1 (34)	0 (0)	3 (100)	
	Farmer Employee	1 (34)	2 (66)	0 (0)	3 (100)	
		23 (92)	2 (8)	0 (0)	25 (100)	
Total		277 (76)	66 (18)	25 (6)	368 (100)	
History of smoking	Yes	63 (54)	35 (29)	19 (18)	117 (100)	0.001
	No	216 (85)	31 (12)	6 (3)	253 (100)	
Total		279 (76)	66 (17)	25 (6)	370 (100)	
Parental addiction	Yes	25 (60)	12 (30)	4 (10)	41 (100)	0.072
	No	254 (77)	54 (16)	21 (7)	329 (100)	
Total		279 (75)	66 (18)	25 (7)	370 (100)	
Educational grade	10^{th}	101 (72)	29 (21)	10 (7)	140 (100)	0.002
	11^{th}	147 (83)	24 (14)	6 (3)	177 (100)	
	12^{th}	31 (58)	13 (92)	9 (17)	53 (100)	
Total		279 (750)	66 (18)	25 (7)	370 (100)	
Economic status	Poor	143 (71)	44 (22)	14 (7)	201 (100)	0.233
	Moderate	110 (81)	18 (13)	8 (6)	136 (100)	
	Good	26 (79)	4 (12)	3 (9)	33 (100)	
Total		279 (75)	66 (18)	25 (7)	370 (100)	
Average	Good	90 (67)	33 (25)	11 (8)	134 (100)	0.019
	Bad	189 (80)	33 (14)	14 (6)	236 (100)	
Total		279 (75)	66 (18)	25 (7)	370 (100)	

Values are expressed as number (%).

The sum of the willing and tendency to addiction score in boys was 36783 and in girls was 31851. Therefore, the tendency to addiction in boys was significantly higher than that of girls.

88% of the students whose parents were employed inclined to have little addiction, and on the other hand, 9% of those whose parents had a job had a high addiction.

17٠.% of the 12^{th}-grade students showed a high degree of addiction.

79% of students with a good economic situation tended to be slightly addicted and 56% of those who had a high addiction tended to have an unfavorable economic situation.

15% of students with a specific illness tended to be addicted, while only 6 percent of those who did not have a specific illness

tended to be addicted.

10% of students with addicted parents tended to be addicted and 60% had a tendency to have little addiction, but 77% of students who did not have addicted parents had a slight tendency to addiction.

75% of students who did not have any other job were less likely to be addicted, and 90% of those who were slightly addicted to the job had no other job.

On the other hand, all students (100%) whose mothers had university education tended to have little addiction.

Discussion

According to the results of this study, smoking and using alcohol and drugs are affected by a wide range of social factors and are related to economic and social poverty. As a result of increasing socioeconomic and social deficiencies, consumption of alcohol, nicotine, and narcotics has also increased.[15]

Most of the population studied in this study was students from poor families in the community (201 from 370 students); however, there was no significant relationship between economic status and addiction, which was consistent with previous studies regarding the financial and addiction status of students.[16] This finding proves the hypothesis that the economic situation is not a predictor of addiction, so it cannot be said that the tendency to addiction in poor families is more or less than the wealthy families.

In this study, 23.16% of students who had a history of smoking showed a high incidence of addiction, and this percentage was 2.37% for students who did not have such history, which in turn indicated the importance of smoking history. This finding shows that smoking in adolescents is one of the most important risk factors in the tendency of adolescents to use drugs.

The prevalence of drug use at least once in a lifetime (including cigarettes, alcoholic beverages, and narcotics) among students in the city of Divandarreh in 2018 was 31.6%, which is in line with similar studies on the students of Shiraz, Iran (30.23%)[4] and Rasht, Iran (23.3%)[17] in the past years. A study conducted on high school students in Tehran, Iran, showed that the prevalence of smoking was at least 35.0% in boys and 26.9% in girls.[18]

Sexually, 10.6% of boys (21 of 198 boys) and 2.3% of girls (4 of 172 girls) tended to abuse drugs. The rate of use in boys was significantly higher than that of girls, which is consistent with most of the researches carried out in this field[4,19] and is not consistent with some studies.[20] On the other hand, this study, like Servatyari et al study,[21] there was a significant relationship between gender, educational grade, and average of study with mental disorders; so it seems that mental disorders are related to the addiction tendency in students.

In this study, pre-university students were significantly more likely to be substance abuser than others (17.0% in 12th grade vs. 7.1% at 10th grade). This predominance of addiction in pre-university students suggests a critical increase in this age that can be a good indicator of need for prevention services at this age.[22]

Other findings from this study include a lack of significant relationship between parents' addiction and addiction in students; this finding can strengthen the hypothesis that parenthood addiction cannot be a reason for students to use drugs or tend to be addicted. In the other words, parenting addiction cannot predict the addiction of their offspring. In this study, 9.7% of the students whose parents were addicted showed a high inclination and 29.2% of them had a moderate tendency to use drugs; these results are inconsistent with the results of the past studies. In some past studies, the influence of healthy parents and, in particular, the father's supporting role in the future character of the children has been proven;[23] the reason for this is perhaps related to the traditionalism of the families of the

present study in comparison to previous studies, as well as to the time and place differences of studies with each other.

Investigating the results of another study also shows that the presence of smokers and drug users in the family is effective in increasing the intent and behavior of substance abuse in individuals, especially adolescents.[24]

In this study, according to the results of table 2, there was a significant relationship between father's education, mother's education, and father's occupation with tendency to substance abuse. It was shown that with increasing parental education, students' unrealistic perceptions about drug dangers have decreased and with increasing father's education, students' attitudes toward drugs are less negative.

Another result of this study is the significant relationship between educational grade and substance abuse tendency. At the twelfth grade, the tendency to addiction was more than other grades, it may be due to the fact that students of this age are mostly affected by the university entrance exam and their future and experience more stress and discomfort, which can lead to tobacco or drug use. On the other hand, due to the sensitivity of this grade, mental, physical, and family discomforts of this age can be a major contributing factor to substance abuse.

On the other hand, Servatyari et al. study shows that traumatic and excessive use of mobile phones is a potential risk factor for drug addiction resulting from mental disorders in students and such disorders are in turn an effective factor in decreasing students' academic performance.[25]

Therefore, identification and elimination of effective factors in the tendency of adolescents to consuming drugs can be effective in preventing drug use in adolescents and reducing the demand for drugs in adults. Providing a suitable environment tailored to the needs of adolescents should be considered as one of the priorities of each family, as well as macro policies for the treatment and protection of addicted persons as well as preventive training, and this is not possible without identifying and modifying related social factors.

Conclusion

According to the results of this study, provision of a quiet and trusting environment for adolescents should be considered as one of the fundamental priorities of each family. In addition, the parent's educational growth is also based on the results obtained in this study, the lower inclination of children to it has an addiction.

Conflict of Interests

Authors have no conflict of interests.

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Cutaneous reactions to carbamazepine in children with epilepsy

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Original Article

Abstract

BACKGROUND: The main components in controlling and treating seizures are antiepileptic drugs (AEDs). Mostly, the systemic side effects of these drugs are regarded very important; however, these drugs can also cause serious mucocutaneous side effects. Carbamazepine is a drug which is used to treat epilepsy. Side effects of this drug can range from skin rash to toxic epidermal necrolysis (TEN) and Stevens-Johnson syndrome (SJS). The purpose of this study was to evaluate skin complications of carbamazepine in children with epilepsy.

METHODS: This study was performed on 99 children, aged 2 months to 11 years, with the diagnosis of skin complications after taking carbamazepine. Records were examined and their initial profiles including their medical skin conditions and rashes were recorded within the checklist. Data were entered into SPSS software. Measures of central tendency and dispersion were achieved. Finally, the relationship between the drug and the cutaneous reactions of these patients was analyzed using the chi-square test.

RESULTS: The most common complications among the patients were maculopapular lesions and skin erythroderma, with the prevalence of 37.4% for each. Other types of skin lesions included papules with 14.1%, macules with 8.1%, and SJS with 3.0%. A significant association (P = 0.02) between the types of the skin lesion and the dose of carbamazepine was observed; the more the dosage was, the more severe skin lesions were.

CONCLUSION: The most common cutaneous reactions to carbamazepine were erythroderma and maculopapular rash in the patients. The findings of this study also revealed that the lack of drug compliance was of high importance.

KEYWORDS: Carbamazepine, Epilepsy, Cutaneous Adverse Drug Reactions, Antiepileptic Drugs

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Introduction

Anticonvulsants play the main role in controlling and curing seizures. The prevalence of seizures in Iran is about 1% and various anticonvulsants are used in this country. Mostly, the systemic side effects of these medications are considered, e.g., hepatitis and kidney failure; however, they can cause mucocutaneous lesions leading to discontinuance or replacement of the medicine. Some of the most prevalent cutaneous side effects are: exanthema, hypersensitivity syndrome, lymphoma-like symptoms, erythema multiforme (EM), erythroderma, toxic epidermal necrolysis (TEN), drug-induced lupus erythematosus (DILE), Stevens-Johnson syndrome (SJS), acneiform eruptions, vasculitis, gingival hyperplasia, hypertrichosis, hair loss, and hair

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color changes.[1] Among the anticonvulsants, aromatic compounds such as phenytoin, phenobarbital, and carbamazepine are more likely to cause skin lesions which sometimes may require hospitalization. The pathogenesis of these skin problems looks multifactorial.[2,3]

The side effects of anticonvulsants are the major cause of morbidity and sometimes mortality during the treatment of epilepsy in patients, which would probably affect their quality of life and burden of disease. The exact incidence rate of adverse reactions to these drugs is not available due to the outpatient treatment for both epilepsy and the adverse drug reactions (ADRs) in majority of the cases. Most of these side effects are mild and will not get the patients hospitalized. In outpatient treatment, the side effects are not properly reported or recorded; therefore, it is difficult to estimate the incidence rate of these complications.

Carbamazepine is a common drug used for treating epilepsy. The skin reactions range from maculopapular eruptions to SJS and TEN.[1] The drug-induced skin eruptions are distinguished from the non-drug-related cases, based on the patient's history, the clinical examination, and the features of the eruptions. The purpose of this study was to evaluate the cutaneous reactions to carbamazepine in epileptic patients who were treated with this medicine and were recorded in Taleghani Hospital of Gorgan, Iran, in 2012.

Materials and Methods

This cross-sectional study was carried out on the children who were treated with carbamazepine as a medication for epilepsy and were hospitalized by virtue of skin lesions and had hospital records. The sample size was determined 99 cases, based on 80% power and 95% level of confidence considering the missing information in the records. Data in the records were extracted based on a checklist that included skin problems caused by taking medications, drug-induced rashes, basic information of the patients, etc. The data were encoded and entered into SPSS software (version 18, SPSS Inc., Chicago, IL, USA). Measures of central tendency and variability and the relationship between cutaneous side effects of the drug and demographic characteristics of these patients were analyzed using the chi-square test.

Results

During the year 2012, 123 cases were hospitalized in Taleghani Hospital due to cutaneous lesions which were appeared while taking carbamazepine. Of all these patients, 20 were excluded: 5 for lacking proper medication compliance and failure to comply with the right drug consumption as written in their prescriptions, 3 for incomplete hospital records, and 12 for consulting with other health services, e.g., allergy and infection units and accordingly for the probability of being diagnosed with a medical complication other than carbamazepine-induced cutaneous reactions. Finally in this study, of the remaining 103 patients, 99 children aged from 2 months to 11 years were randomly chosen and examined. They were admitted to Taleghani University Hospital of Gorgan and were diagnosed with carbamazepine-induced cutaneous lesions. In terms of age frequency, the average age of the hospitalized patients that participated in this study was 44.49 months and the standard deviation (SD) was 33.22. The minimum age among the patients was 2 months and the maximum was 11 years. 25% were less than 16 months, 25% were 16 to 37 months, and the other 50% were aged between 37 and 67 months.

According to figure 1, while assessing the types of skin reactions caused by carbamazepine in patients, we observed that the most prevalent reactions were erythroderma and mucopapular eruptions with the portion of 37.4% for each. SJS was the most infrequent reaction with the prevalence of 3.0%. The prevalence of papules

and macules was 14.1% and 8.1%, respectively.

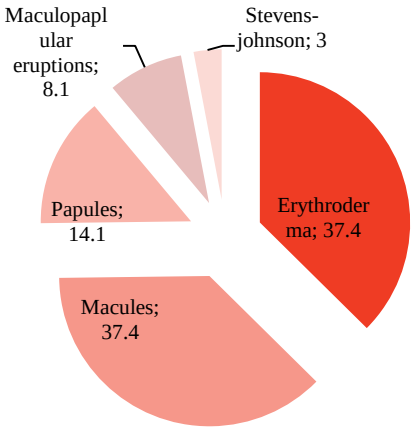

Figure 1. Absolute frequencies of different types of rash in children treated with carbamazepine

In this survey, the number of males who were affected with rashes due to using carbamazepine was higher. In terms of ethnicity, 41 patients (41.4%) were Fars, 18 patients (18.2%) were Turkmen, 26 patients (26.3%) were Sistani, and 14 patients (14.1%) were of other ethnic groups.

Studying the patients, it was found out that the majority of them (77.8%) had no history of allergic reactions to any foreign matter or medicine. Among the types of seizure, generalized seizures were more prevalent happening to 60 patients (60.6%) and partial seizures were less seen with the prevalence of 39.4%. The relationship between the types of skin lesions and the types of seizures are compared in table 1. It should be noted that no meaningful significant relationship was observed between sex and the type of skin reaction after the drug use (P = 0.06).

The average duration of drug use in patients was 12.82 ± 6.56 days. The minimum and maximum intervals between taking the drug and onset of the reactions were 4 days and 30 days, respectively. Concerning the interval between emergence of skin lesions and going to the hospital, the average time was 3.25 ± 3.07 days; the minimum interval was 1 day (going on the same day that rashes appeared) and the maximum interval was 5 days. The relationship between types of skin lesions and the time each takes to appear is evaluated in figure 2.

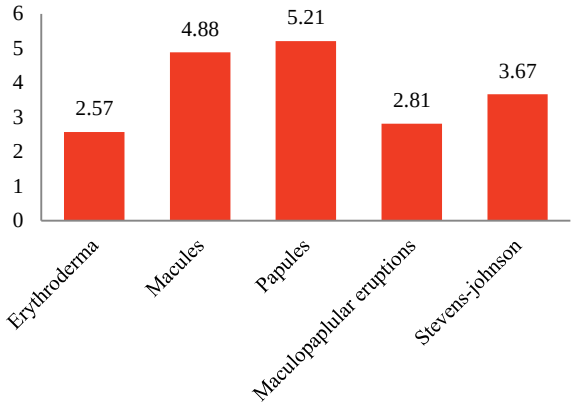

Figure 2. Relationships between types of skin lesions and rash start time

In terms of the relation between types of skin lesions and the daily drug dosage used by the patients, analysis of variance (ANOVA) statistical test showed that there was a significant correlation here; the more the dosage was, the more severe lesions were.

With regard to the possible influence of ethnicity on the occurrence of skin reactions during treatment with this medicine, chi-square analysis was used to assess this hypothesis.

Table 1. Comparison of relations between types of skin lesions and convulsions among the patients (in terms of the number of people)

Type of seizure	Erythroderma	Macules	Papules	Maculopapular	SJS	P
Generalized	25	5	6	22	2	0.61
Partial	12	3	8	15	1	

SJS: Stevens-Johnson syndrome

Findings indicated that erythroderma and maculopapular rash were more prevalent in Fars patients and macules were more common in Turkmen ones. Statistically, this difference was not a significant correlation (P = 0.28) (Table 2).

