Chronic Diseases
Volume: 6/ No: 4/ 2018

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Chronic Diseases Journal

Publisher: Vesnu Publications (Farzanegan Radandish)
Kurdistan Univercity of Medical Sciences

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Postal Code: 6617713446
Email: cdjournal@muk.ac.ir/cdjourn@gmail.com **Tel:** +98 87 33 66 00 89
Interval: Quarterly
eISSN: 2345-2226, **pISSN:** 2588-7297

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Original Article(S)

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DOI: 10.22122/cdj.v6i4.327 Published by Vesnu Publications

An epidemiological survey of traffic accidents in Kangavar, Iran, in 2014

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Original Article

Abstract

BACKGROUND: Traffic accidents in Iran are the second leading cause of mortality and the first cause of years of life lost (YLL). This study aims to determine the epidemiology of road traffic accidents referring to Shahid Chamran Hospital of Kangavar, Iran, in 2014.

METHODS: This was a cross-sectional descriptive-analytical study. The studied population included all dead and injured patients of traffic accidents referring to Shahid Chamran Hospital in Kangavar in 2014 that by using census sampling method were entered in the study. The data collection tool was a researcher-made checklist involving demographic and traffic variables that were filled by examining hospital records and making phone calls to all participants. Data were analyzed through chi-square and analysis of variance (ANOVA) tests.

RESULTS: The mean age of participants was 30.98 ± 17.06 years. 75.81% of the population was men. The average time of traffic accident occurrence was 15:14:47. The majority of injured subjects were motorcycle drivers (32.89%), followed by car passengers (22.41%), and pedestrians (19.64%). Car-motorcycle (29.60%), overturning (28.66%), and car-pedestrian collision (17.45%) were the first three most common types of traffic accidents, respectively. Multiple trauma (42.29%), lower limb trauma (24.88%), and head/neck trauma (17.87%) were the most frequent injuries. There was a statistically significant association between the types of accidents and the variables of marital status, educational level, place of residence, days of the week, seasons, injured person's condition, type of collision, and the injured organ ($P < 0.050$).

CONCLUSION: Based on the findings, since the majority of casualties in traffic accidents are motorcyclists, it is recommended to review the traffic rules for this group.

KEYWORDS: Epidemiology, Traffic Accidents, Iran

Date of submission: 22 Sep. 2017, ***Date of acceptance:*** 16 Dec. 2017

Citation: Jafari S, Jabbari A, Esmailnasab N, Moradi G, Sohrabi S. **An epidemiological survey of traffic accidents in Kangavar, Iran, in 2014.** Chron Dis J 2018; 6(4): 159-64.

Introduction

One of the major causes of trauma in the world is traffic accidents, which are directly associated with behavioral factors, the growing number of vehicles, and industrial developments in the 20th century.[1] Targeting an age group that are active economically, road traffic injuries impose a heavy burden on the national economy as well as on households.[2] According to the World Health Organization (WHO) global status report on road safety in 2015, the total number of road traffic deaths worldwide was 1.25 million per year, with the highest mortality rates being in low-income countries. The low-income and middle-income countries have the most traffic accidents and their mortality rate is two times that of high-income countries. They account for 90% of global road traffic deaths.[3] In the ranking of the most important causes of mortality and years of life lost (YLL) in Iran,

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traffic accidents ranked second and first, respectively.[4,5] Statistics (2005) showed that the mortality rate of traffic accidents in Iran was 44 per 100000 population, and 1.06 million people were injured and disabled.[6] Research results indicate that a wide range of variables are the determinants of mortality from road traffic accidents. Being male, low age, mental distress, urbanization rate, per capita gross domestic product (GDP), increased traffic density, and motorization rates are mentioned as risk factors.[7,8]

Targeting the labor force, road traffic accidents impose high economic burdens on societies, because men and age group of < 40 years are among the most important groups at risk.[9,10] Traffic accidents, therefore, are one of the social, economic, and health problems due to their extent of impact. The reduction of these accidents is one of the priorities of planners and policymakers in every society. Kangavar City is located on the main communication routes in Iran; and therefore, deals with a heavy traffic of cars and heavy vehicles. Accordingly, it is a good case for conducting traffic studies and related risk factors. Thus, the objective of this study is to evaluate the epidemiology of road traffic accidents referring to Shahid Chamran Hospital of Kangavar in 2014.

Materials and Methods

This study was cross-sectional descriptive-analytical. The studied population included all traffic casualties referring to Shahid Chamran Hospital in Kangavar in 2014. Sampling method of this study was census. Therefore, all the people who referred to the hospital in 2014 due to traffic accidents and had medical records were studied. Data were collected using a researcher-made checklist containing demographic variables such as age, sex, marital status, educational level, age in the first driving experience for motorcycle drivers, and also traffic variables including the condition of the injured (death/injury), the type of traffic accident, the time and place of the accident, the number of car passengers, the injured organ, and the role of the injured (driver/passenger/pedestrian) in two stages. In the first stage, the data were extracted from hospital records. In the second stage, the studied variables in the checklist that were not recorded in the medical files were completed. At this stage, calls were made to people. At the end, data were analyzed by STATA software (version 12) using descriptive (mean and frequency) and inferential [chi-square test and analysis of variance (ANOVA)] statistics. The significance level was considered to be 0.05.

Results

Among the accidents registered at the hospital, 864 cases were eligible for inclusion in the study. 75.81% of the participants were men and 24.19% were women. The mean age of the subjects was 30.98 ± 17.06 years. 58.6% of the subjects were married and 41.4% were single. The results of demographic variables are presented in table 1.

A total of 864 referrals to the hospital were made following 670 accidents, of which 57.52% were intracity, 40.72% were intercity, and 6.71% were intravillage accidents. 858 cases were injured and 6 ones died. In terms of time (season, month, and day), summer (35.37%), June (14.33%), and Thursday (17.82%) had the highest number of accidents. The average time of traffic accident occurrence was 15:14:47. The majority of subjects were motorcycle drivers (32.89%) who had started driving at the age of 17.27 ± 5.87 on average. Car-motorcycle collision (29.60%) was the most common type of accidents. The average number of car passengers was 2.05 ± 1.28, which were family members or relatives in 77.84% of the cases. In examining the most common injuries to the subjects, multiple trauma (42.29%) had the highest frequency. The results of traffic variables are presented in table 1.

Table 1. Demographic and traffic variables of the study participants

Variables	Intracity	Intercity	Intravillage	Total	P
Age (year) (mean ± SD)	30.00 ± 18.19	32.01 ± 15.74	31.37 ± 18.09	30.98 ± 17.06	0.260
Age in the first motorcycle riding experience (mean ± SD)	17.05 ± 5.98	17.52 ± 5.84	18.10 ± 5.70	17.27 ± 5.87	0.690
Hour (mean)	15:27:43	14:42:24	16:29:11	15:14:47	
Sex [n (%)]					
Male	298 (79.47)	289 (72.07)	40 (72.73)	655 (75.81)	0.050
Female	77 (20.53)	112 (27.93)	15 (27.27)	209 (24.19)	
Marital status [n (%)]					
Single	175 (46.79)	148 (37.09)	18 (32.73)	356 (41.40)	0.010
Married	199 (53.21)	251 (62.91)	37 (67.27)	504 (58.60)	
Educational level [n (%)]					
Illiterate	45 (27.38)	19 (9.36)	1 (3.70)	66 (12.45)	0.020
Primary school-junior high school	121 (41.44)	75 (36.95)	16 (59.26)	214 (40.38)	
High school-diploma	92 (31.51)	71 (34.98)	7 (25.93)	174 (32.83)	
Associate-bachelor degree	34 (11.64)	34 (16.75)	3 (11.11)	72 (13.58)	
Master degree and higher	0 (0)	4 (1.97)	0 (0)	4 (0.75)	
Place of residence [n (%)]					
Village	59 (15.73)	123 (30.67)	44 (80.00)	236 (27.38)	< 0.001
City	316 (84.27)	278 (69.33)	11 (20.00)	626 (72.62)	
Day [n (%)]					
Saturday	58 (17.37)	38 (14.84)	6 (13.95)	106 (16.01)	0.010
Sunday	49 (14.67)	26 (10.16)	2 (4.65)	80 (12.08)	
Monday	47 (14.07)	28 (10.94)	7 (16.28)	87 (13.14)	
Tuesday	45 (13.47)	34 (13.28)	8 (18.60)	89 (13.44)	
Wednesday	48 (14.37)	32 (12.50)	2 (4.65)	87 (13.14)	
Thursday	56 (16.77)	50 (19.53)	6 (13.95)	118 (17.82)	
Friday	31 (9.28)	48 (18.75)	12 (27.91)	95 (14.35)	
Month [n (%)]					
April	21 (6.23)	22 (8.43)	2 (4.65)	46 (6.87)	0.300
May	24 (7.12)	20 (7.66)	4 (9.30)	49 (7.31)	
June	37 (10.98)	40 (15.33)	11 (25.58)	96 (14.33)	
July	44 (13.06)	20 (7.66)	4 (9.30)	69 (10.30)	
August	46 (13.65)	29 (11.11)	5 (11.63)	81 (12.09)	
September	49 (14.54)	32 (12.26)	5 (11.63)	87 (12.99)	
October	25 (7.42)	37 (14.18)	2 (4.65)	72 (10.75)	
November	13 (3.86)	10 (3.83)	2 (4.65)	26 (3.88)	
December	13 (3.86)	11 (4.21)	1 (2.33)	28 (4.18)	
January	27 (8.01)	14 (5.36)	2 (4.65)	43 (6.42)	
February	18 (5.34)	12 (4.60)	3 (6.98)	33 (4.93)	
March	20 (5.93)	14 (5.36)	2 (4.65)	40 (5.97)	
Season [n (%)]					
Spring	82 (24.33)	82 (31.42)	17 (39.53)	191 (28.51)	0.010
Summer	139 (41.25)	81 (31.03)	14 (32.56)	237 (35.37)	
Autumn	51 (15.13)	58 (22.22)	5 (11.63)	126 (18.81)	
Winter	65 (19.29)	40 (15.33)	7 (16.28)	116 (17.31)	
Status of the injured subject [n (%)]					
Vehicle driver	10 (2.69)	82 (20.81)	3 (5.77)	96 (11.57)	< 0.001
Motorcycle rider	151 (40.59)	95 (24.11)	20 (38.46)	273 (32.89)	
Bicycle rider	7 (1.88)	3 (0.76)	0 (0)	10 (1.20)	
Pedestrian	138 (37.10)	21 (5.33)	4 (7.69)	163 (19.64)	
Vehicle passenger	19 (5.11)	163 (41.37)	4 (7.69)	186 (22.41)	
Motorcycle passenger	39 (10.48)	30 (7.61)	17 (32.69)	90 (10.84)	
Other	8 (2.15)	0 (0)	4 (7.69)	12 (1.45)	

Table 1. Demographic and traffic variables of the study participants (continue)