Table 2. Comparison of relation between types of skin lesions and the daily drug dosage

Type of skin lesions	Average (mg/day)	SE	P
Erythroderma	237.84	13.75	0.02
Macules	256.25	22.03	
Papules	321.43	32.61	
Maculopapular	347.57	12.73	
SJS	350.00	76.37	

SJS: Stevens-Johnson syndrome; SE: Standard error

Discussion

This study was performed on 99 children aged 2 months to 11 years who were referred to Taleghani Hospital of Gorgan, in 2012, and were diagnosed with adverse skin reactions after carbamazepine therapy. In terms of age frequency, the average age of hospitalized patients that participated in this study was 44.49 ± 33.22 months.

The minimum age among the patients was 2 months and the maximum was 11 years. 25% were less than 16 months, 25% were 16 to 37 months, and the other 50% were aged between 37 and 67 months. Mamishi et al. reported 7 Iranian children with severe skin reactions caused by barbiturates. These children were aged 2 to 11 years. Their symptoms began 1-2 weeks after taking the drug. Early prodromal symptoms were fatigue, fever, cough, anorexia, and then the mucocutaneous manifestations started to appear and worsen gradually. The skin reactions ranged from skin rashes to large blisters.[4]

In our study, the majority of patients were male with the frequency of 61.6%. About ethnicities of patients with skin lesions caused by carbamazepine, the majority was Fars, and after that, the number of Sistani and Turkmen patients was respectively higher. In this survey, 77.8% of the patients had no specific history of allergy to any food or drug and only 22.2% of them had histories of allergies. Comparing the relationships between the types of skin lesions and the patients' allergy backgrounds did not indicate any significant correlation. Concerning the family relationship between parents of the children, 37 children had relative parents and the other 62 did not. The statistical analysis showed that there was a correlation about this in the patients. Assessing types of seizure after the initial diagnoses indicated that 60.6% of the seizures were generalized and the other 39.4% were partial. The average time of carbamazepine treatment was 12.82 ± 6.56 days among patients. Garcia et al. reported a patient with severe carbamazepine-induced cutaneous reaction in the treatment of post-herpetic neuralgia (PHN). The patient was treated with carbamazepine and amitriptyline due to neuralgia. After 15 days, she developed malaise, muscle pain, with a mild non-specific cutaneous rash. Carbamazepine was discontinued immediately. One week later, she was hospitalized with urticaria, generalized exanthema, bullae, and maculopapular rashes all over her body. She evolved with progressive worsening of her symptoms, with increase in the number and size of cutaneous lesions besides areas of necrosis and loosening of the epidermis in different parts of her body. Eventually, this worsening evolved to septic shock followed by death.[5]

The dose of carbamazepine used by patients was also assessed. The average recommended dosage was 15 to 20 mg per kg of body weight. Unfortunately, not every family had effective medication compliance and some failed to live up to the dosage a neurologist had prescribed for them. This resulted in occurrence of cutaneous reactions and hospitalization. These patients were excluded from this study. The prevalence of different types of skin lesions

were as follows: 37.4% erythroderma, 37.4% maculopapular eruptions, 14.1% papules, 8.1% macules, and 3.0% SJS. According to the study of Huang et al.[6] maculopapular rash was the onset of symptoms in every patient. The incidence rates of erythroderma and SJS were 35.5% and 28.9%, respectively. 19.7% of the patients had TEN, 10.5% of them had maculopapular eruptions, and 5.0% had both maculopapular eruptions and urticaria. Phenytoin was the most common drug causing skin reactions. About the onset time of the side effects, the minimum time was 10 days and the maximum time was 5 years. The skin lesions were also assessed in hospitalized patients during 5 years. 734 patients showed symptoms for six types of skin lesion during this time. Three common non-serious lesions were urticaria, exanthema, and lesions looking like EM; and the rest were common serious complications such as SJS rash and exfoliative dermatitis. Anticonvulsants were the most common drugs causing serious skin reactions. Among patients with more serious skin reactions, the number of males and the average age were higher. They had been using the drug for a longer time and this prolonged their hospitalization time.[6]

Pharmacokinetics of carbamazepine in children is age- and body weight- dependent and highly variable due to influence of dosing regimen and comedication.[7] There is an association of variants of genes that regulate certain isoforms of cytochrome P450 enzymes (CYPs), some sodium channels, and drug transporters with either pharmacokinetics or pharmacodynamics of carbamazepine in children.[8] Genetic factors contribute to the high interindividual variability in response to antiepileptic drugs (AEDs). However, most genetic markers identified to date have limited sensitivity and specificity, and the value of genetic testing in guiding AED therapy is limited.[9] The use of genetic testing to guide epilepsy treatment is likely to increase in the future, as better understanding of the function of epilepsy genes will permit the application of precision medicine targeting the biological mechanisms responsible for epilepsy in the specific individual.[10].

Conclusion

The results of this study showed that skin reactions were one of the most frequent side effects of carbamazepine. Given the importance of the adverse reactions to this medicine, the appearance of these complications and particularly, the initial symptoms including skin reactions, should be noteworthy to the doctors. The findings also point out to the poor drug compliance in some families. They interfered in the dosage and the proper use of the medicine; thus, they could not live up to their medical prescription and this resulted in misusing of the drug in some children. Families should be perfectly justified about the exact dosage and timing of the drug and should be asked about how they are using the medication every time a doctor visits them. The average duration between the beginning of using the drug and admission of patients to the hospital was 21 ± 16 days. According to this, we could possibly say that generally, families did not pay enough attention to the danger of adverse reactions to carbamazepine and delayed in taking their children to a pediatric neurology center. In this study, the most prevalent skin lesions seen in the patients were erythroderma and maculopapular eruptions. According to this, if someone introduces these two types of skin lesion to the families as the most common ones caused by carbamazepine, it would be helping them get their children admitted to a medical center in a better time. Also according to the relationship between the dosage of medications and the incidence rate of each type of these lesions, increasing the dosage could cause severe and more extensive cutaneous reactions.

Conflict of Interests

Authors have no conflict of interests.

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Hope measurement questionnaire for family members of patients admitted to intensive care units

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Original Article

Abstract

BACKGROUND: Since the concept of hope in the family members of patients admitted to the intensive care unit (ICU) is of particular importance and the role of this concept in the health of this group of people is evident, it seems that a valid and reliable scale for measuring this concept is necessary. The purpose of this study was to design a hope measurement questionnaire for family members of patients admitted to the ICU of Besat Hospital in Sanandaj, Iran.

METHODS: The families of patients in the ICUs were selected using the convenience sampling method and completed the "Hope Questionnaire" along with demographic characteristics questionnaire and Beck Depression Inventory (BDI) (criterion scale). The validity of the instrument was determined by construct validity and criterion validity and the reliability was evaluated through calculation of internal correlation coefficient and test-retest. Data were analyzed by factor analysis, correlation coefficients, and Cronbach's alpha.

RESULTS: The items having the most factor loading were named based on the nature and size of the variables from which the extracted factors had the most share. First factor, including 15 items alone, represented 14.867% of the total variance and was named "Optimistic Thinking towards the Future" and the second factor, representing 14.666% of the total variance, was named "Pessimistic Thinking towards the Future" which had 7 items. The correlation between the scores of Hope Scale and the BDI, which was performed for assessing the criterion validity of the scale ($P < 0.01$).

CONCLUSION: The Hope Scale helps researchers gauge the different dimensions of hope through a deeper understanding of this concept. The scale had high validity and reliability in all fields. Considering the simplicity of its application and implementation, it can be used in various researches in which hope is considered as one of the studied variables.

KEYWORDS: Questionnaire Design, Hope, Intensive Care, Psychometric, Intensive Care Unit

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Introduction

Intensive care unit (ICU) is designated as an environment for providing special care to critical and ill patients. Critical illnesses often occur without warning and for a short period of time for patients and their families.[1] ICU is where ill patients are hospitalized and treated by experienced doctors and nurses and with the best treatment.[2] Hospitalization in the ICU potentially has an undesired concept for the patient and family and makes them incur many problems that escaping from their negative effects is inevitable. Fear of losing one of the family members, fear of the future, fear of financial burden of disease on the family, changes in family members' roles, anxiety and distress, depression, loneliness, and frustration are among the threats that affect the integrated family system.[3-5] Having a patient in ICU is accompanied with tensions and special

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challenges for family members which can include loss of control, changes in roles, fear of the future and patient's health, and frustration.[6]

The experience of hope in families with a patient admitted to the ICU is significantly different from that of a family with a patient admitted to other units. Because these families face a period of hospitalization in which their patients are in critical condition and between death and life; even if the length of hospitalization in the ICU is short, the life of family members is affected for weeks or months in different aspects.[7-10]

Considering the abovementioned, giving hope by the health care team is essential because giving hope to the patient's family is considered as one of the roles of nursing. In particular, nurses can improve the health outcomes in this group and, consequently, in society, by creating positive impacts on hope in the family members of these patients. Therefore, it is necessary to pay more attention to the phenomenon of hope in the family of these patients.[11,12] Hope is a human phenomenon that asks for more research, and since nurses deal with a wide range of human responses, they need to develop nursing knowledge in relation to the phenomenon of hope for comprehensive care of their patients.[13] Families with a patient in the ICU are more likely to experience disappointment than those who have a patient admitted to other units. These conditions require actions that would support and direct family members during their patient hospitalization period at the ICU and improve the hope in them.[14]

Hope is the most basic and important part of life that relates to the meaning and purpose of life. Hope is a fundamental experience based on the circumstances that embrace the individual. Hope is like an emotional, intellectual, behavioral path and life path related to person or one's world. Hope is the human ability to immerse in his/her dreams. Hope exists even in the dream of a consequence that has not yet happened.[9,15,16] Though studies such as the study of hope experience in patients with advanced cancer, the experience of hope in women with genital cancer, as well as the study of hope and social support have been done and improved clinical performance, the review of nursing literature suggests that despite the growth of the body of nursing knowledge in relation to hope, complete understanding of the phenomenon of hope has not yet been achieved, and the focus of these researches has been on patients with cancer, and on the other hand, with limitations in quantitative research for answering emotional, intellectual, and intuitive questions and given that the concept of hope can have different meanings in different cultural conditions and backgrounds, and different people experience it differently, it seems that this problem will be better investigated in the light of qualitative research that allows participants to express their experience of hope for having a patient admitted in the ICU.[17,18] Therefore, this research is designed with a qualitative and quantitative approach to design a tool for measuring hope in family members of patients admitted to the ICU.

Materials and Methods

This was a combined study in which content analysis was used as a type of qualitative research. The samples of this study were composed of family members of the patients admitted to the ICU of Kurdistan University of Medical Sciences hospitals, Iran, who were selected based on purpose.

The main method of data collection was interviewing and recording in the field. During the interview, non-verbal phrases, environment, and reactions of participants were recorded. In order to gain access to credible and real data, the researcher created a close and direct relationship with the participants. Through a deep, extensive, semi-structured interview, participants' experiences

were collected and recorded and as quickly as possible were transcribed on paper, coded, and analyzed by content analysis method to provide feedback for subsequent interviews or the adequacy and saturation of the data.

The study participants were the family members of patients hospitalized in ICUs. Data were collected through interviews with semi-structured questions. The research environment was a real area (natural environment) and there was access to samples in health care centers in ICUs. Before conducting interviews, the researcher identified the right people by being present in the research environment and after communicating with each individual, explained to them the method and the objectives of the study and with their opinion and agreement, determined the time of the first interview session and conducted it. Then, in the next sessions, the interview was conducted by asking semi-structured questions from the participants.

Since for constructing the questionnaire, the themes obtained from conventional content analysis and review of existing questionnaires were respectively used, the method of instrumentation in this study was inductive-deductive. Based on the concept resulted from the first stage, the main dimensions of the questionnaire were extracted. Then, proper phrases, that each would cover one aspect of the concept of hope, were developed. After extracting the constructive categories of the questionnaire, the items were compiled based on participants' experiences (inductive) and extracted codes from texts and similar questionnaires (deductive). At the design stage, the researcher used a set of items determined for the structure or structures of the instrument and judged to what extent these items could meet the expectations of the instrument structure. The researcher provided a pool of items based on the domains and sub-domains formed by the final definition of the concept of hope. From these items, the Hope Questionnaire was designed for family members of patients. Data analysis was carried out using conventional content analysis.

Results

The Hope Scale was divided into two sub-scales. Based on the performed factor analysis, items 4 and 9 were eliminated due to the fact that they were not included in any of the factors.

Items that had the most factors loading were put under the category of that factor. After assigning the items to four factors, these factors were named based on the nature and size of the variables from which the extraction factors have had the highest share and review of the vocabulary and terms, the implications of variables, the existing theories, and previous studies.[5] The first factor including 15 items which alone represented 14.867percent of the total variance was named "Optimistic Thinking towards the Future" and the second factor representing 14.662 percent of the total variance was named "Pessimistic Thinking towards the Future", which had 7 items.

The correlation between the scores of "Hope Scale" and the Beck Depression Inventory (BDI), which was performed to assess the criterion validity of the scale, was $r = 0.0$, which was significant at the level of $P < 0.01$.

When evaluation of the criterion validity is performed in the short time interval between the implementation of the two instruments, the correlation of 40%-70% is usually acceptable.[14]

The Cronbach's alpha coefficient, which was performed by analyzing the questionnaire, was 0.834. The correlation of all items, except 2 items, with total score of the scale was meaningful and statistically significant, which were not deleted due to the importance of these items.

Cronbach's alpha of the first sub-scale (optimistic thinking towards the future) was calculated 0.795 and the Cronbach's alpha for the second sub-scale (pessimistic thinking towards the future) was calculated 0.721.

Table 1. Factor analysis of Hope Scale

Number	Items	Factor 1	Factor 2
18	Everything gets better	0.572	0.374
19	I try to think better	0.552	-
20	I believe that there is a chance for me too	0.550	0.323
21	Good events will happen	0.534	0.342
15	Maybe there is a chance for me	0.530	-
17	I force myself to try harder	0.504	-
14	I think of the chances that may come to me	0.504	-
13	I am sure that my life will be better	0.490	0.459
2	There are still some good things to come across	0.419	
24	I know I am doing right in life	0.407	-
12	I do some things to get rid of bad thoughts	0.390	-
1	I look at a problem from different aspects	0.375	-
6	I can change my future	0.351	-
10	One day, I find someone to love him/her	0.348	-
8	My self-confidence becomes more and more every day	0.339	0.309
9	I do not worry about problems so much	-	-
4	I do not feel sorry all my time	-	-
22	I cannot solve the problems	-	0.675
7	Conditions will not get better for me	-	0.659
11	I am pretty sure that I cannot solve the problems	-	0.631
16	There is no light at the end of this path	-	0.631
23	I am not optimistic that I will have a good life	0.303	0.583
3	I will not be better than I am	-	0.583
5	I always see the bad side	-	0.341

The Pearson correlation coefficient between the scores obtained from the two implementation of the Hope Scale was 0.445 which indicates the average consistency of this scale (Table 1).

Discussion

In this research, which was performed with the aim of designing the Hope Measurement Questionnaire for family members of patients admitted to ICUs, the construct validity and the criterion validity of the scale, along with its internal reliability and consistency were studied.

The findings of factor analysis indicated that the structure of this scale was two-dimensional. The designers of the "Hope Scale" assessed its construct validity by examining the correlation of the "Hope Scale" with the General Health Questionnaire (GHQ) for adolescents, which indicated a significant positive correlation between the two scales;[6] but different dimensions of the concept of hope and consequently, being a one-dimensional or multidimensional scale is not mentioned.

The criterion validity and the concurrent validity of Hope Scale, examined by calculating the correlation coefficient between the hope scores of the research units and their self-efficacy scores, showed that there was an acceptable correlation between these two concepts.