Variables	Intracity	Intercity	Intravillage	Total	P
Type of accident [n (%)]					
Car-car	13 (3.89)	32 (12.45)	1 (2.44)	47 (7.32)	< 0.001
Car-motorcycle	116 (34.73)	58 (22.57)	13 (31.71)	190 (29.60)	
Car-pedestrian	94 (28.14)	13 (5.06)	5 (12.20)	112 (17.45)	
Car-bicycle	5 (1.50)	2 (0.78)	0 (0)	7 (1.09)	
Motorcycle-motorcycle	20 (5.99)	3 (1.17)	0 (0)	23 (3.58)	
Motorcycle-pedestrian	39 (11.68)	9 (3.50)	0 (0)	49 (7.63)	
Motorcycle-bicycle	2 (0.60)	0 (0)	0 (0)	2 (0.31)	
Overturning	35 (10.48)	127 (49.42)	17 (41.46)	184 (28.66)	
Other	10 (2.99)	13 (5.06)	5 (12.20)	28 (4.36)	
Injured organ [n (%)]					
Head and neck	61 (16.35)	82 (20.60)	4 (7.41)	153 (17.87)	< 0.001
Upper limb	41 (10.99)	54 (13.57)	3 (5.56)	101 (11.80)	
Lower limb	127 (34.05)	67 (16.83)	10 (18.52)	213 (24.88)	
Chest	8 (2.14)	18 (4.52)	1 (1.85)	27 (3.15)	
Multiple places	136 (36.46)	177 (44.47)	36 (66.67)	362 (42.29)	

The results of univariate analysis indicated that there was a significant association between the type of accident (in terms of intracity, intercity, and intravillage locations) and marital status, educational level, place of residence, days of the week, seasons, injured subject's status, type of incident, and damaged organ (P < 0.050) (Table 1).

The most frequent accidents were related to residents (according to the classification of the health network in the city) in the areas covered by Center 2, Base 1, and Center 1 with 16.44%, 16.30% and 14.52%, respectively. The highest number of intracity accidents occurred at Enghelab Boulevard (11.82%), Iraqi Square (8.31%), and Azadegan Square (4.21%). The highest number of intercity accidents occurred at Nahavand junction (6.18%), Tuyserkan junction (5.79%), and Karkhane junction (5.41%). And the highest number of intravillage accidents occurred in Gowdin (11.63%), and Dehlor and Qarloq villages (6.98%).

Discussion

In this study, out of 670 traffic accidents, 52.57% were intracity, 40.72% were intercity, and 71.70% were intravillage. The average age of traffic casualties in this study was similar to that of other studies in Iran.[11,12] The male/female ratio of traffic accidents was 13/3. Time surveys showed that most intracity accidents occurred on Saturday (17.37%), most intercity accidents occurred on Thursday (19.53%), and most intravillage accidents occurred on Friday (27.91%), and the difference was statistically significant (P < 0.010). Increased tendency of people for excursion and recreation on weekends and going back to work at the beginning of the week (Saturday) have increased crowdedness, resulting in an increase in accidents on these days. No significant difference was observed between the number of accidents and the month of the accident. In general, however, most accidents occurred in June (14.33%) and September (12.99%). The reason for this is clear. The beginning and the end of trips are in June and September. These results are partly consistent with those obtained by Khorshidi et al., which showed that most accidents occurred on Thursdays and in summer.[13] The results of this study showed that the most important groups at high risk of traffic accidents are motorcycle riders (40.59%), followed by pedestrians (37.10%) in the cities; car passengers (41.37%) and motorcycle riders (24.11%) between the cities; and motorcycle riders (38.46%) and motorcycle passengers (32.69%) in villages.

Motorcycle riders and car passengers made the highest casualties in intracity and intercity traffic accidents. This result is consistent with that of Sadeghian et al.[14] Most intracity accidents were car-motorcycle collisions (34.73%), while most intercity (49.42%) and intravillage accidents (41.46%) were mostly due to overturning. One of the main reasons for car-motorcycle accidents and motorcycle casualties in this city can be due to the frequent use of motorcycle as an easy vehicle to avoid traffic congestion. Motorcycles, however, lack safety equipment and most motorcycle passengers do not observe safety measures; and thus, they are most likely to be injured in case of accidents. The results related to the age of first motorcycle riding experience show that motorcycle riders practice riding before obtaining a license. In this study, the minimum age of the first motorcycle riding experience was 5 years and the maximum age was 53 years (mean: 17.27 ± 5.87). The findings showed that the most important organs damaged in traffic accidents were multiple injuries and lower limb injury in intracity and intravillage accidents, while they were multiple injuries and neck and head injury in intercity accidents. This can be well justified by the type of accidents and at risk groups.

One of the limitations of this research is that it does not address the status of addiction and personal and psychological disorders of the casualties, especially those of car drivers and motorcycle riders. It is suggested to conduct similar studies to examine the above variables.

Conclusion

According to the results of this study, motorcycles play an important role in accidents and injuries, and, more importantly, the average age of starting to ride motorcycles is lower than the age allowed for obtaining a license. It is essential to design appropriate interventions to educate the correct culture of motorcycle use and to implement these interventions in middle and high schools. In addition, it is recommended to develop training and intervention programs tailored to the time and place of the accidents by the traffic police and health centers. It is also recommended to develop and strengthen safe community committees in the city.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The researchers appreciate the sincere help of the collaborating staff of Shahid Chamran Hospital and the health network of Kangavar City. The present study was conducted with the financial support of the Research and Technology Department of Kurdistan University of Medical Science with the registration number 95.64.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.328 Published by Vesnu Publications

Report of the clinical features of patients with leptospirosis in Golestan, Iran, 2011-2015: Based on information available at the provincial health center

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Original Article

Abstract

BACKGROUND: Leptospirosis is a zoonotic disease with a global distribution that is caused by pathogenic spirochetes of Leptospira. It has a global spread, but it is more common in warm and tropical regions. In developing countries such as Iran, it is considered as a work-related illness and occurs mostly in farmers, ranchers, slaughterhouse workers, butchers, and fishermen in the warm seasons of the year. The aim of this study was to report the information available at the provincial health center about the clinical features of patients with leptospirosis in Golestan province, Iran, from 2011 to 2015.