A positive relationship has also been shown between self-efficacy and hope in the performed research.[7] Moreover, studies have reported a positive and significant relationship between hope and self-efficacy.[8]

The results of this study showed that hope in different fields of study was different and this difference in hope scores was significant. Studies have shown that hope leads to higher scores, in other words, hope is an important factor for goal-based behaviors such as getting a grade from homework.[8]

Hope is considered as one of the most important predictors of academic achievement. People who are more hopeful have higher education goals and more expectations of achieving success.[9]

In this research, the results of the internal consistency of the "Hope Scale" were evaluated by calculating the Cronbach's alpha, which corresponded to the coefficients obtained from the other studies. Calculating the reliability of the scale by a re-test method indicates the moderate consistency of the scale. The re-test method has some drawbacks. One of these problems is that many features change over time without being dependent on the consistency of the instrument.[7]

In examining the consistency of an instrument, estimating the amount of variation of the variable over time determines the time interval between two test runs. Most researchers recommend a minimum of two weeks intervals (to prevent the potential impact of the first test) and a maximum of one month (in order to reduce the likelihood of a change in the intended phenomenon) to conduct a retest.[10]

It is not recommended to check the consistency in cases where the variable under study is changed in short periods of time.[11] In view of these aspects, the concept of hope seems to be one of the concepts that is not constant in individuals at different times and it is volatile.

Conclusion

The Hope Scale helps researchers measure the different dimensions of hope through a deeper understanding of this concept. The study of the psychometric properties of "Hope Scale" showed that the scale had high validity and reliability in all fields and considering the simplicity of its application and implementation, it can be used in various researches in which hope is considered as one of the studied variables.

Conflict of Interests

Authors have no conflict of interests.

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The comparison of executive functions between active users of methamphetamine and those in abstinence phase

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Original Article

Abstract

BACKGROUND: Addiction to stimuli causes malfunction and morphologic changes in the nervous system. Representation of these changes in exclusive functions is accompanied by contradictory findings. This study was conducted aiming to compare the executive functions of two groups of users and non-users of methamphetamine in Tehran, Iran.

METHODS: This study was conducted in the form of a case–control study from October 2014 to March 2014. In this regard, 30 men who were active users of methamphetamine and 35 men who were in abstinence phase in Tehran were selected using respondent-driven sampling (RDS) method and assigned into two groups. The executive functions of the two groups were evaluated using the software version of the Wisconsin Card Sorting Test (WCST) and the data were analyzed using t-test and chi-square test using SPSS software.

RESULTS: The exclusive function index in methamphetamine users significantly decreased in comparison with the control group. Also, the preservation errors in consumer group were greater than the control group ($P < 0.050$).

CONCLUSION: The results of this study showed that exclusive functions in stimulant users were associated with significant damage. Considering the importance of executive functions as a mediating factor in the recurrence of consumption, it is desirable to decrease the function of this index in the treatment of dependence to methamphetamine to be on the center of clinical attention.

KEYWORDS: Executive Functions, Methamphetamine, Neuropsychological Tests, Wisconsin Card Sorting Test

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Introduction

Drug use disorder is a recognized global challenge worldwide and one of the most harmful social damages of the present age, with many social and economic consequences.[1]

Addiction is a brain disease that causes malfunction and morphologic changes in the nervous system and the mechanism of response to rewards and pleasure.[2] Methamphetamine is a group of stimulants that increases the mood, consciousness, and stimulation of the central nervous system (CNS).[3] It is estimated that more than seventy-five thousand people in the United States use methamphetamine, cocaine, and ketamine, and this figure is on the rise.

Chronic methamphetamine use is

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associated with cognitive impairment and psychiatric syndrome.[4] Methamphetamine consumption causes significant disorders in some neuropsychiatric domains, including the creation of some deficiencies in exclusive functions, attention, social cognition, flexibility, and working memory.[5] Changes in hormonal and biological functions are the side effects of chronic methamphetamine use.[6] The results of the study by Baicy and London[7] showed that the use of methamphetamine led to defect in the markers of the dopaminergic and serotonergic system that was associated with cognitive deficits such as disorder in the inhibition control and exclusive functions.

Studies have shown that these hormonal changes are associated with psychological consequences such as anxiety and depression, and methamphetamine users show higher levels of cortisol in facing stressors.[6] The results of the study by Farhadian et al.[8] suggest that chronic use of methamphetamine is associated with damage to executive functions, although these damages can be improved by avoiding consumption. In fact, exclusive functions are mechanisms for modulating the functions of cognitive processes.[8] The exclusive functions are called a set of self-command acts, that their ultimate goal is self-regulation.[3]

Changes in grey matter due to drug use and its relation to cognitive functions indicate that these areas play an important role in the development of depression and addiction disorders.[9] Also, the findings of the study by Zhang et al.[9] showed that biologic changes caused by the use of methamphetamine had a significant association with borderline personality disorder (BPD) and antisocial personality disorder (ASPD).

It is expected that stimuli-dependent patients experience two types of disorder in the Wisconsin Card Sorting Test (WCST): the preservation error (inability to stop the sequence of actions) and the shortfall in the number of completed classes that refer to the correct course sequences that represent a frontal lobe disorder in these people.[3]

Anderson et al.[10] and Avants et al.[11] pointed to the deficiencies in the completion of classes by stimuli-consumer subjects in the WCST. On the other hand, there is some inconsistent evidence with these findings that shows that methamphetamine use is not associated with these defects. For example, in the study by Chang et al.,[12] there was no difference in the working memory, expression, reaction time, processing speed, and executive functions between the two methamphetamine and control groups.

In the perspective of prevention, damage to executive functions is the basis for avoiding the patient from the treatment process and increasing the slip in stimulant users. Low flexibility and low restraint ability are components of executive functions that contribute to the recurrence of consumption. Studies show that executive functions in interacting with biological system and biological markers can guide the avoidance and treatment process and ultimately predict therapeutic outcomes.[2] Because the therapeutic effects of cognitive-behavioral interventions are realized due to the development of the neurological system and the role of executive functions, this brain-conceptual structure is worthy of clinical attention. Considering the various and significant cognitive damages of methamphetamine consumption and the wide and increasing range of users of this substance in Iran, the present study was conducted aiming to compare the executive functions of the two groups of users and non-users of methamphetamine.

Materials and Methods

This study was conducted in the form of a case–control study from October 2014 to March 2014. The study population consisted of all men dependent to methamphetamine in two active use and abstinence phases in

Tehran, Iran, who were under treatment in the addiction treatment center of Vardij. They were selected using a respondent-driven sampling (RDS) method that is a combination of chain sampling and a mathematical model (Markov chain theory and networks bias) and is being considered today in the world's major health organizations.

Regarding the uncertainty of the size of the society of methamphetamine users and the impossibility of using sample size tables, the average sample size of the three recent studies on the evaluation of the executive functions was used to select the sample size and a sample size consisting of 70 people was selected. In the registration phase, 5 people were excluded from the study for various reasons and 65 patients were entered the study process (30 consumers and 35 normal individuals).

Screening and preliminary assessments were performed 28 days before the assignment of the subjects by a team of two psychiatrists, three clinical psychologists, and two nurses. The inclusion criteria were: 1) age range of 18-60 years, 2) minimum reading and writing ability, 3) 1-3 years dependence on methamphetamine as a single-use pattern, 4) at least three months of abstinence in control group participants, 5) the amount of consumption being between 0.3 to 1 gr per day as inhalation method, and 6) residence in Tehran or suburb with a deviation of 30 km^2. Exclusion criteria were: 1) co-dependence on other substances, 2) severe psychiatric disorders, and 3) receiving any neuroleptic treatment. The demographic checklist was completed at the baseline stage by the participants. The software version of WCST was used to evaluate exclusive functions. The implementation of WCST was carried out three days a week at 10 am. The test results were sent by e-mail to the participants after a week. Data were analyzed by SPSS software (version 22, IBM Corporation, Armonk, NY, USA). All stages of the research were carried out after obtaining informed consent and based on the latest version of the Helsinki Declaration. [Clinical Trial Registration Code: Thai Clinical Trials Registry (TCTR)20180402001].

In this study, a demographic checklist, Structured Clinical Interview for DSM (SCID), and WCST were used.

Demographic checklist: It was designed and used by the researcher to collect personal information such as education, age, job status, and income.[13]

SCID-4: It is a clinical interview that is used to diagnose dysfunctions of axis 1 based on Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV). The reliability coefficient between evaluators for SCID is reported to be 0.60.[14]. The diagnostic agreement of this tool was favorable for Persian language for most of the specific and general diagnosis with reliability greater than 0.60. The kappa coefficient for all of the current diagnoses and life expectancy diagnosis was 0.52 and 0.55, respectively.[15]

WCST: This tool is designed by Grant and Berg for the purpose of examining exclusive functions.[3] In this test, the number of completed classes represents the success of the subject in completing each of the three patterns (color, shape, number). The purpose of preservation is insistence of the subject on the initial false response or previous successful response in spite of the examiner's feedback to change the pattern of the cards. Validity and reliability of the WCST are desirable.[3] The reliability of this tool according to Cronbach's alpha method was estimated equal to 0.77.

For data analysis, independent t-test was used. The demographic characteristics of the two groups were also assessed by chi-square test. Kolmogorov–Smirnov test (K-S test) was used to assess the precondition for the use of independent t-test based on normal distribution of scores. The results indicated that this criterion was acceptable ($P < 0.050$).

Table 1. Demographic status of the participants in the research in two research groups

Variable	Active users (n = 30)	Abstinence (n = 35)	P
	Frequency	Frequency	
Education			NS
Lower than diploma	13	18	
Above diploma	17	17	
Age			0.040
18-25	18	22	
> 25	12	13	
Job status			NS
Employed	16	20	
Unemployed	14	15	
Monthly income			NS
Less than one million tomans	15	18	
More than one million tomans	15	17	

NS: Non-significant

The precondition of the similarity of variances was tested by Levene's test (P > 0.050). After the confirmation of the assumption of the equality of variances in the two groups, the combined variance was used. Moreover, in order to identify the outlier data, the Grubbs' test was used in the QuickCalc software environment (version 5.3, GraphPad, La Jolla, CA, USA). For this purpose, after calculating the amount of test statistics and comparing it with the standard value of each individual data, the outlier data were identified and removed from the analysis process (at the significance level of 0.050). The examination of the similarity of variances indicated that WCST index was not significant (P > 0.050); thus, it is possible to use the independent parametric t-test to compare the groups.

Results

The demographic status of the participants in the study is presented in table 1.

The results of the chi-square test on the demographic characteristics of the two groups of users and non-users indicated that the two groups showed a significant difference in the age index component and most of the participants who used drugs were in the age range of 18-25 (P < 0.050).

As shown in table 2, there was a significant difference between the two groups of active use and abstinence in the two sub-tests of the completed classes and the preservation errors at the level of 0.050.

Discussion

This study was conducted aiming to compare the exclusive functions in users and non-users of methamphetamine. The results showed that individuals dependent to methamphetamine showed significant defects in executive functions compared with control group, which indicates the damage of the precursor region in managing attention and changing the attention and position from one situation to another.

In line with the results of the present study, the results of the study by Pirnia et al.[3] showed that there was a significant difference between the exclusive functions in the users and non-users of methamphetamine.

Table 2. The results of independent t-test in sub-tests of exclusive functions in two groups

Variable	Users (mean ± SD)	Non-users (mean ± SD)	T	P
Completed classes	10.83 ± 1.47*	13.94 ± 1.85	2.89	0.039*
Preservation errors	15.71 ± 1.44	13.09 ± 1.83*	3.12	0.041*

* P < 0.050; SD: Standard deviation

Also, the findings of Farhadian et al.[8] showed that chronic use of methamphetamine was associated with damage to executive functions. In this regard, the results of the study by Mizoguchi and Yamada[5] showed that chronic use of methamphetamine was associated with damage to exclusive functions. Moreover, the results of the meta-analysis by Potvin et al.[16] showed that methamphetamine use was associated with a wide range of cognitive defects, including impairment in exclusive functions. Van der Plas et al.[17] also showed that stimulant users experienced injuries in exclusive functions. High impulsivity and poor exclusive functions are the hallmarks of methamphetamine use disorder.[18]

The higher rate of preservation errors in the methamphetamine-user group is consistent with previous research findings. Simon et al.,[19] for example, found that the rate of preservation errors in the users group was significantly higher than the control group.

Part of the results of this study showed that methamphetamine users in completing classes showed significant defects in comparison with the control group. These results are consistent with the results of Verdejo-Garcia et al.[20]

In explaining these results, it can be argued that the destruction resulted from methamphetamine generally happens at the frontal lobe of the forehead,[21] and since this area has the task of the exclusive functions, obviously seems that the use of methamphetamine changes this area of the brain and affects the exclusive functions. In this regard, the results of study by Meredith et al.[22] showed that methamphetamine users, as compared to heroin users, showed greater damage in the WCST, which suggests damage to the forehead area.

The study of addiction and impulse control disorders has shown that drug use behaviors are associated with neurobiological changes related to brain networks of reward, stress, and executive functions.[23] In addition to damaging the dopaminergic and serotonergic neural terminals, damage to energy-producing cells in the orbitofrontal cortex (OFC) and posterior parietal cortex (PPC) can be responsible for the attention deficit in the methamphetamine users. The results of this study, considering the effectiveness of cognitive and executive processes in the management of avoiding from drugs and the ability to continue the non-consumption process, can be applied and used in designing preventive and therapeutic interventions.

The results of this study were accompanied by several limitations. The main limitations were: (1) according to the small size of the sample due to the existing restrictions, it is necessary to interpret the findings of this study as primary outcomes, and (2) the cross-sectional nature of the study prevents the total inference and comprehensive prediction. It is recommended to use a larger sample in future studies, so that, due to statistical error less than one from one hand and the actual significance level on the other hand, it would be possible to be more confident about the characteristics of the society. It is also suggested that a similar study be conducted in the female society.

Conclusion

The results of the present study showed that exclusive functions in the form of two components of completed classes and preservation errors in methamphetamine users showed a significant decrease compared to abstinence (non-user) group. These findings reflect the biological and psychological consequences of the use of stimulants and can have clinical applications in the field of therapeutic and rehabilitation interventions.

Conflict of Interests

Authors have no conflict of interests.

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Early maladaptive schema, emotion regulation, and general health in prisoner and non-prisoner men: A comparative study

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Original Article

Abstract

BACKGROUND: Early maladaptive schemas (EMSs) and difficulty in emotion regulation are mechanisms leading to dysfunctional behaviors and reduction of mental health; hence, this study aimed to compare EMSs, emotion regulation, and general health in prisoners and non-prisoners.

METHODS: The research method was causal-comparative (post-event). Statistical society comprised all of prisoners and non-prisoners in Fuman City in Iran. Of them, 100 prisoners were selected using random sampling and they were compared with 100 matched non-prisoner men based on the inclusion criteria and. Non-prisoners were matched with prisoners in terms of age, job, and education level. Both groups filled out Young Early Maladaptive Schemas Questionnaire (YEMSQ), Persian version of the Cognitive Emotion Regulation Questionnaire (CERQ-P), and 12-item General Health Questionnaire (GHQ-12). Data were analyzed using independent t-test and multivariate analysis of variance (MANOVA).

RESULTS: A significant difference was observed between two groups in total score of EMSs, emotion regulation, and general health ($P < 0.001$).

CONCLUSION: There is a significant difference between two groups in general health, maladaptive schema, and emotion regulation which indicates that EMSs, inability to regulate emotions, and low general health could play a critical role in criminal behaviors.