METHODS: This cross-sectional descriptive study surveyed all patients with leptospirosis in Golestan provincial health center from 2011 to 2015. All information was collected by a self-designed checklist that its reliability was approved by three infectious specialists. In case of defective files, patients were contacted. The collected data were analyzed by an epidemiologist via SPSS software.

RESULTS: In this study, during the years of 2011 to 2015, 75 cases of leptospirosis were recorded. 50 cases (66.6%) were men and 25 (33.3%) were women. The most common complaint of patients at referral was fever (70 cases, 93.33%). The most complained problem after fever (93.33%) was musculoskeletal pain and jaundice reported 57.33% and 54.66%, respectively.

CONCLUSION: It is important to pay attention to this disease in farmers and villagers, especially in agricultural seasons. Due to the high prevalence, morbidity, and mortality of leptospirosis, early diagnosis based on common symptoms is important. Healthcare centers in each area are required to recognize common diseases to reduce irreversible complications.

KEYWORDS: Leptospirosis, Zoonotic Disease, Iran

Date of submission: 12 Sep. 2017, ***Date of acceptance:*** 25 Dec. 2017

Citation: Abbasi A, Jafarpour H, Khodavandegari Z, Rezaei A, Amirkhanlou S. **Report of the clinical features of patients with leptospirosis in Golestan, Iran, 2011-2015: Based on information available at the provincial health center.** Chron Dis J 2018; 6(4): 165-70.

Introduction

Leptospirosis is a zoonotic disease with a global distribution that is caused by pathogenic spirochetes of Leptospira.[1] Leptospira are spiral, slender, and moving organisms that have 2 flagella and hook-like endpoints which are responsible for the movement of these organisms. Currently, 22 species of leptospira including 10 pathogenic species, 7 non-

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pathogenic species, and 5 intermediate species have been discovered. Leptospira require culture medium and specific conditions for growth, and they can be seen using a microscope with a dark background. The disease has a global spread, but it is more common in warm and tropical regions.[2] In developing countries such as Iran, it is considered as a work-related illness and occurs mostly in farmers, ranchers, slaughterhouse workers, butchers, and fishermen in the warm seasons of the year. No detailed information is available on the incidence of disease. However, according to a recent World Health Organization (WHO) report, the annual incidence of the disease in temperate regions varies from 0.1 to 100 in 100000 in tropical and humid areas and occurs sporadically in industrialized countries.[3] Infection is transmitted through direct or indirect contact (damaged skin or mucus) with water or soil contaminated with urine of wild and domestic mammals, especially sheep, horses, and rodents.[1,4] The incubation period usually lasts from 1 to 2 weeks, but it can vary from 1 to 30 days. In mild cases, most patients are asymptomatic or only mildly ill. In mild-symptomatic patients, symptoms often consist of fever, sudden onset of fever and chills, headache, nausea and vomiting, abdominal pain, redness of the conjunctiva, and muscle pain, especially in the legs. Symptoms may disappear within a few days but may persist for a few weeks.[5] Clinical diagnosis of leptospirosis is based on the history of the exposure, along with one of the variable manifestations of the disease. Blood and urine biochemical findings in acute leptospirosis are not specific. Evidence of bacterial infection includes leukocytosis with left shift, increased inflammatory markers, thrombocytopenia, as well as increased amylase, aminotransferase, alkaline phosphatase, and bilirubin. In severe form of the disease, there may be signs of coagulation activation and diffused alveolar bleeding. A definite diagnosis is based on the extraction of the organism from the patient.[2] Ghanaie et al. in Guilan province, Iran, obtained 177 confirmed cases by serological tests from 465 suspected cases of leptospirosis.[6] By obtaining information about the prevalence of the disease in that region and informing the treatment centers to consider it as one of the most important differential diagnoses in patients with fever, especially in the farming seasons, the prevalence can be reduced with the timely treatment that makes its complications under control. The aim of this study was to report the information available at the provincial health center about the clinical features of patients with leptospirosis in Golestan province, Iran, from 2011 to 2015.

Materials and Methods

This cross-sectional descriptive study surveyed all patients with leptospirosis in Golestan provincial health center from 2011 to 2015. Demographic data, clinical examinations, laboratory results, and history of exposure to the risk factors were extracted from patients' records. After approval by the Research and Technology Deputy and receiving the code of ethics from the Ethics Committee, the sampling began with the introduction letter for the center. All information was collected by a self-designed checklist and its reliability was approved by three infectious specialists. In case of defective files, patients were contacted. The collected data were analyzed by an epidemiologist using SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

Results

In this study, after collecting data during the years of 2011 to 2015, using descriptive statistics [frequency, percentage, mean ± standard deviation (SD)], 75 cases of leptospirosis were recorded in Golestan province, of which 50 cases (66.6%) were men and 25 (33.3%) were women. The mean and SD of the men and women's age were 43.82 ± 14.40 and 47.38 ± 11.72 years, respectively (Table 1).

Table 1. Distribution of leptospirosis by gender and age

Sex	Number	Percentage (%)	Mean age (year)	Standard deviation
Male	50	66.7	43.82	14.40
Female	25	33.3	47.38	11.72
Total	75	100		

According to this study, the highest incidence (42.2%) was in the age range of 45-60 years. The youngest person in this study was 14 years old and the oldest was 75 years old. The number of positive cases in urban areas was 22 cases (29.33%), and in rural areas it was 53 cases (70.66%). The two cities of Gorgan with 53.3% (40 people) and Aqqala with 1.33% (1 person) had the highest and lowest incidence, respectively. In terms of occupation, most cases of leptospirosis were observed in farmers and ruminants (51.4%). 5.5% of staff and ranchers had a 2.8% risk. The highest number of visits was in summer (52.6%), with the highest rate of 32% in August. In autumn, 18.6%, in spring 13.3%, and in winter 1.33% of the patients were identified (Table 2).

Table 2. Distribution of patients' referral time

Time of visiting	Number	Percentage
March	2	2.66
April	3	4.00
May	5	6.66
June	18	24.00
July	24	32.00
August	8	10.66
September	11	14.66
October	1	1.33
November	2	2.66
December	0	0
January	0	0
February	1	1.33

According to the results of this study, the highest incidence of this disease was in those who had a farming history in the field (56 cases, 74.66%). Contact with contaminated water was the second most common cause (40%) of the disease (Table 3). 5 cases (6.66%) used non-plumbing water (fountains/wells), and in the remaining cases (93.33%), plumbing water was consumed. The most common complaint of patients at referral was fever (70 cases, 93.33%).

Table 3. Distribution of the disease

Way of Contamination	Number	Percentage
History of farming on the field	56	74.66
Contact with contaminated water	30	40.00
Contact with animals	34	32.00
Contact with contaminated person	1	1.33
Overall	75	100

Musculoskeletal pain (57.33%) and jaundice (54.66%) were also the most common complaints after fever (Table 4).

Table 4. Distribution of frequency of patients' clinical complaints

Complaints	Number	Percentage
Fever	56	74.66
Musculoskeletal pain	30	40.00
Jaundice	41	54.66
Others (bleeding from the nose, subcutaneous bleeding, stomachache, and cough)	42	56.00
Headache	21	28.00
Skin rash	12	16.00
Red eye	7	9.33

Because some patients referred with more than one complaints, the overall number and overall percentages seem to be higher than the real amount.

In terms of laboratory findings, 53.3% (40 cases) had thrombocytopenia, of which 25.3% had platelet counts below 20000 in mm^3 (Table 5).

Table 5. Distribution of blood platelet level

Platelet	Number	Percentage
< 20000	19	25.3
20000-50000	13	17.3
50000-100000	8	10.6
> 100000	35	46.6

In 3 patients (4%), the creatine phosphokinase (CPK) was twice more than

normal. In 38 patients (50.6%), the total bilirubin value was higher than 1.5 mg/dl. Serum glutamic oxaloacetic transaminase (SGOT) was 2-3 times more than normal in 28% (21 people) and serum glutamic-pyruvic transaminase (SGPT) was also 2-3 times more than normal in 28% of cases. In terms of complications of the disease, hepatitis occurred in 3 (4%) patients, kidney failure in 2 (2.66%), and hepatitis along with kidney failure was observed in 2 (2.66%) patients. In treatment, 45.3% of patients were treated with ceftriaxone, 22.01% with ampicillin, and 23.85% with ceftriaxone and ampicillin. One case (1.33%) was treated with gentamicin (Table 6). In terms of response to treatment, 94.66% had complete recovery in follow-up, and in 4 cases (5.33%) death occured due to illness.

Table 6. Distribution of the treatment performed for patients

Treatment	Number	Percentage
Ceftriaxone	34	45.30
Ampicillin	19	25.30
Ceftriaxone + Ampicillin	21	28.00
Gentamicin	1	1.33

Discussion

Leptospirosis is one of the most common diseases of humans and animals with a global spread, caused by a pathogen called leptospira. It is more prevalent in regions with temperate and humid climates and can trap people as an occupational and non-occupational illness. In our study, the overall prevalence of leptospirosis in Golestan province during 2011 to 2015 was 75%. In a study carried out by Ghanaie et al., 177 cases were reported in Guilan province.[6] Moreover, in the study by Shojaee et al., 80 cases were reported in Mazandaran province, Iran, from 2011 to 2015.[7] While the incidence of leptospirosis in a study by Alavi and Khoshkho in Khuzestan, Iran, in 2014 was 45%.[8] This indicates that Golestan is also the most prevalent region of the disease like other northern provinces of Iran (Mazandaran and Guilan) compared with other parts of the country. In our study, the two cities of Gorgan and Aqqala had the highest (53.30%) and lowest (1.33%) rates of disease, respectively. In the study of Javid et al. in 2013, Minoodasht and Bandar-e Gaz had the highest (21.3%) and lowest (0) rates of the disease, respectively.[9] In our study, 49.33% of patients were between the ages of 45 and 60 years old, and in the study conducted by Esmaeili et al. in Mazandaran, the most cases were in the age range of 40 to 59 years.[10] While in the study of Babamahmodi et al., the age range was 15 to 34 years,[11] and in the study of Sethi et al., the highest incidence was in the age range of 21 to 30 years.[12] In Golestan province, farming rice is prevalent and mainly men are occupied in this job. In our reports, mostly men were sick compared to women (66.6% compared to 33.3%), which is due to the greater role of men in farming rice. In the report of Zakeri et al., in Mazandaran, 82.8% of cases were men,[13] and in the study of Ghanaie et al. in Guilan, 67.2% were men.[6] In our data results, 56 patients (74.66 %) had a short period of time from the work experience in farms to the onset of symptoms , which is consistent with the study of Babamahmodi et al.[11] There was a history of contact with contaminated water in 30 people (40%). In a study conducted by Esmaeili et al. in Mazandaran, the rate of this contact was 9.8%,[10] in Zakeri et al study was 53.3%,[13] and in Sethi et al. study it was 44.2%.[12] The history of exposure to animals (cattle, sheep, and goats) was reported in 24 patients (32%), in Zakeri et al.[13] study it was 45%, and in Sethi et al. study in India it was 62.1%.[12] Our studies have shown that the prevalence in rural areas is more than urban areas (70.66% vs. 29.33%), which is consistent with the results of other studies.[11,12] Animal keeping at home, agricultural lands, and working with naked hands and feet on farming fields provide the skin for scratches and infection transmission.