KEYWORDS: Maladaptive Schemas, Emotion Regulation, General Health, Prisoners

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Introduction

Crime is one of the social and psychiatric problems.[1] According to World Health Organization (WHO), about 9 million people across the world are in prisons and at least half of prisoners suffer from psychiatric and personality disorders such as major depression, anxiety, and other psychiatric symptoms.[2]

Young et al. in 2003 extended Beck's model of cognitive schemas by introducing early maladaptive schemas (EMSs), which are assumed to be responsible for incidence of psychiatric disorders. Young et al. proposed 18 schemas based on clinical experiences. He cited that these maladaptive schemas resulted from the interaction between the individual's emotional temperament and negative early life experiences and subsequent adult psychopathology in adulthood.[3] These schemas influence what we interpret as events, they could bias and distort our perceptions and behaviors. In many cases, we are more likely to remember information that supports our negative schema and core beliefs about the world and ourselves compared to information

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that challenges them. They could therefore lead to continuation of schemas. Unmet main emotional needs in children could be considered as the basic factor for development of EMSs.[4]

EMSs are stable after formation during lifecycle and could form the basis of cognitive structures of individuals and play key role in organization of experiences of individuals.[5] EMSs could affect data processing procedure and distort the reality and experiences. They may be used adaptively, allowing people to function successfully in their environment, or maladaptively, leading to problems in life.[6]

Young et al. presented 18 maladaptive schemas that could have effect on emotion, behaviours, and interpersonal relationship.[3] Committing crime as a social problem could be affected by maladaptive schemes.[7] A study showed that these maladaptive schemas, especially in two fields of avoidance-exclusion and autonomy-impaired performance could be vulnerable for people to take criminal behaviours.[8] Moreover, Noferesti and Akbari Zardkhane conducted a study on EMSs in sexual criminals (over 18 years old) and normal individuals in Tehran, Iran, and found that 4 schemes including abandonment, mistrust, dependency, and vulnerability were prevalent in prisoners.[9]

Emotions are most often conceptualized as a set of experiential, physiological, and behavioral responses.[10] Emotion regulation is defined as the attempts people make to maintain, inhibit, and enhance emotional experience and expression of emotions, both positive and negative.[11] Emotion regulation strategies are neither adaptive and healthy nor maladaptive.[11] Cognitive emotion regulation means using cognitive-behavioral strategies to change the type and severity of emotional experience.[12] Difficulties with emotion regulation are associated with mental health disorders as well as problematic behaviors such as substance use and high-risk sexual behaviors.[13]

In regard of the significant of identifying and changing maladaptive schemas, promotion of general and mental health and emotion regulation in prisoners can be useful for prevention of criminal behaviors in future. The aim of this study was comparing EMSs, emotion regulation, and general health of prisoner and non-prisoner men.

Materials and Methods

In this study, research method was causal-comparative (post-event). Statistical society comprised all of prisoners and non-prisoners in Fuman City in Iran (n = 200). Of them, 100 prisoner men were selected using random sampling based on the inclusion criteria; non-prisoner men were matched with prisoner men in terms of age, job, and educational level.

Inclusion criteria included being male, age range of 20-40 years old, having at least secondary school education, having at least 2 years of conviction, commitment of intentional crimes, and having certificate of mental health. After selection of the cases, 100 prisoner men participated in this study. Exclusion criteria included suffering from schizophrenia and psychotic and bipolar disorders. Both groups filled the 90-item Young EMS Questionnaire (YEMSQ), Cognitive Emotion Regulation Questionnaire (CERQ) (long form), and 12-item General Health Questionnaire (GHQ-12) under supervision of a psychologist.

Instruments: The data collection instruments in this study were demographic questionnaire, 90-item YEMSQ, CERQ (long form), and GHQ-12.

Demographic questionnaire: The questionnaire measures items such as age, background, job, type of crime, education, marital status, and number of children.

EMSQ: The self-report questionnaire of EMS contains 90 items that can measure 18 domains of EMS including unrelenting

standards/hypercriticalness, emotional inhibition, negativity/pessimism, punitiveness, self–directedness, subjugation, approval-seeking/recognition-seeking, hypervigilance/ inhibition, entitlement/grandiosity (impaired limits), insufficient-control/self-discipline, dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, failure, abandonment/instability, defectiveness/ shame, social isolation/alienation, emotional deprivation, and mistrust/abuse. Each scale has 5 items to measure the type of EMSs.[14] Reliability of the questionnaire was reported to be 0.95 and 081 using internal consistency and retest methods, respectively.[15] In Iran, this form was normalized by Yoosefi et.al. Confirmatory factor analysis (CFA) of the Differentiation of Self (DSI-2) scale showed that the questionnaire had required validity.[16]

CERQ (long form): The questionnaire includes 36 items and 9 subscales including self-blame, acceptance, rumination, positive refocusing, focus on planning, positive reappraisal, perspective-taking, catastrophizing, and blaming others. The questionnaire was used by Garnefski et.al to evaluate cognitive strategies used by person after experiencing threatening or stressful events of life. Reliability of the questionnaire was obtained 0.91, 0.87, and 0.93, using Cronbach's alpha.[17]

GHQ: The 12-item questionnaire has been prepared with the purpose of screening healthy and abnormal people. Therefore, the aim of the questionnaire is not to achieve to a psychiatric diagnosis. The questionnaire is available in 12, 28, 30, and 60-item forms. 12-item form of the instrument has such feature that healthy people could be screened from abnormal individuals in the shortest time. Short form of the questionnaire is validated in most countries across the world and is used. In Iran, short form of the questionnaire with 12 items was validated by Iran Healthcare Research Center of Scientific Information Database (SID) under supervision of Dr. Montazeri. Validity of internal consistency of the questionnaire was estimated to be 0.87 by Cronbach's alpha after translating instrument and testing it on 748 Iranian students.[18]

Results

In this study, 200 prisoner and non-prisoner men were compared with each other. The results showed prevalence of illiteracy among prisoners (89.4%) compared to non-prisoner men (23.4%). In this study, investigating job status in prisoners and non-prisoners was done through placing them in 3 groups of self-employment, governmental employment, and unemployed. The results showed that unemployment rate among prisoners (34.0%) was more than non-prisoner men (23.4%). Married men formed 62.8% of participants and single men formed 37.2% of participants. Prisoner men were mostly addicted to drugs and substances.

Hypothesis 1: There is a significant difference between prisoner and non-prisoner men in EMSs.

According to insignificant value of Levene's test in studied variables, assumption of equality of variances was provided. Independent t-test with value of 4.75 and degree of freedom (df) of 198 showed that due to the obtained value in P = 0.005, H1 was confirmed based on the significant difference between two groups in terms of EMS (Table 1).

Table 1. Results of independent t-test to compare total score of early maladaptive schemes (EMSs) within two groups of prisoner and non-prisoner men

Participants	N	Mean difference	SE difference	T	df	P
Prisoners	100	106.60	22.43	4.75	198	0.005
Non-prisoners	100					

SE: Standard error; df: Degree of freedom

Table 2. Results of independent t-test to compare total score of emotion regulation between two groups of prisoner and non-prisoner men

Participants	N	Mean difference	SE difference	T	df	P
Prisoners	100	10.47	4.23	2.475	198	0.385
Non-prisoners	100					

SE: Standard error; df: Degree of freedom

Hypothesis 2: There is a significant difference between prisoner and non-prisoner men in emotion regulation.

Mean differences and standard error (SE) of two groups in terms of total score of emotion regulation were respectively equal to 10.47 and 4.23. Independent t-test with value of 2.475 and df of 198 showed that the difference between two groups was significant statistically in terms of emotion regulation (0.385) (Table 2).

Hypothesis 3: There is a significant difference between prisoner and non-prisoner men in general health.

Mean differences and SE of two groups in terms of total score of general health were respectively equal to 1.733 and 2.475. Independent t-test with the value of 2.475 and df of 198 showed that the difference between two groups was significant statistically in terms of general health (P = 0.631) (Table 3).

In order to compare dimensions of EMS in two groups of prisoner and non-prisoner men, multivariate analysis of variance (MANOVA) test was used. To test the significance of difference between levels of independent variable in linear combination of dependent variables, Pillai's test, Hotelling's trace test, Wilks' lambada test, and Roy's largest root test were applied. Significance levels of all tests showed that there was a significant difference between two groups at least in terms of one dimension of EMS (Table 4).

According to table 5, there was a significant difference between two groups in terms of abandonment/instability, emotional deprivation, dependence/incompetence, vulnerability to harm or illness, failure, entitlement/grandiosity, negativity/pessimism, overvigilance/inhibition, and punitiveness (P < 0.050). However, there was no significant difference between two groups in terms of defectiveness/shame, social isolation/alienation, mistrust/abuse, enmeshment/undeveloped self, failure, approval-seeking/recognition-seeking, and unrelenting standards/hypocriticalness.

Analysis of each domain associated with EMS using Bonferroni alpha showed that there was a significant difference between two groups in disconnection and rejection [F(1,28) = 13.987, P = 0.001, partial eta = 0.333], impaired autonomy and performance [F(1,28) = 13.705, P = 0.001, partial eta = 0.340], impaired limits [F(1,28) = 14.416, P = 0.001, partial eta = 0.340], other-directedness [F(1,28) = 13.642, P = 0.001, partial eta = 0.328], and overvigilance/inhibition [F(1,28) = 14.427, P = 0.001, partial eta = 0.340]. Therefore, EMSs in prisoner men were significantly higher than non-prisoner men. Square of eta can specify portion of each domain (Table 6).

In order to compare dimensions of emotion regulation between two groups of prisoner and non-prisoner men, MANOVA was used. The results from Wilks' lambda test showed that variances of emotion regulation dimensions were not the same within two groups and were significantly different from each other [F(1,32) = 8.134, P = 0.275, Wilks' lambda = 0.668].

Table 3. Results of independent t-test to compare total score of general health in prisoner and non-prisoner men

Participants	N	Mean difference	SE difference	T	df	P
Prisoners	100	1.733	0.752	2.303	198	0.631
Non-prisoners	100					

Table 4. Results of multivariate analysis of variance (MANOVA) test for mean values of early maladaptive schemes (EMSs) and emotion regulation in two groups of prisoner and non-prisoner men

Effect		Value	F	Hypothesis df	Error df	P	Partial eta squared
EMS	Pillai's trace	0.472	4.298	5.000	24.000	0.006	0.472
	Wilks' lambda	0.528	4.298	5.000	24.000	0.006	0.472
	Hotelling's trace	0.895	4.298	5.000	24.000	0.006	0.472
	Roy's largest root	0.895	4.298	5.000	24.000	0.006	0.472
Emotion regulation	Pillai's trace	0.332	1.327	9.000	24.000	0.275	
	Wilks' lambda	0.668	1.327	9.000	24.000	0.275	
	Hotelling's trace	0.498	1.327	9.000	24.000	0.275	
	Roy's largest root	0.498	1.327	9.000	24.000	0.275	

EMS: Early maladaptive schema; df: Degree of freedom

Measurement of each dimension of emotion regulation using Bonferroni alpha showed that there was a significant difference between two groups only in hypocriticalness [F(1,32) = 8.134, P = 0.275]. Therefore, values of hypocriticalness in criminal men were significantly higher than normal men, although in punitiveness, approval, positive refocus, planning refocus, positive reappraisal, and other-punitiveness, no significant difference was observed between two groups (Table 7).

The results showed that mean values and SE of total scores of EMS, emotion regulation, and general health of prisoner men were higher than non-prisoner men. Obtained results from Wilks' lambda test showed that variances of 5 dimensions of EMSs were equal between both groups and were not significantly different and this finding could indicate reliability of further results [F(5,24) = 4.298, P = 0.006, Wilks' lambda = 0.528, partial eta = 0.472]. Implementation of Pillai's test showed that variances of EMS dimensions were significantly different between prisoner and non-prisoner men.

Table 5. Results of effects between trails in terms of values for dimensions of early maladaptive schemes (EMSs) in two groups of prisoner and non-prisoner men using multivariate analysis of variance (MANOVA)

Dependent variable		Type III sum of squares	df	Mean square	F	P	Partial eta squared
Disconnection and rejection	Abandonment-instability	374.533	1	374.533	16.824	< 0.001	0.375
	Defectiveness-shame	333.333	1	333.333	4.463	0.070	0.113
	Social isolation-alienation	86.700	1	86.700	3.556	0.063	0.118
	Emotional deprivation	464.133	1	464.133	16.779	< 0.001	0.375
	Mistrust-abuse	246.533	1	246.533	0.228	0.008	0.227
Impaired autonomy and performance	Dependence/incompetence	374.533	1	374.533	20.935	< 0.001	0.428
	Vulnerability to harm or illness	307.200	1	307.200	0.640	0.004	0.256
	Enmeshment/undeveloped self	128.133	1	128.133	4.075	0.053	0.127
	Failure	246.533	1	246.533	13.319	0.001	0.322
Entitlement/grandiosity (impaired limits)		235.200	1	10.796	6.012	0.003	0.278
Insufficient-control/self-discipline		258.133	1	12.467	10.334	0.001	0.308
Other-directedness	Self-directedness	235.200	1	235.200	9.189	0.005	0.247
	Subjugation	264.033	1	264.033	10.452	0.003	0.272
	Approval-seeking/recognition-seeking	136.533	1	136.533	0.701	0.065	0.117
Overvigilance/inhibition	Unrelenting standards/hypocriticalness	48.133	1	48.133	1.657	0.209	0.056
	Emotional inhibition	294.533	1	294.533	12.948	0.001	0.316
	Negativity/pessimism	313.633	1	313.633	8.327	0.007	0.229
	Punitiveness	218.700	1	218.700	9.556	0.004	0.254

Df: Degree of freedom

Table 6. Results of effects between trails in terms of values for dimensions of early maladaptive schemes (EMS) in two groups of prisoner and non-prisoner men using multivariate analysis of variance (MANOVA)

Dependent variable	Type III sum of squares	df	Mean square	F	P	Partial eta squared
Disconnection and rejection	800.622	1	800.622	13.978	0.001	0.333
Impaired autonomy and performance	500.330	1	500.330	13.705	0.001	0.340
Impaired limits	133.986	1	133.986	14.416	0.001	0.340
Other–directedness	700.383	1	700.383	13.642	0.001	0.328
Overvigilance/inhibition	633.347	1	633.347	14.427	0.001	0.340

Df: Degree of freedom

Discussion

The results of the current study showed that there was a significant difference between prisoner and non-prisoner men in terms of EMS. In other words, mean values of prisoners in EMS were significantly higher than mean values of non-prisoners and the difference was significant statistically ($P < 0.050$). This result is in consistence with findings of Richardson, indicating that sexual criminals have more EMS than non-prisoners.[19]

The results are in consistence with findings of Najafi and Sattarpour which showed that mean values of EMS including emotional deprivation, failure, emotional inhibition, and overvigilance were different between non prisoners and prisoners.[20] Also, findings of Rezaei et al. showed that addicted people had EMSs.[21] So, they feel that other people are rejective. The study of Reeves and Taylor showed that EMSs correlated to personality disorders such as anti-social disorders.[22]

Moreover, the results are in consistence with findings of Ball et al.,[23] showing that the most EMSs of homeless addicted people were respectively sacrifice, social isolation, unrelenting standards, entitlement, emotional inhibition, and mistrust/abuse and the lowest schemes included dependence/incompetence and self-inadequacy. The results are also in consistence with findings of Rezaei et al.[21]

The results of the current study about emotion regulation showed that there was a significant difference in significance level of 0.005 in terms of emotion regulation of prisoner and non-prisoner men; prisoners cannot regulate their negative emotions effectively. This finding is in consistence with findings of Suri,[24] under the title of EQ variables of the criminals and ordinary people (a comparative study), showing that prisoners had low score in terms of components of emotional intelligence (such as self-awareness, self-control and social skills, self-motivation, and empathy) and ability to regulate emotions.

Table 7. Results of effects between trails in terms of values for dimensions of emotion regulation in two groups of prisoner and non-prisoner men using multivariate analysis of variance (MANOVA)

Dependent variable	Type III sum of squares	df	Mean square	F	P	Partial eta squared
Self-punitiveness	16.941	1	16.941	0.991	0.327	0.030
Approval	5.765	1	5.765	0.372	0.546	0.011
Hypocriticalness	76.500	1	76.500	8.134	0.008	0.203
Positive refocus	19.882	1	19.882	1.665	0.206	0.049
Planning refocus	0.118	1	0.118	0.024	0.878	0.001
Positive reappraisal	4.971	1	4.971	0.589	0.448	0.018
Recognition-seeking	2.941	1	2.941	0.295	0.591	0.009
Catastrophizing	21.441	1	21.441	2.337	0.136	0.068
Other-punitiveness	21.441	1	21.441	1.971	0.170	0.058

Df: Degree of freedom

The results of the current study indicated poor general health in prisoners. This finding is in line with findings of Sobhi-Gharamaleki et al.[25] They showed that general health problems in prisoners were high. In this regard, this study showed that prisoner men had lower general health than non-prisoner men due to having EMS and inability to regulate their emotions.