In this study, the prevalence of disease in farmers was significantly higher than other occupations (51.4%), which is similar to other studies.[1,6,11,13,14] Our study emphasized that leptospirosis was an occupational disease and that the agricultural occupation was more prevalent in the summer. The results of this study showed that 52.6% of the disease incidence was in summer, which is consistent with other studies based on the seasonality of the disease.[14,15] Fever has been the most common clinical symptom (91.33%). In the study by Golsha et al. in 100% of cases,[15] in the study by Sethi et al. also in 100%,[12] and in Davoodi et al. study in 98.13% of cases,[1] fever was the most common symptom, that is consistent with our study. Headache was found in 28% of our patients, and in Sethi et al. study it was observed in 37% (15 cases);[12] while in Babamahmodi et al. study it was found in 93.1%,[11] and in Golsha et al. study in 83.3%,[15] which were significantly higher than that of our study. Jaundice was present in 41 patients (54.66%), while in the study of Golsha et al. it was observed in 3 patients (25%),[15] in the study of Davoodi et al. in 2 patients (1.86%),[1] and in the study by Najafi et al. it was reported in 6.5% of patients,[16] which was significantly higher in our patients. Conjunctival hyperemia was found in 7 of our patients (9.33%), which was less than other studies.[12,15] Musculoskeletal pain was found in 57.33% of patients, which is consistent with the statistics obtained from other studies.[1,13,15] In terms of complications of the disease, in our study, kidney failure was present in 2 patients (2.66%). In the study by Ghanaie et al., it was 4.5%,[6] while it was 60.5% in Sethi et al. study;[12] in comparison with that, the rate of kidney complications in our patients was significantly lower. In our study, 5.33% of patients had death due to the disease and 94.6% had complete recovery. In the study of Ghanaie et al., death occurred in 1.1% of patients.[6]

Conclusion

In general, the results indicate that leptospirosis in Golestan province is high and the same as in other northern provinces of the country. It is important to pay attention to it in farmers and villagers, especially in agricultural seasons. Due to the high prevalence, and morbidity and mortality of leptospirosis, early diagnosis based on common symptoms is important. Healthcare centers in each area are required to recognize common diseases to reduce irreversible complications.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The authors would like to express their thanks to the Student Research Committee of Mazandaran and Golestan Universities of Medical Sciences for supporting this research project.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.330 Published by Vesnu Publications

Pattern of animal bites and factors associated with delay in post-exposure prophylaxis in bitten people

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Original Article

Abstract

BACKGROUND: Since the epidemiology of animal bites and the relevant factors in post-exposure prophylaxis (PEP) are of great significance for preventing the deaths resulting from rabies and controlling the rabies disease, the main purpose of the current study is to account for the patterns of animal bites and factors associated with delay in PEP in bitten people.

METHODS: This cross-sectional study was conducted on all animal bites cases in Khaf city, Khorasan Razavi province, Iran, and included 553 cases of animal bites recorded from March 2014 to February 2016 in the healthcare centers. Chi-square test (or Fisher's exact test) was used to identify the factors associated with delays in PEP.

RESULTS: Results indicated that majority of the cases with animal bites were men (79.7%) aged from 21 to 60 years (48.5%). Due to the type of animal bites in all ages, the damages caused by dogs (85.2%) were greater than the damages caused by cats (9%) and other domestic or wild animals (5.8%). The frequency of delay in treatment was 14.4% in women and 5.2% in men (P = 0.002). The frequency of treatment delay in housewives (18.6%) and children under 6 years old (6.3%) was greater than that in other occupations (P = 0.003).

CONCLUSION: According to the current study's results, individuals' gender and occupation are among the main factors associated with delay in PEP. Therefore, identifying factors related to delay in treatment and providing people with the necessary education by health personnel are of considerable significance in prevention of unpleasant consequences of animal bites.

KEYWORDS: Bites, Post-Exposure Prophylaxis, Rabies

Date of submission: 22 Sep. 2017, *Date of acceptance:* 12 Dec. 2017

Citation: Samiee Roudi K, Soltani M. **Pattern of animal bites and factors associated with delay in post-exposure prophylaxis in bitten people.** Chron Dis J 2018; 6(4): 171-8.

Introduction

One of the major reasons of mortality all over the world is animal bites which can be prevented by quick treatment after the exposure. Rabies is caused by a rhabdovirus genotype 1 which is a widespread and lethal infection throughout the world. It is reported that in Asia, Africa, and Europe, rabies is mostly caused by dogs, while in United States of America it is caused by bats.[1,2] The main animal sources of transferring the rabies virus to human being are domestic dogs which are responsible for 90% of all animal bites in the world.[3] Dog bite is widespread among men and cat bite is prevalent among women. Two thirds of deaths caused by cat bites take place among people aged 20 to 35, while two thirds of deaths caused by dog bites are among children or the youth.[4] It is estimated that animal bites are the main reasons of 1.9 million lost years due to people's disability, and 6 billion financial losses in a year.[5] Increase in

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the rate of animal bites, and increase in buying vaccines and other medicines by the government for preventing rabies and the relevant diseases will certainly increase the government's costs. Biting is an animal's instinctive behavior which is displayed when the animal feels fear or when its food is to be taken.[6] Rabies is a deadly disease which can cause death by the progression of symptoms. Of course, after exposure to the rabid animal, a quick treatment can prevent the disease incidence. This activity is known as post-exposure prophylaxis (PEP).[7]

If there are multiple deep ulcers around the neck and head, especially in the endemic areas, there will be a dire need for vaccination and immunoglobulin. Washing the ulcer by water and soap for five minutes is an effective method for decreasing the number of viral parts of the body.[7] Generally, due to the widespread vaccination of domestic dogs and cats, mandatory vaccination of human beings, and treatment by immunoglobulin, the number of deaths caused by rabid animals has decreased significantly in the world.[8] However, some studies conducted in Iran reported that the incidence of animal bites has increased during the recent years. For example, in a study conducted in Ilam (west of Iran), the incidence of animal bites has increased from 34 cases in each 100000 individuals in 1999 to 98 cases in each 100000 individuals in 2008.[9]

In Rafsanjan, Iran, the incidence of animal bites has increased from 180 cases in each 100000 individuals in 2003 to 241 cases in each 100000 individuals in 2005.[10] However, in Golestan province, Iran, the rate of cases with animal bites had a decreasing trend from 2005 to 2009.[11] Rabies is one of the most important viral zoonotic diseases because of its universal distribution,[6] the frequency of outbreaks, high human and veterinary costs, high death rate, and the resulting high economic expenditures in different countries of the world every year.[11] In order to prevent and control the rabies disease, the following programs should be implemented: doing the regular epidemiologic care programs, designing and improving the registration rules, issuing certificate for dog owners, vaccinating the dogs having owner, improving the public awareness of the disease, easy availability of preventing services, and effective and inexpensive vaccination of human beings.[5] Since the epidemiology of animal bites and the relevant factors in PEP are of great significance for preventing the deaths resulting from rabies and controlling the rabies disease, the current study aims at determining the trend of animal bites and factors associated with its PEP in Khaf city, Khorasan Razavi province, Iran.

Materials and Methods

This cross-sectional study was conducted on all animal bite cases in Khaf city (Figure 1) and included 553 cases of animal bites recorded from March 2014 to February 2016 in the healthcare centers. Sampling method was based on census. The inclusion criterion included all people referring to healthcare centers for treatment and the exclusion criteria included the individuals who were bitten by animals but were not from khaf, where the population of this study came from. The main data-gathering instrument was a checklist including the following variables: age, gender, job (housewife, self-employed, rancher, student, children below 6 years, and other), residential area (urban or rural), animal (dog, cat, wild animal, other animals), vaccination program (3 dosage, 5 dosage), received vaccination dosage (0.5 ml, 1 ml), injury status (deep, superficial), the date of animal bites (month, year), type of animal (domestic, wild, stray), and injury area (hand, leg, abdominal parts, head, and face).

For the purpose of this study, a delay in the initiation of anti-rabies PEP was defined as the individuals who are exposed to animal bites, refer to health care centers for treatment 48 hours or later after the animal bite.[12]

Figure 1. Location of Khorasan Razavi in the map of Iran

The data were entered into the SPSS software (version 23, IBM Corporation, Armonk, NY, USA). Mean and standard deviation (SD) were used for descriptive statistics of the data and chi-square test (or Fisher's exact test) was conducted for data analysis. P-values < 0.05 were considered to indicate statistical significance.

Results

553 cases of animal bites were recorded from March 2014 to February 2016. The cases' age range was from 1 to 80 years and the average age was 28.78 ± 9.10 years, the average number of ulcers was 1.59 ± 0.92, 441 cases were men (79.7%), and 289 cases (52.6%) were from villages. 140 cases of animal bites (79.6%) received 3 dosages of vaccination and 495 cases (89.7%) received vaccination with 0.5 ml dosage. Most of animal bite cases (174 people, 31.8%) were observed during the evening time from 4 pm to 7 pm, and the lowest numbers (76 people, 13.7%) were observed from 8 pm to 4 am. In 2015, 234 cases of animal bites (42.3%) were reported in January and February (fall and winter seasons) (Figures 2 and 3).

Results indicated that majority of animal bite cases were men (79.7%) and the frequency of animal bite was higher in men aged from 13 to 20 and 21 to 60 compared to women. This difference was proved to be statistically significant (P = 0.001).

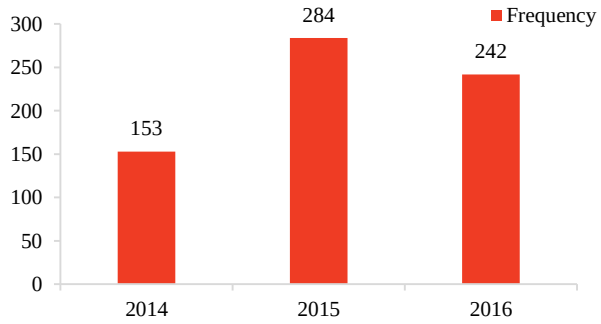

Figure 2. Trends of human rabies exposure cases across the study years

Considering animal type, injuries caused by dogs were 85.2% more than injuries caused by cats (9%) and other domestic and wild animals (5.8%).