Conclusion

EMSs could affect performance of individuals on emotion regulation, so that people cannot express their emotions in a healthy manner and as a result, they may face many interpersonal and legal problems. These problems could affect mental health and trigger for more criminal behaviors.

Conflict of Interests

Authors have no conflict of interests.

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Saphenous vein versus total arterial graft in coronary artery bypass graft

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Original Article

Abstract

BACKGROUND: Coronary artery bypass graft (CABG) surgery remains the gold standard treatment for left main coronary artery and multivessel disease. In the last decade, arterial conduit clearly has had superiority over venous conduit. The aim of this study is to report and compare both types of conduit in Erbil Cardiac Center, Iraq.

METHODS: A retrospective cohort study was used to compare patients who received total arterial grafts (n = 25) with patients who had saphenous-vein bypass grafts (n = 25), at the point of gender, age, operation duration, post-operative complications, hospital stay, and the 6-month cardiac ejection fraction (EF) improvement.

RESULTS: All patients of arterial group were men in comparison to 68% men versus 32% women in venous group; mean age of the patients was 50 years and 61 years for arterial and venous conduits, respectively. Duration of operation was 3.97 hours and 4.27 hours, hospital stay was 5.42 days and 7.20 days, and EF improvement was 11.48% and 4.40% for arterial and venous conduits, respectively. Although the duration of operation was not statistically significant, the total duration of hospital stay and EF improvement were statistically significant.

CONCLUSION: Arterial conduit has started in the last decades. Although it technically needs more accuracy and time, it has a better outcome compared to the venous conduit.

KEYWORDS: Saphenous Vein, Arterial Graft, Coronary Artery Bypass

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Introduction

In severe coronary artery disease (CAD), coronary artery bypass graft (CABG) surgery is indicated to re-establish an adequate blood supply to the ischemic myocardium.[1,2] CABG is a standard surgical procedure for advanced CAD. It is well known for decreasing the symptoms and improving survival.[3-5]

It reduces morbidity and mortality in patients with left main stem (LMS), triple-vessel disease (TVD), and/or proximal stenosis of the left anterior descending coronary artery (LAD) compared to medical therapy,[2,6,7] and decreases coronary repeated revascularization rate in comparison to percutaneous coronary intervention (PCI).[2,8] Advances in medical therapy for ischemic heart disease (IHD) and heart failure (HF) have improved the outcomes of patients with CAD. The survival advantage of CABG surgery over medical therapy in patients with stable angina has been challenged.[9] Effectiveness of CABG surgery is directly related to graft patency.[2,10]

The efficacy of CABG is dependent on the long-term patency of the selected conduits. The left internal thoracic artery (LITA) is established as the best conduit for CABG, particularly for grafting the LAD.[11] After initially unfavorable outcomes,[12] there has been an emerging and renewed enthusiasm for the radial artery (RA) as an alternative conduit through the use of improved harvesting techniques and antispasmodic medications.[13]

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Conduits are divided into two groups: arterial and venous.

Venous conduits [saphenous vein grafts (SVGs)]

Excellent patency can be achieved in the first five years with SVGs. They are unaffected by native coronary artery stenosis (NCAS); however, endothelial and media hyperplasia (5-8 years post-operatively) and subsequent atherothrombosis markedly diminish patency. Attention to harvesting, avoidance of trauma, over-distension, and preservation of vessel wall integrity and vasa vasorum may contribute to longer-term patency, as may the use of statins.

Arterial conduits

LITA: Since the publication by Tatoulis et al. in 1986 (and other publications around that time), it has been universally accepted that LITA is the best coronary graft and LITA to LAD is the single most important component of any coronary revascularization in reducing recurrent cardiac events and enhancing survival.[14] LITA-LAD improves perioperative mortality and is strongly recommended in all situations including emergency revascularization, older age, and in patients with co-morbid states [diabetes, obesity, renal dysfunction, and chronic obstructive airway disease (COAD)].[15]

The right internal thoracic artery (RITA)

The RITA is biologically identical to the LITA.[16-20] Hence, it is not logical to universally proclaim the LITA as the best conduit. The RITA is usually of greater diameter than the LITA in right-handed people and potentially easier to use.

RA

The RA is often considered as the second graft of choice after the ITA, having a high patency rate close to 90% up to 10 years after CABG.[21]

As known well, the LITA is the preferred graft in myocardial revascularization due to high patency in addition to early and late survival rates. The radial and gastroepiploic arteries may also be considered as alternative arterial grafts. SVGs are the most commonly-used venous grafts. Arterial grafts are superior to venous grafts due to their long-term patency rates. According to the literature, 90% of ITAs remain patent 10 years after surgery, while only 50% of saphenous grafts remain patent.[22]

In 1973, Carpentier et al. first performed surgery using an RA. Subsequently, they recommended that RA should not be used due to the 35% incidence of narrowing or stenosis of the conduit.[12] In 1992, Acar et al.[13] reported promising mid-term and long-term patency rates for RA and argued that it had gained widespread acceptance as a conduit for CABG as a result of its suitable inner diameter, good length, minimal donor site discomfort, ease of handling, and excellent early clinical results. Improvements in the harvesting techniques and postoperative administration of calcium channel blockers (CCBs) were also expected to improve the results. Today, RA as an arterial graft is the second preferred graft after LITA for CABG. In our study, we compared the long-term patency rates of arterial and venous grafts by angiography in patients with recurrent ischemic symptoms.

Despite the patency rate difference between different types of grafts, technically they are different during harvesting and grafting on the epicardium. On the other hand, harvesting site may affect the patient's condition at perioperative period and hospitalization in general.

The superiority of the arterial conduit to the venous graft is well studied and mentioned in different literatures and still is discussed. The aim of this study is to evaluate the outcome of patients of both groups and to give patients the greatest possible benefit of CABG.

Materials and Methods

This retrospective cohort study included candidates for doing bypass graft surgery. Only cases with three graft operations were selected; then patients were divided into two

groups, first those with arterial conduit LITA, RITA, and RA harvested from left forearm and second group were cases whose great saphenous vein (GSV) was used as a conduit. Data were collected carefully from each patient: gender, age, operation duration (duration of bypass and duration of cross clamp), post-operative complications (reopening and infection), day of mobilization, total hospital stay, and the 6-month cardiac ejection fraction (EF) improvement.

Data entry and coding were performed using Microsoft Excel (version 2016). The data were transferred to and analyzed by SPSS software (version 20, IBM Corporation, Armonk, NY, USA). Descriptive statistics [percentage, mean, and standard deviation (SD)] were used. T-test was used to test statistical significance between two groups. The ethical clearance (R-C-64) was obtained from the Ethical Committee of Surgical Specialty Hospital, Hawler Medical University, Erbil, Iraq.

Results

The study included 50 patients, 25 patients for each group. From venous group 17 (68%) were men and 8 (32%) were women, while all patients from arterial group were men (P = 0.002) (Tables 1 and 2).

Table 1. Association between study groups and gender

Gender	Groups		Total
	Venous conduit [n (%)]	Arterial conduit [n (%)]	
Male	17 (68.0)	25 (100)	43 (84.3)
Female	8 (32.0)	0 (0)	8 (15.7)
Total	25 (100)	25 (100)	51 (100)

Mean and SD of age of venous group was 60.92 ± 6.70 years and for arterial group, it was 50.46 ± 5.03 years (P = 0.001) (Figure 1). Duration of operation was 4.27 hours for venous group and 3.97 hours for arterial group, which was not statistically significant (P = 0.040) (Figure 2).

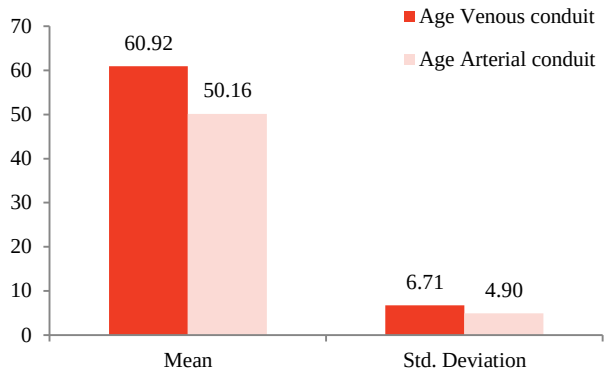

Figure 1. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to age

Table 2. Comparison between venous and arterial conduits in regard to different variables

Variables	Groups	N	Mean ± SD	P
Age (year)	Venous conduit	25	60.92 ± 6.70	0.001
	Arterial conduit	25	50.46 ± 5.03	
Hospital stay	Venous conduit	25	7.20 ± 1.32	0.001
	Arterial conduit	25	5.42 ± 0.75	
Duration of operation	Venous conduit	25	4.27 ± 0.51	0.040
	Arterial conduit	25	3.97 ± 0.56	
Duration of cross clamp	Venous conduit	25	30.92 ± 3.95	0.001
	Arterial conduit	25	45.73 ± 5.22	
Duration of bypass	Venous conduit	25	62.08 ± 7.80	0.001
	Arterial conduit	25	48.31 ± 5.16	
EF	Venous conduit	25	52.72 ± 7.46	0.006
	Arterial conduit	25	57.23 ± 2.61	
Mobilization day	Venous conduit	25	2.44 ± 0.50	0.001
	Arterial conduit	25	1.19 ± 0.40	

EF: Ejection fraction; SD: Standard deviation

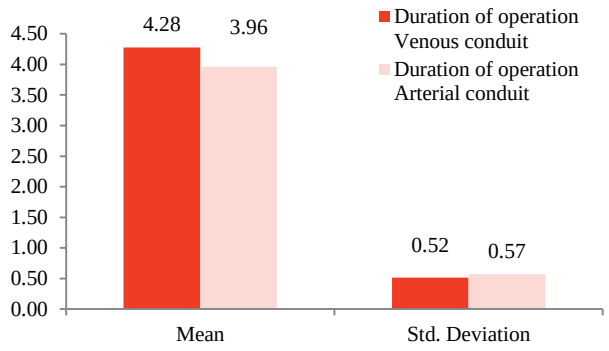

Figure 2. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to duration of operation

Duration of total bypass was 62.08 minutes for venous and 48.31 minutes for arterial conduits (P = 0.001) (Figure 3), while duration of cross clamp was 30.92 minutes and 45.73 minutes, respectively (P = 0.001) (Figure 4).

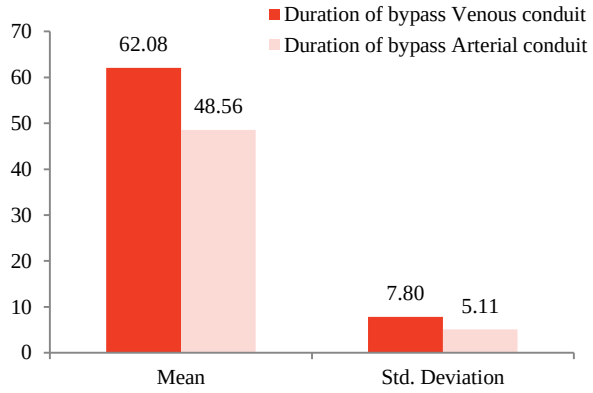

Figure 3. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to duration of bypass (minute)

Both of them were statistically significant. Reopening incidence was 3 cases for venous and 5 cases for arterial conduit (P = 0.470) (Table 3). Infection occurred in 5 patients of venous and 2 patients of arterial conduit (P = 0.190) (Table 4). Patients with arterial conduit were mobilized earlier than patients with venous conduit at 1.19 for arterial and 2.44 for venous conduit with statistical significance (P = 0.001) (Table 5).

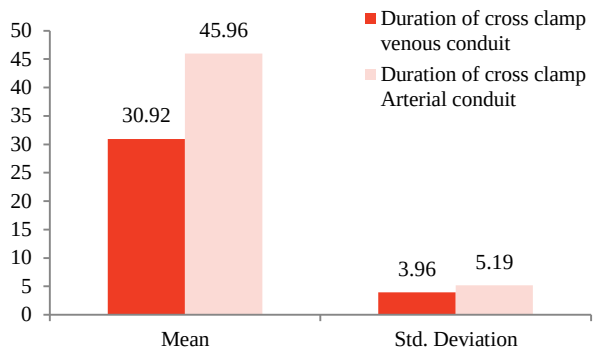

Figure 4. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to duration of cross clamp (minute)

Rate of improvement for EF was 4.40% for venous conduit (48.32% to 52.72%) (Figure 5), while it was 11.48% for arterial conduit (45.68% to 57.16%) which was statistically significant (P = 0.006) (Figure 6).

Table 3. Association between study groups and reopening of the operation site

Reopening	Groups		Total
	Venous conduit [n (%)]	Arterial conduit [n (%)]	
No	22 (88.0)	21 (80.8)	43 (84.3)
Yes	3 (12.0)	5 (19.2)	8 (15.7)
Total	25 (100)	26 (100)	51 (100)

P = 0.470

Overall time for hospital stay was 5.42 days and 7.20 days for arterial and venous conduit groups, respectively, which was statistically significant (P = 0.001) (Figure 7).

Table 4. Association between study groups and infection of site of operation

Infection	Groups		Total
	Venous conduit [n (%)]	Arterial conduit [n (%)]	
No	20 (80.0)	24 (92.3)	44 (86.3)
Yes	5 (20.0)	2 (7.7)	7 (13.7)
Total	25 (100)	26 (100)	51 (100)

P = 0.190

Discussion

Despite the proven benefits of ITA on long-term outcome,[23,24] the SVG has been widely

accepted as the conduit of choice for myocardial revascularization.

Table 5. Comparison between venous and arterial conduits in regard to mobilization day

Variables	Groups	N	Mean ± SD	P
Mobilization day	Arterial conduit	25	57.23 ± 2.61	0.001
	Venous conduit	25	2.44 ± 0.50	
	Arterial conduit	25	1.19 ± 0.40	

SD: Standard deviation

Other studies show that SVGs patency is still problematic at 10 years.[16,18] On the other hand, the difference between them during perioperative period also plays a crucial role.

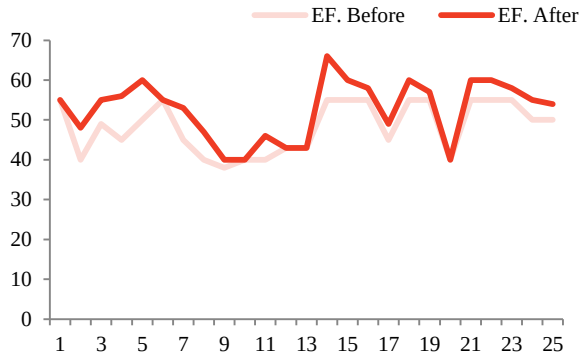

Figure 5. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to rate of improvement for ejection fraction (EF) (%)

Harvesting the conduit and using it for grafting also affect the procedure in general, intra, and postoperative period more precisely.

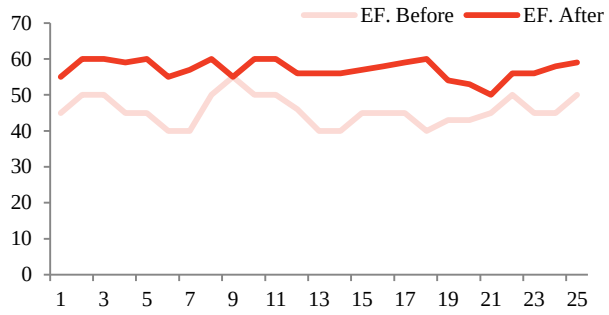

Figure 6. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to venous conduit (%)

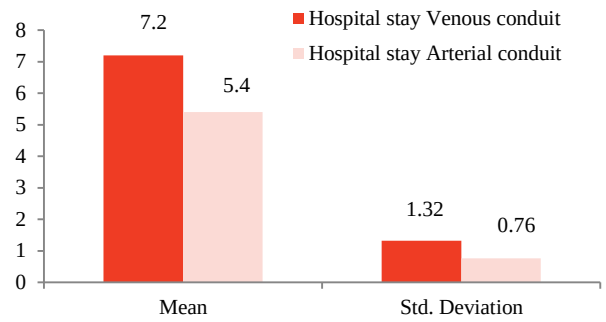

Figure 7. Saphenous vein graft (SVG) versus total arterial graft in coronary artery bypass graft (CABG) according to duration of hospital stay

Accuracy by well-trained hand and more precaution for anastomosis play an important role in intraoperative period. Venous harvesting usually needs a large wound at lower extremity with possibility of more infection which elongates the duration of hospital stay and delays mobilization postoperatively.

Total arterial conduit is more preferably done for young and male candidates for coronary bypass surgery. Cross clamp and bypass time are two important parameters during operation which determine subclinical tissue injury. Although the cross clamp time was longer for arterial group, total bypass time was significantly shorten because there was no proximal anastomosis. More tissue dissection in venous conduit leads to more incidence of infection, delayed mobilization, and prolonged hospital stay.

Conclusion

Although it is more difficult technically regarding harvesting and grafting, arterial conduit has better outcome compared to venous conduit at perioperative period with improvement of cardiac contractility later.

Conflict of Interests

Authors have no conflict of interests.

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Reducing chronic medical complications due to failure of patient safety using Standardized Plant Analysis Risk-Human Reliability Analysis (SPAR-H) method

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Original Article

Abstract

BACKGROUND: Human errors in the medical profession can lead to irreparable errors in people's lives, damage, and heavy costs. Among health care workers, nurses spend more time with patients compared to other personnel; hence, they are more prone to human error. Therefore, the purpose of this study was to identify and evaluate human errors using the Standardized Plant Analysis Risk-Human Reliability Analysis (SPAR-H) method in nursing staff of a general hospital in Qazvin Province, Iran.

METHODS: This cross-sectional study was conducted in a general hospital in Qazvin during last 6 months of 2016 and first 6 months of 2017. The target population in the present study was nursing groups based on their highest work experience, from each section in hospital. The SPAR-H method was used to investigate human error in the population and the collected data were analyzed using SPSS software.

RESULTS: The highest error related to inappropriate venipuncture with probability of 0.7, and the least probable error related to error in entering the numbers of vital signs with the probability of 0.0045.

CONCLUSION: Due to the sensitivity of the role of nurses in hospitals, the need for increased workforce, the use of people with higher work experience in sensitive sectors, reducing overtime even for those who volunteered to work overtime, scientific scheduling of the personnel's work shifts, and providing practical training such as stress control methods in case of emergencies can be effective in reducing the probability of an error.

KEYWORDS: Medical Error, Risk, Analysis, Nursing, Iran

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Introduction

Human errors are one of the topics that in today's theoretical and practical management world account for a considerable part of the time, budget, and attention of the experts and managers. The organizational structure of the staff of an organization is one of the factors that plays an effective role in reducing human error.[1] The damages caused by human error in different professions have different consequences and small mistakes can lead to catastrophic dimensions in important and sensitive jobs.[2,3]

Human error called medical error in the medical profession is the failure to act correctly or to commit a mistake in planning or execution that inactivates or potentially causes an unwanted event that results in death, prolongation of hospitalization, or disability when discharged.

These include diagnostic errors, errors in drug administration and treatment, errors in surgical procedures, errors in the use of

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technology and equipment, errors in the interpretation of paraclinical tests, etc.[4]

The review of resources shows that the mistakes of medical professions are less studied than other occupations in Iran and other countries. Various studies globally suggest that human error in these occupations has imposed heavy costs on patients by imposing additional costs of health care due to error, disability, and income reduction. In addition, errors lead to a reduction in patient's trust in the therapeutic care system, as well as a decrease in the patient satisfaction.[5]

According to the Starfield Institute of the American Academy Institute of Medicine (IOM), medical error in the United States (US) hospitals and healthcare institutions (including drug errors, laboratory errors, errors in diagnosis, surgical errors, radiological errors, etc.) after cardiovascular diseases (CVDs) and cancers is the third most common cause of death, and nearly 98000 deaths occur each year due to these errors; in 2008, 17.1 billion dollars were spent on measurable errors in US hospitals.[6,7]

Among the medical staff, nurses spend more time with patients than other personnel; hence, they are more prone to human error.[8] This could be created or increased due to factors such as mental and physical exhaustion, unusual work hours, occupational stress, weakness in personnel communication, information processing deficits, inexperience and deficit in standardization of nursing orders.[9-12]

Since some of these unwanted events are unavoidable and can be repeated under the same conditions, by sharing their experience of errors, they can be prevented from happening again.[13] In this regard, different methods have been proposed to evaluate human error capabilities such as Human Error Assessment and Reduction Technique (HEART), Technique for Human Error Rate Prediction (THERP), A Technique for Human Error Analysis (ATHENA), Standardized Plant Analysis Risk Human Reliability Analysis (SPAR-H), Systematic Human Error Reduction and Prediction Approach (SHERPA), etc. Among these methods, SPAR-H was first proposed by the US Nuclear Regulatory Commission (NRC) and the Idaho National Laboratory (INL) to develop nuclear power plant safety models and then completed by Gertman et al. in 2004 and was published in 2005.[14]

The SPAR-H is based on revisions to the first and second-generation techniques of Human Reliability Assessment (HRA) process, which divides human activities into two types of practical and diagnostic activities, which can be used to classify errors and quantify the contribution of human beings to error. In this method, the factors affecting human performance are divided into eight categories: available time, stress/stressors and environmental factors causing stress, experience/training, work complexity, ergonomics of the work environment including human-machine interfaces, functional procedures, suitability of tasks, and work processes. As a result, managers make decisions easier and with the knowledge of the probability of occurring mistakes.[15,16]

In a study using SPAR-H method, it was concluded that the most probable error was error in injecting blood products with a 78% and the least probable error was in the serum device with a 55% error probability.[17] In the study of Khandan et al., the rate of performance error has been reported 46.8%, inspection 25.6%, recovery 8.5%, communication 12.1%, and selective error 7.0%.[18]

Considering the importance of nurses' role in patient safety and providing safe services to patients, this study was aimed to identify and evaluate human errors using SPAR-H method in nursing staff of one of the general hospitals in Qazvin Province, Iran.

Materials and Methods

This cross-sectional study was conducted in a

general hospital in Qazvin during last six months of 2016 and first six months of 2017. The hospital was divided into 10 sections [emergency, women internal, men internal, women surgery, men surgery, urology, hematology, general surgery, intensive care unit (ICU), coronary care unit (CCU)]. The target population in this study was nursing groups based on their highest work experience. In each section, three people (one morning shift, one noon shift, one night shift) were enrolled. The SPAR-H method was used to investigate human error in the population, which was performed in the following steps, respectively:

1- In the first step, task analysis was performed using Hierarchical Task Analysis (HTA)[19] independently for both groups of diagnostic and practical activities related to the nursing profession.

2- In this step, the probability of human error was determined, thus providing an effective diagnostic and practical form for the nursing profession after entering basic error-affecting information including age, sex, history, education. The worksheets were completed with the presence of the researcher and after providing the required information to the subjects.

This step of the study took the form of the following steps:

A) Evaluation of each Performance Shaping Factors (PSFs) from the diagnostic or performance dimension:

At this stage, each of the factors shaping performance for diagnosis or performance was evaluated. These factors include available time, stress/stressors, complexity, experience/training, operational procedures, ergonomics, task suitability, and work processes.[14,20] Each of these shaping factors has specific coefficients.

B) The calculation of the probability of error in diagnostic or performance errors was calculated as follows:

(1) If all PSF values are sufficient, the diagnostic and functional failure probability is 1.0E-2 (one to the power of -2) and 1.0E-3 (one to the power of -3), respectively.

(2) Otherwise, the probability of a diagnostic and performance error is:

-The probability of diagnostic error = 1.OE-2 × available time × stress and stressors × work complexity × training and experience × operating methods × ergonomics × fitness with task × working process

-The probability of a performance error = 1.OE-3 × available time × stress and stressors × work complexity × training and experience × operating procedures × ergonomics × fitness with task × working process

C) Calculation of the regulatory factor when there are several (three or more) negative factors for the PSF: When three or more PSFs with a negative effect are present, instead of the above equations, another equation is used in which the regulatory factor is also calculated. Negative PSF means that the coefficient of choice is greater than 1. Nominal human error probability (NHEP) for diagnostic error is 1.OE-2 and for the performance error is 1.0E-3. The PSF score used in this mode is the result of the coefficient of all the specified values of the PSF. Therefore, the regulatory factor is used to calculate HEP in this way:

HEP = NHEP.PSF/NHEP(PSF-1) + 1

Where HEP is a human error.

D) The final HEP is recorded by diagnosis or performance: If the regulatory agent was not used, the final diagnosis HEP would be recorded using section B, and if the regulatory agent was used, the amount of section C would be calculated and recorded.

E) Calculating error occurrence without dependence equation [Task Failure Probability without Formal Dependence (Pw/od)]: The probability of the task failure without the dependence equation is actually the sum of the probability of failure of the diagnosis with the probability of failure of the performance.

(3) Determination of the amount of

dependency share (Pw/d) available between tasks: The table of dependency conditions was used, which includes the change in the person being analyzed, the open or closed time range, the analyzed person's displacement, and the presence or absence of additional indications to guide the individual to make or not to make an error.

In this case, the dependence of the negative effect of a human error on the subsequent errors is calculated as the general error. Dependency can be in full, high, moderate, low, or zero modes. After determining the dependence, the probability of the final probability of the error was calculated.[17]

Pw/od = The probability of failure without the dependence relation (calculated in section E): For a complete dependence, the probability of failure = 1; for a high dependence, the probability of failure equals to 2 (Pw/od + 1); for the average dependence, the probability of error equals to 7 (Pw/od × 6 + 1); for a low dependence, the probability of failure is equal to 20 (Pw/od × 19 + 1); and for zero dependence, the probability of failure is equal to Pw/od.

D) Risk level assessment was performed using the probability and severity of the risk.

Results

Analysis of the results of demographic information showed that 64% of the participants in the study were women with an average age of 34 years and 36% of them were men with an average age of 38 years, of which 12% were apprentices, 75% were undergraduates, and 13% were masters. Their work experience was 12 years. Based on the results, there was no significant relationship between the probability of error and sex, age, and educational status (P > 0.05). But there was a meaningful relationship with the average of working experience.

The findings of the study indicate that in the nursing activities, in the diagnostic errors, the most probable error belonged to patient's diagnosis mismatch with record and incorrect injection because of nominal or physical resemblance (0.4%), and the least probable error rate related to the probability of entering the incorrect code in the system and entering the incorrect patient in the system for laboratory and paraclinical services (0.0016%). Among the performance errors, the most probable error rate belonged to the patient bedsore (0.005%) and the least probable error was error in entering vital signs' numbers (0.000125). Among the combined errors, the most probable error belonged to inappropriate venipuncture with probability of 1 and the lowest probable failure belonged to the probability of failure in entering at least one of the drugs because of the nominal similarity with the probability of 0.0045 (Table 1).

Probable errors were ranked as the percentage of error probability in table 2.

The highest probable failure belonged to inappropriate venipuncture with a probability of 0.7, and the lowest probability error related to the probability of mistake in entering numbers related to vital signs with the probability of 0.0045.

Discussion

In the present study, the human errors of nurses in a general hospital were identified and evaluated via the SPAR-H method. There was not a significant relationship between gender, age, educational status and the probability of error, which was in line with the results of the study by Shamsaii et al.[21] With increased work experience, stress decreases in emergency situations, and knowing error-prone bottlenecks can overcome the likelihood of an error in such situations and prevent the occurrence of errors and increase patient safety.

In this study, the most probable incidence of errors belonged to inappropriate venipuncture with the probability of 0.7. Therefore, the nurses are trained to do appropriate venipuncture to reduce the chance of such an error.

Table 1. The probability of human error (nursing)

Row	Task list	Probable error	The probability of the diagnostic error	The probability of the performance error	Error probability without dependency factor	Error probability with coefficient of dependency
1	Admission	Wrong registration request	-	0.0002	0.0002	0.0002
		Failure to match patient's diagnosis with the record	0.4000	-	0.4000	0.0400
		Mistake in closing the patient's bracelet and error in identifying the patient	-	0.0025	0.0025	0.0025
2	Entering the doctor's orders at the card	Probability of not entering at least one order in the card	-	0.0025	0.0025	0.0025
		Mistake in entering at least one case of drugs due to nominal similarity	0.0040	0.0005	0.0045	0.0045
3	Controlling the patient's vital signs	Error in entering numbers related to vital signs	-	0.0001	0.0012	0.0012
4	Monitoring the patients	Falling from bed	-	0.0025	0.0025	0.0025
		Patient's bedsore	-	0.0050	0.0050	0.0050
5	Attaching the peripheral venous catheter	Inappropriate venipuncture	0.1000	0.6000	0.7000	0.7000
6	Serving drug to the patient	Wrong injection due to nominal or apparent similarity	0.4000	-	0.4000	0.4000
		Giving a wrong oral medicine	0.1000	-	0.1000	0.1000
		Needle stick when injecting medication or sampling	0.0160	0.0010	0.0170	0.0170
7	Blood injection	Injecting wrong blood products to the patient	0.0500	-	0.0500	0.0975
8	Entering paraclinical tests and services in the system	Probability of entering the wrong code in the system	0.0016	0.0001	0.0017	0.0017
		Probability of entering the wrong patient's name in the system	0.0016	0.0001	0.0017	0.0017
9	Delivering patients to the next shift	Uncertainty about the correctness of patient connections	0.0080	0.0010	0.0090	0.0090

In hospitals, one of the most common in the hospitals is the similarity error in the patient's name and the inconsistency of the patient's profile with their records, which are Because of the change of shift and high work pressure on nurses. Color labels on the records and their identification bracelets are used to reduce the likelihood of error due to nominal similarity. Another common mistake in the hospital is giving and injecting a wrong medication due to a mistake in the form or appearance of the drug; the probability of this error in this hospital was 0.4 and 0.1, respectively. In a study done in hospitals affiliated to Mazandaran University of Medical Sciences, Sari, Iran, incorrect dose administration was one of the major causes of medical errors.[22] The results of some studies indicated that most of the drug failures occurred because of the high workload, drug interactions, delivery

problems, incomplete and inappropriate communication of personnel when delivering shifts, and unreadable prescriptions.[23,24] Hence, the hospital's proposed solution, i.e., using labels for similar drugs and listing these medications and sticking them to the wards in front of the nurses, was done to reduce the chance of error.

Table 2. Prioritizing the error rate

Probable error	Probable total error
Inappropriate venipuncture	0.7000
Failure to match patient's diagnosis with the record	0.4000
Wrong injection due to nominal or apparent similarity	
Giving a wrong oral medicine	0.1000
Injecting wrong blood products to the patient	0.0975
Needle stick when injecting medication or sampling	0.0170
Uncertainty about the correctness of patient connections	0.0090
Patient's bedsore	0.0050
Mistake in entering at least one case of drugs due to nominal similarity	0.0045
Probability of not entering at least one order in the card	0.0025
Falling of patient from bed	
Probability of entering the wrong code in the system	0.0017
Probability of entering the wrong patient in the system	
Mistake in entering the patient name	0.0002
Mistake in closing the patient's bracelet and error in identifying the patient	
Error in entering numbers related to vital signs	0.0001

Another detected mistake is that errors can occur in the hospital was injecting wrong blood products to the patient prone to error 0.0975. In a study that investigated the human error in emergency department, it was found that the most likely error in the nursing group was blood and blood products transfusion with a probability of 0.78.[17] In a study by Hewitt, one of the common mistakes of nurses was error in blood transfusion,[25] which is matched with this study. The strategy provided by the hospital included double check-ups of blood requests by the two nurses, sending separate samples for wrist application and blood products, scientific-practical empowerment of all new personnel by the blood bank, and assessment of information provided to the personnel by the head nurse, informing signs and symptoms of unhealthy blood products, control of patients' vital signs and clinical status in the first 51 minutes that blood transfusion was started.

Conclusion

The probability of error as well as the role of different situations can affect the performance of personnel in their duties; therefore, by using the ergonomic interventions the risk of human errors can be reduced. Also, the findings of this study suggest the need for increased workforce, the use of people with a higher work experience in sensitive wards, reducing overtime even for volunteers who want overtime, scientific scheduling of personnel's working shifts, and providing practical training such as stress control techniques in case of emergencies in high-risk situations.

Conflict of Interests

Authors have no conflict of interests.

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The approach of futures studies based on scenario planning: A case study of health services in Sanandaj City, Iran

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Original Article

Abstract

BACKGROUND: Futures studies is a managerial tool which is also regarded as a soft knowledge to gather the information on what may happen in the future or what is more likely to happen mainly to reduce risk factors. This study aims to identify the favorable future and the most probable occurring scenarios concerning the demands in the healthcare services and medical treatments in Sanandaj City, Iran.

METHODS: In this study, environmental monitoring, Delphi method, and scenario planning were utilized. To determine the drivers of content and the periphery, we used a non-structured questionnaire. A total of 12 experts in the field of medicine, management, sociology, psychology, and economics as well as health care management participated in the study.

RESULTS: In the present study, in order to calculate the scenario planning and relative data analysis, we reflected on the morphology between the key factors that influenced the health care. Two important uncertainties were identified: the quality of service by suppliers and the level of attitudinal knowledge of the clients. In addition, using a cross (matrix) method, we were able to identify four passable future scenarios.

CONCLUSION: Based on the findings and results of this study, Apple Health Scenario, where two uncertainties of suppliers' services of a qualitative increase status, and the increasing level of knowledge and attitude of health applicants, have the best conditions. Consequently, a favorable future will be required for health services, health and medical treatment and other future prospects will not be desirable for this matter.

KEYWORDS: Future, Planning Techniques, Health Services

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Introduction

Since the human has tried to maintain his health and cure his diseases, health system has existed. The health system is all activities which their main purpose is to promote, restore, or maintain health.[1] This system requires proper equipment, financial resources, communication and coordination, and sound management so as to get and present the services which is responsible for them.[2]

Futurology is the illustration of future with a distinct and scientific methodology and is widely used in the field of health.[3] Futurology is an applied field, the speed in future research is of great importance and significance. If the organizations do not create the future, their competitorswill make the future fast and there will no longer be an opportunity for us in the future. According to Hermann Kahn, there will not be any free future.[4] Futurology is a process enabling an organization to create its suitable

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and preferable future by innovation.[5] Foresight and futurology do not foresee, but introduce believable future.[6] Futurology enables managers to link their clear outlook with the current day's issues and topics.[7] According to Slaughter, futurology is among those disciplines transforming conventional laws.[8] The power of futurology is that it can link diversities and uncertainties and point to the opportunities and damages.[9] Nowadays, any organization or institution that does not plan for itself will be planned by others and the planning will not take place in the favor of our interests, benefits, and values, yet it will be a future in the direction and favor of the planners' interests.[10] The complexities of today's world and its dynamism have led to the ineffectiveness of previous planning methods.[8] Having a plan and strategy to implement them is of the needs and necessities of guaranteeing the survival and development of organizations; success in this direction requires the cooperation of all internal and external factors of the organizations that, given the precise and practical recognition of the internal, regional, and global situation, must be done and achieved.[11] Today, strategic and long-term planning of organizations without the use of futurology science is not effective enough and does not meet all future conditions.[12] Various factors affecting request and demand for health treatment services include: demographic characteristics, disease outbreaks, health policies, gender distribution, age pyramid, population growth rate, health insurance expansion, gross domestic product (GDP) and per capita income (PCI), knowledge and medical technology development process, and cultural characteristics of society.[13] According to United Nations (UN) human development reports, the share of health and treatment costs in GDP of developed countries is often higher than developing countries.

On the other hand, in Iran, increasing population and demand for health care and inadequate income resources of the country's healthcare sector to meet the increasing costs of health care have caused serious problems and crises for Iran's healthcare management. Governmental resources are limited, and there is no possibility to increase them in the short run, regarding the issued reports by the Central Bank of Iran, the price index of the health sector in the 1991s had the most increase.[14] The purpose of this study was to present a futuristic approach to the health care sector of Sanandaj City, Iran, and to present and introduce the possible scenarios or future prospects of this focal issue. The health department can illustrate its strategic planning so that if any of the scenarios occur, they will suffer the least damage and can have the best use with the least damage in any probable event or maybe misfortune of the future.

Materials and Methods

In this research, the environmental monitoring method, inspired by documentary studies was used to collect theoretical foundations and the Delphi method was used along with interviews and non-structural questionnaires to collect information, or the same influential factors, and drivers of these influential factors from the experts, and the scenario method and the Schwartz model were used to introduce and presentfour credible and probable scenarios in which 15 experts in the fields of medicine, management, sociology, psychology, and economics, and experienced managers in the health and treatment center of Sanandaj were tested in three rounds of Delphi accompaniment. Finally, 12 experts participated fully in all three rounds.

Sampling was non-probabilistic, definite, and judgmental. The research was qualitative regarding the strategy, in terms of the purpose it was applied, in terms of method it was descriptive and from the exploratory and survey branch, and regarding the time of data collection it was multi-sectional. In order to

create a scenario, it is necessary to identify and designate key uncertainties by observing factors with high impact and high unpredictability so that we can create a matrix,[15] and based on steps 4 and 5 of the Schwartz model, a two-by-two matrix will be formed to introduce four scenarios in four houses. The Schwartz model encompasses eight main steps: 1) clarifying the main focus of the scenarios (the main question), 2) reviewing past changes to identify driving trends and forces in progress, 3) identifying future changes and driving forces of known changes, 4) identifying key uncertainties, 5) creating a logical framework based on identified uncertainties, 6) fertilizing main features and developing narratives for each scenario, 7) identifying the themes for each of the scenarios of the organization, and 8) defining indicators and guidance signs.[16] According to the Schwartz eight-step approach, we collected information using expert opinions. We determined key agents by using ideas of certified and expert people with sufficient information about health, medical, and treatment servicesIn terms of literature in this research, expert is someone with at least 10 years of continuous work of experience in the subject.

Results

Based on above-mentioned methodology along with environmental monitoring, 4 subsets were obtained: the way of influencing of driving factors (Table 1), interactive impacts analysis (Table 2), factors with high impact and unpredictability (Table 3), and recognizing uncertainty factors (Table 4). These features led the research to the following fining and 4 scenarios (Figure 1). Identified factors which eventually reached 51 factors were asked from professionals according to the Delphi method and the views were passed to other members. Then the opinions of the experts collected and turned into a single list, once again were given to all the members and the next step started. This method was used for all stages and the output of each stage was the result of consensus among all the members. After identifying the key factors, a list of their stimuli or their influential forces was prepared and after identifying the best ones regarding uncertainty and comprehensive effects, an inclusive matrix was formed. In the matrix, members by regarding the 10-year horizon of scenarios, tried to set it up and their final opinions turned into a single form accepted by all of the members and was inserted into Excel software. Then the software by processing, wrote down the abstract of the results gotten through main idea and the paradigm of the interviewee members.

For valuing, the Likert spectrumwith a scale of 1 up to 9 was used, but in terms of categorization based on the severity, this was done in a predetermined way.

20 out of identified 51 factors affecting demand for services were of high impact, accounting for about 39% of the factors and can be prioritized, preferred, and regarded in sectorial decision-making and policy-making, so that the decisions can be effective and efficient enough. 23 out of the 51 identified factors affecting demand for services were of high influence, accounting for about 45% of the factors, and can be applied in decision-making, policy-making, and efforts to increase productivity and improve the qualitative and quantitative level of offered services, so that the decisions are more realistic and logical.[8]

Table 1. Driving factors influence

The driving factor empowers and boosts another driving factor			The driving factor has no effect on the other one	The driving factor weakens another driving factor		
Strong boost	Great boost	Low boost	Not related	Low weakening	Great weakening	Strong weakening
+3	+2	+1	0	-1	-2	-3

Table 2. Interactive impact analysis

Variables		Healthcare tariffs		Life expectancy		The quality of the infrastructure		Prioritizing individual health		Security attitude to the province		Supervising of relevant institutions		IT capacity	
		Much	Low	Much	Low	Optimal	Undesirable	Low	Much	Low	Much	Enough	Not enough	Appropriate	Inappropriate
Healthcare tariffs	Much			-2	+2	0	0	+3	-3	-1	+1	-2	+2	-1	+1
	Low			+2	-2	0	0	-3	+3	+1	-1	+2	-2	+1	-1
Life expectancy	Much	-1	+1			+2	-2	-3	+3	0	0	+1	-1	0	0
	Low	+1	-1			-2	+2	+3	-3	0	0	-1	+1	0	0
The quality of the infrastructure	Optimal	0	0	0	0			0	0	+3	-3	0	0	+1	-1
	Undesirable	0	0	0	0			0	0	-3	+3	0	0	-1	+1
Prioritizing individual health	Low	+3	-3	-3	+3	0	0			0	0	0	0	-1	+1
	Much	-3	+3	+3	-3	0	0			0	0	0	0	+1	-1
Security attitude to the province	Low	0	0	0	0	+1	-1	0	0			0	0	0	0
	Much	0	0	0	0	-1	+1	0	0			0	0	0	0
Supervising of relevant institutions	Enough	0	0	0	0	0	0	0	0	+1	-1			+2	-2
	Not enough	0	0	0	0	0	0	0	0	-1	+1			-2	+2
IT capacity	Appropriate	+2	-2	0	0	+2	-2	0	0	+3	-3	+1	-1		
	Inappropriate	-2	+2	0	0	-2	+2	0	0	-3	+3	-1	+1		

IT: Information technology

Table 3. Factors with high impact and unpredictability

The degree of affinity between factors	Factors with high impact and unpredictability
51.40.39.37.31.27.16.13.9.7.2.1	Costs and tariffs for health services for the general public and citizens
50.46.45.31.28.27.24.23.18.17.14.11.6.2.1	Life expectancy and the number of elderly people in Sanandaj
37.36.34.27.26.22.18.15.8.2	Quality of transportation infrastructure in Sanandaj city
46.41.37.28.21.18.14.13.12.7.6.4.3.2.1	A culture of personal health priority in the families of Sanandaj
35.30.29.27.23.20.19.17.14.10.2.1	A security attitude to the province as an investment rejection factor in private sector in the health part
51.43.42.29.17.13.11.2.1	Supervision of relevant institutions in the context of health services
41.27.26.25.16.11.10.9.4	IT capacity for providing health services and treatment

IT: Information technology

Table 4. Uncertainty table

The name of the key uncertainties	Factors with high impact and unpredictability	Number
Key uncertainty 1: Qualitative status of service providers	Costs and tariffs for health services for the general public and citizens Imagination of security attitude to the province as an investment rejection of private sector in the health sector Quality of transportation infrastructure in Sanandaj City Use of IT capabilities to provide health services and treatment Reduction of suitable monitoring in health sector	1
Key uncertainty 2: The status of the level of knowledge and attitude of the applicants	Life expectancy and the number of elderly people in Sanandaj Spreading the culture of priority to personal health in Sanandaj households	2

IT: Information technology

Out of the 51 identified factors affecting demand for services were moderate in intensity, accounting for about 16% of the factors and can be used in decision-making and policy management of the sector, covering the various dimensions of the phenomenon and focal research question. 2 out of the 51 identified factors had a high degree of unpredictability, namely the inability to detect whether or not the agents are done, accounting for about 4% of all the factors and can be the focal point of attention in decision-making and policy management in the sector having a large share in future shuffling of the focal point. 12 out of the 51 identified factors affecting demand for services were highly unpredictable, accounting for about 24% of factors, and can be used in decision-making and policy-making to make and adopt more realistic decisions. 22 out of 51 identified factors influencing demand for services had a moderate unpredictability rate, accounting for about 43% of the factors that can be considered for increasing productivity in this section, and the various dimensions of the phenomenon and the focal point of the research can be covered.

To create scenarios, it was necessary to identify, introduce, and designate key uncertainties by observing and contemplating factors with high impact and unpredictability in order to create a matrix, and regarding the Schwartz model, a two-by-two matrix for introducing four scenarios in four houses should be shaped and formed.

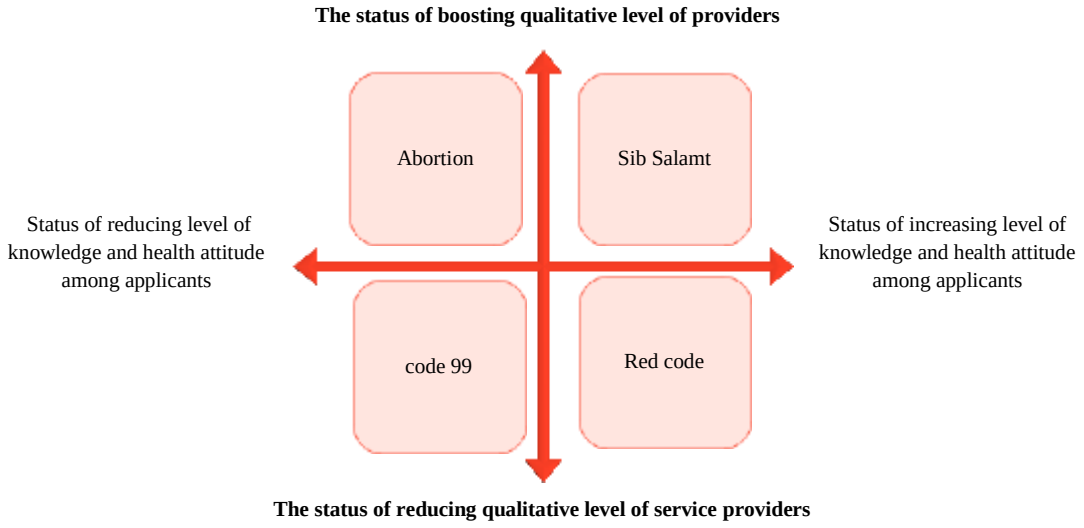

Figure 1. The cross-scenario method

Three types of connections may exist between driving factors:

1. A driving factor boosts another driving factor
2. A driving factor weakens another driving factor.
3. A driving factor has no effect on the other one.

Considering the plurality and multiplicity of identified factors, each of them can be valid in decision-making, but because the purpose would be scenario planning and formulating, so distinguishing and highlighting factors with impact severity and unpredictability is of high importance.

At this stage, a conceptual belt must be elegantly made so that one can find similarities between the factors with a lot of impact and very high unpredictability in the terms of value, usage, etc., so that a key category can be attained.

In scenario-writing or scenario-making as an art, one should be able to make a sort of collage and pair-matching in the creation of the alignment and aggregation of the identified, yet unpredictable, factors, so that through aggregation and combination, one can attain two to three vital key uncertainties. As can be seen in table 4, some uncertainties will turn the future of the focal issue into a few segments.

Discussion

As it can be observed in figure 1, in scenario 1 (Sib Salamat): Sanandaj in 2025, with the support of the public sector and private sector investment, is supposed to be able to improve and upgrade its transportation infrastructure. Aviation development can also attract health tourist especially from the Kurdistan region, the development of information technology (IT) infrastructure can make it easier to receive services and there may be an increasing tendency of domestic and foreign applicants to receive services in Sanandaj. Improvement of infrastructure, especially adding the rail transport, can result in some kind of improved PCI and an increase in the welfare level of households, resulting in more budget allocations from the household basket to health and treatment; more community attention to oral health has caused an increase in demand and development of dental services, especially 24–hour (overnight) services.[11] The good functioning of the health sector, government support policies, the development of public and private insurance, the government's attention to reducing legal barriers and service matching and coordination, changing the way of look and idea toward this province, and government investment in the province has attracted private sector investment in all areas especially the healthcare sector. The conditions in the past ten years can increase the population over 65 in the city of Sanandaj, demanding their own unique health services.[13] A fair hearing and people's understanding about the fairness of this investigation in medical misdiagnosis can give the community more confidence and trust in this section. The charity, given the government supportive and persuasive policies and advent of the culture of charity people for building hospitals, can do better in making service centers and providing services to less-privileged classes. Choosing the name of the scenario is also based on the desired situation and is, with regard to the key uncertainties associated with a healthy diet (apple), a symbol of community health and the suitability of the service provision.[10]

Scenario 2 (curettage/abortion): It is 2025. In the past ten years, due to changing attitudes towards the province, good investment can be made in the health sector. Communicational infrastructures are supposed to be developed and road transport is easier and less costly. Adding the rail transportation to Sanandaj transport infrastructure improves conditions .By developing IT infrastructure, a good basis for providing health services can be created. By providing adequate supervision and a

perceived sense of justice in issues and problems caused by medical errors, community assurance, trust, and confidence to service providers in this sector has been increased. Reducing costs and tariffs of this section helps poor people in the community use cheap services significantly.[9,10]However, due to the lack of prioritization of health and health issues in Sanandaj households, the opportunities and facilities are left unused; although facilities and health centers are available to the general public at low cost and kind of cheap price, because of the lack of attention to the issue of health, fewer people try to use these facilities. Failure to do so reduces the life expectancy and number of elderly people which has lowered this group's demand for services. Although there are good conditions in the field of health, but due to the lack of importance of this issue for the community, this section of health provision is not used suitably and the incentive for families to receive oral care, especially for their children may be diminished. Although in recent years PCI may be increased in citizens of Sanandaj, this may not change much in terms of household spending on health issues; due to the lack of promotion of community health awareness, there is lack of proper use of appropriate conditions. This status quo is as an embryo gone because of ignoring the opportunity and lack of awareness.[10]

Scenario 3 (red code): In 2025, over the past 10 years, the attention is supposed to be drawn to the health issues among the various strata and layers of society significantly. Families attach great importance to health and treatment issues, especially in the health of infants and children. This attention of public to health issues increases life expectancy and the number of people over 65 years. The prevalence of a culture of prioritizing to individual health in households of Sanandaj may increase the demand for health care. Periodic check-ups may become a common custom and the level of health knowledge in households may increase and improve significantly in the past decade. In general, this upgrading of the cultural and informational level of the community regarding the health issues can lead to a significant increase in health services demand comparing to past years, yet lack of legal protection by the government has caused a lot of problems for the individuals in this sector. The lack of infrastructure development may seriously damage the provision of services in this sector. Regarding reducing the health care costs and providing insurance services, the government may not provide good services as a trustee. In the past decade, the inappropriate distribution of services and the lack of establishment of hospital facilities and equipment that should be accountable and responsive to the needs of the province, can send patients to neighboring provinces or the center of the country; the lack of change in attitude towards the province can reduce the attraction of investors in various areas, especially health and treatment. Inadequate supervision in this area can reduce the sense of perceived fair hearing by the public. Regarding establishing non-governmental organizations (NGOs) and utilizing the capacity of the charities, there is not a decent performance, and the hospitality's benefactor might not be paid much attention. Despite the proper demand in the health sector market, these factors may cause the opportunities created be wasted one by one, imposing double costs on households of Sanandaj and missing the opportunities, as the scenario name suggests this concept.[17]

Scenario 4 (code 99): It is 2025. Provincial infrastructure, especially in transportation, might not be well-developed. Road transport is not well developed, it is not possible to transport by railways, and air transportation is also facing ups and downs. IT infrastructure is not well developed, and the lack of change in attitude towards the province reduces

investment. And by the lack of investment in the public sector in infrastructure, the private sector might not be willing to invest in Sanandaj healthcare sector. Due to the lack of development in the transport infrastructure debate, the willingness of physicians and specialists to attend and work in Sanandaj can be diminished, and in terms of attracting tourism therapy, opportunities might also be lost, and even demand for health services in the province may be overflowed into other cities of the country. Opportunities might also be lost in the field of dental and oral health services and psychological and counseling services, and the demand for this section may not be adequately addressed and met. Despite the rising life expectancy of the elderly, special attention might not be paid to meeting the needs of this group. In the upcoming years, due to population aging resulted by an increase in the population of the 1980s, we may face a torrent of elderly and middle-aged healthcare recipients which by considering present situations, we may not be able to meet the needs of this generation in the future.[18] There are also many problems in the area of perceived justice in medical misdiagnosis cases. Insurance might not be effective over the past few years, and the penetration rate of insurance, especially supplementary insurance, might not have a growing and increasing trend. Considering the above-mentioned issues, to solve the problem in the coming years, by taking short-term measures to solve the current problems and long-term planning, conditions for meeting and responding to health and treatment demands shall be provided. The latent and potential demand due to lack of awareness and underdevelopment of infrastructure and facilities can be considered as a threat to the future of the health market and, as it is derived from the title of the scenario, the referenced situation is similar to the ill patient in urgent need of help maintaining his vital signs.[19]

Conclusion

The results of the scenario portfolio and the statuses fixed by our experts have been brought into four main scenarios under specific names. These scenarios include a complete explanation of the four possible future scenarios and product of all the information and scenarios derived from the cross-scenario method. Based on the aggregation and collage of factors with rankings of the most effective and the most unpredictable, we provided introduction and formulation opportunity of two important uncertainties as axes of scenario including key uncertainty 1: the status of qualitative level of service providers and key uncertainty 2: the status of the level of knowledge and attitude of the applicants. Finally, based on the analysis of the relationships and interactions between the identified drivers and factors as well as the key uncertainties extracted from the story and narrative of each scenario as a possible future for the health services, health and treatment demand in Sanandaj City was investigated. The health department can illustrate its strategic planning so that if any of the scenarios occur, they will suffer the least damage and can use it best and most with the least possible harm in any probable event of future.

Conflict of Interests

Authors have no conflict of interests.

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The relationship between handedness and academic achievement in high school students of Sanandaj City, Iran

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Short Communication

Abstract

BACKGROUND: Academic achievement is considered as one of the main results of the educational system and focusing on factors affecting it is of great importance. The present study was performed with the aim to determine the relationship between handedness and academic achievement in high school students in Sanandaj City, Iran, in 2016.

METHODS: This was a cross-sectional study the population of which included the high school students of Sanandaj and 2630 pupils were selected from among them. The study tool was the Annette's questionnaire. To measure the academic achievement, the average score of the first semester of the 2016-2017 school year of the students was used. The collected data were analyzed using the SPSS software and descriptive and statistical tests such as the Mann-Whitney and Kruskal-Wallis tests.

RESULTS: Among the samples, 7.7%, 87.4%, 4.9% were left handed, right handed, and of no handedness, respectively. The average score of handedness in the school children was 16.75 ± 11.99 out of 24. There was no relationship between academic achievement and handedness (P = 0.105).

CONCLUSION: The results suggested that other factors than handedness affect the success and academic achievement of the students.

KEYWORDS: Handedness, Students, Academic Achievement

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Introduction

Handedness is defined as the dominant preference of one hand for performing functional assignments that can be accomplished with one hand.[1] About 90% of people are right handed.[2] Despite this fact, only in 70% of the left-handed individuals, the right hemisphere is dominant for language.[3] Structural and functional cerebral hemispheres have differences, and each of them has been specially trained for certain cognitive functions.[4] Human beings and their natural abilities may be described as superior to the right or superior to the left.[5] There are three different, even contradictory approaches, most of them try to justify the relationship between superiority and mental abilities of the people.[6]

The rate of the right-handedness and left-handedness was 24.3% and 27.3%, respectively in the study by Noroozian et al.[7] The findings

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of the study by Solgi and Alipour indicated that the right-handed students had a higher level of self-awareness, alertness, and social skills compared to the left-handed ones.[4] In another study, the level of emotional reactivity and anxiety was higher respectively in the left-handedness and the right-handedness, and the difference was statistically significant, but there was no significant difference between the two groups in terms of stress and depression.[8] This study was carried out with the aim of determining the relationship between handedness and academic achievement in high school students of Sanandaj City, Iran, in 2016.

Materials and Methods

This was a cross-sectional study and the population of which consisted of high school students in Sanandaj. Using the following sample size formula, based on previous studies[6] and with α = 0.05 and β = 0.2, the sample size was obtained as 2630.

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (S_1^2 + S_2^2)^2}{(\bar{x}_1 - \bar{x}_2)^2}$$

$$n = \frac{(1.96+0.86)^2 (12.39+9.98)^2}{(15.87-16.11)^2} \approx 2630$$

The data collected using the Annette's handedness questionnaire. The questionnaire was developed by Annette in 1967 and its reliability was more than 0.80.[9] This questionnaire has been used in the studies by Bayrami et al.,[10] Taghizadeh et al.,[11] Azami et al.,[12] and Jahangiri and Rouhi[13] and its validity and reliability have been verified. The questionnaire included 12 items scored on a 5-point Likert scale. For each item, the subjects were asked about the preference in using the right or left hand and the scoring was based on the subject's response. The scores of +2, +1, and 0 indicated the options of the right hand preference at all times, the right hand preference in most cases, and the lack of a preference for hand utilization, respectively. In addition, the scores -2 and -1 indicated the left hand preference in all cases and the left hand preference in most cases, respectively. The overall range of scores varied from -24 to +24 respectively for the left handedness and right handedness. Individuals who obtained a score of +9 or higher, -9 to +8, and -9 or lower in the test were regarded as the right-handed individuals, individuals without a preference, and the left-handed individuals, respectively.[9]

The data were analyzed using the SPSS software (version 20, IBM Corporation, Armonk, NY, USA). To describe the collected data, descriptive statistics including frequency and mean and standard deviation (SD) were used. The Kolmogorov Smirnov (K-S) test was used to examine the normal distribution of the data. Regarding the non-normal distribution of the data, the Mann-Whitney, Kruskal-Wallis, and Spearman correlation coefficient tests were utilized.

Results

The rate of response to the questionnaire was 94.4% and the mean handedness score in the students was 16.75 ± 11.99. Moreover, the mean age of the subjects was 14.46 ± 1.42 years old, with the minimum and maximum age of 10 and 18 years old, respectively. Among the subjects, 190 (7.7%) and 2170 (87.4%) cases were respectively left-handed and right-handed and the others did not have a preference in using their hands.

The results of the study showed that there was a statistically significant difference between the educational grade and the academic achievement (P < 0.001). Other results and statistical analyses of this study are presented in tables 1 through 4.

Table 1. Mean age, grade, and academic achievement in high school students in Sanandaj City, Iran, in 2016

Variables	Mean ± SD	95% confidence interval
Age	14.60 ± 1.42	(14.55-14.66)
GPA	17.00 ± 1.98	(16.92-17.08)
Academic achievement	16.49 ± 2.33	(16.40-16.58)

GPA: Grade point average

Table 2. Relationship between handedness and academic achievement in high school students in Sanandaj City, Iran, in 2016

Handedness	Mean academic achievement	Mean grade of academic achievement	X^2	df	P
Left-handed	16.31	1220.16	4.503	2	0.105
Right-handed	16.48	1238.32			
Non handedness	16.90	1359.27			

Findings of table 2 showed that there was no significant statistical relationship between handedness and academic achievement in the studied students.

Table 3. Relationship between academic achievement and gender in high school students in Sanandaj City, Iran, in 2016

Gender	Mean academic achievement	Mean grade of academic achievement	Z	P
Male	16.61	1282.65	-2.397	0.017
Female	16.41	1212.60		

The results presented in table 3 revealed that there was a significant statistical relationship between gender and academic achievement in the students studied (z = -2.397, P = 0.017).

Table 4. Relationship between age and academic grade with academic achievement in high school students in Sanandaj City, Iran, in 2016

Variables	Spearman correlation coefficient	P
Age	0.029	0.149
GPA	0.90	< 0.001

GPA: Grade point average

The results of table 4 showed that there was a significant relationship between GPA (grade point average) and academic achievement (r = 0.90, P < 0.001), but there was no significant relationship between the students' age and their academic achievement (P > 0.050).

Discussion

This study, performed to examine the relationship between handedness and academic achievement among high school students in Sanandaj City in 2016, indicated that the amount of left-handedness among the studied students in this study was 7.7%. This rate has been reported to be between 6% and 20% in other studies.[14,15] The results of this study are consistent with the findings of the studies in Rajasthan[14] and Kenya.[15] The findings of this study indicated that academic achievement in the right-handed, left-handed, and double-handed students (without the preference of hand use) was not statistically significant. This finding is consistent with the findings of the study by Heydari et al.[2]

There are some points in examining the causes of differences, including the location of study, age of the subjects, and their educational levels. Other factors influencing the study results in most studies are cultural factors that can have a significant impact on the use of the tools. In some cultures, left-handed people are seen as people with disabilities, so they have to reluctantly use their right hand and be introduced as the individuals with right-handedness.

On the other hand, according to studies, the distribution and proportion of the left-handedness vary in different countries, regions, and times. This can be indicative of the impact of the mental development conditions, cultural factors, and changes in educational management.[2] The findings of this study showed that there was no significant difference between the scores of the male and female students and their handedness. This finding is consistent with the findings of the study by Alipour and Kalantarian.[6] The results of the study showed that there was a significant difference between the academic achievement and grade, the birth rate, the

parents' education level, the household economic status, and the presence of a person with genetic disorders in the family. These findings are as follows; the tenth grade had higher scores than the other grades, the students who were the first babies of the family also had higher academic achievement compared to others. This difference can be attributed to the fact that the first-born children have more opportunities and facilities, and most of them may be the only child of the family who are provided with more facilities and their parents spend more money on their success.

One of the most striking findings in this study was that the students living in a family with a member with a genetic disorder had a lower level of educational achievement compared to others. This finding, beside a genetic effect, could have other causes, including the negative impact of the people with disabilities in the family on other members, including students.

Conclusion

The results of the study indicated that there was no significant statistical relationship between academic achievement and handedness. This valuable finding revealed that handedness do not play an important role in academic achievement of the students, however other factors contribute to the students' achievement as well.

Conflict of Interests

Authors have no conflict of interests.

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Gastric varices: Endoscopic view

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A 60-year-old man was referred to our clinic with new-onset dyspepsia. Our patient was a known case of nonalcoholic fatty liver disease (NAFLD), hypertension, diabetes mellitus type II, and coronary artery disease (CAD). On physical examination, vital signs were normal, but mild splenomegaly was noted that was confirmed by abdominal ultrasound.

Due to unexplained dyspepsia and age over 40 years, the patient underwent upper gastrointestinal endoscopy. No abnormality was seen in the esophagus, but large gastric fundic varices were seen (Figure 1). Biopsy urease test was performed as diagnostic test for Helicobacter pylori, which was positive.[1,2]

Figure 1. Large gastric fundic varices

Finally, the patient was discharged with propranolol (nonselective beta blocker) as a primary prophylaxis against variceal hemorrhage, and antibiotic regimen to treat Helicobacter pylori.[1,2]

NAFLD is a sinusoidal cause of non-cirrhotic portal hypertension; therefor, if these patients present with upper gastrointestinal symptoms such as dyspepsia or bleeding, gastric or esophageal varices should be considered.

Conflict of Interests

Authors have no conflict of interests.

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