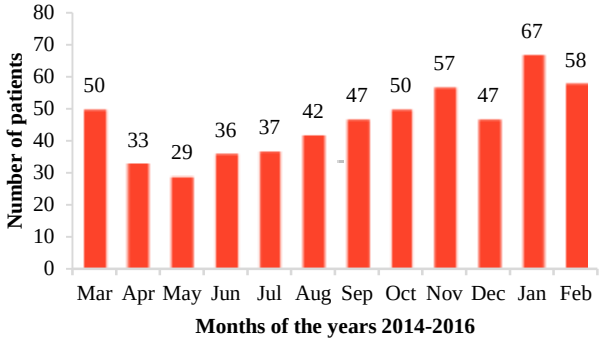

Figure 3. Cumulative monthly distribution of the cases presented for post-exposure prophylaxis (PEP) at healthcare centers, 2014–2016

Table 1. Distribution of injuries and type of animal within age categories

Variable	Age categories (year)				
	> 60 [n (%)]	21-60 [n (%)]	13-20 [n (%)]	≤ 12 [n (%)]	P
Total	52 (9.4)	268 (48.5)	106 (19.2)	127 (23.0)	0.001
Sex					
Male	31 (7.0)	219 (49.7)	96 (21.8)	95 (21.5)	
Female	21 (18.7)	49 (43.8)	10 (8.9)	32 (28.6)	
Injury status					0.182
Deep	14 (12.5)	50 (44.6)	18 (16.1)	30 (26.8)	
Superficial	31 (7.3)	211 (49.6)	87 (20.5)	96 (22.6)	
Type of biting animal					0.025
Dog	42 (8.9)	236 (50.1)	90 (19.1)	103 (21.9)	
Cat	2 (4.0)	21 (42.0)	11 (22.0)	16 (32.0)	
Other wild animals	8 (25.0)	11 (34.4)	5 (15.6)	8 (25.0)	
Bite area					0.001
Leg	24 (9.3)	130 (50.6)	47 (18.3)	56 (21.8)	
Hand	15 (7.0)	110 (51.7)	50 (23.5)	38 (17.8)	
Head and face	4 (21.1)	3 (15.8)	4 (21.0)	8 (42.1)	
Body	9 (14.0)	25 (39.1)	5 (7.8)	25 (39.1)	

That is to say, the frequency of injuries caused by dogs in people aged 21 to 60 was 50.1% higher than that by cats (42%) and other wild or domestic animals (34.4%). While in lower ages (12 and below), 32% of injuries were caused by cats, 21.9% were caused by dogs, and 25% by other wild or domestic animals. This difference was also statistically significant (P = 0.025).

Regarding the area of injuries in all ages, the injuries occurred in legs (46.5%) and hands (38.5%) were more than injuries in other parts of the body. In other words, 51.6% of hand injuries occurred in people from 21 to 60 years old, 23.5% occurred in people aged from 13 to 20 years. However, the rate of head and face injuries occurred in age groups less than 12 and above 60 were 42.1% and 21.1%, respectively; and the difference was statistically significant (P = 0.001).

Considering the intensity of injuries caused by animals, deep injuries occurred in groups less than 12 and more than 60 years old were more than the superficial injuries. However, the difference was not proved to be statistically significant (P = 0.182) (Table 1).

Results indicated that for PEP, 92.9% of the animal bite cases referred to healthcare centers in less than 48 hours and the rest referred after 48 hours. The frequency of delay in treatment was higher in women than men (14.4% in women and 5.2% in men, P = 0.002). Among the housewives, this rate was 18.6% and 6.3% for children below 6 years old. These frequencies were higher than the frequencies observed in the other professions (P = 0.003).

In addition, the frequency of delay in treatment during the summer was greater than other seasons (11.3%); and in people with superficial injuries, it was higher than that in people with deep injuries (8% against 4%). In people having injuries in their hands, this frequency was 9.9% more than people with injuries in other parts of the body; and in people injured by wild animals, the frequency of delay in treatment was 13.3% more than other cases. However, the differences were not proved to be statistically significant (P = 0.165) (Table 2).

Discussion

In order to control and develop organizational programs for animal bite incidences, considering trend and epidemiology of animal bite cases are of great significance. The patterns of animal bite reveal that majority of animal bite cases occur by dogs and cats. Due

to the number of animal bite records in healthcare centers of this area, a sharp increase is observed in 2015.

Table 2. Distribution of demographic and clinical characteristics of the bitten subjects, delay in the initiation of anti-rabies vaccination, and the factors associated with delay among animal-bitten patients, 2014-2016

Variable	Delay		P
	Present [n (%)] 512 (92.9)	Absent [n (%)] 39 (7.1)	
Sex			0.002
Male	417 (94.8)	23 (5.2)	
Female	95 (85.6)	16 (14.4)	
Place of residence			0.505
Urban	242 (93.1)	18 (6.9)	
Rural	268 (92.7)	21 (7.3)	
Age group (year)			0.532
≤ 12	119 (93.7)	8 (6.3)	
13–20	99 (94.3)	6 (5.7)	
21–60	244 (91.4)	23 (8.6)	
> 60	50 (96.2)	2 (3.8)	
Occupation			0.003
Child < 6 years	45 (93.8)	3 (6.2)	
Animal husbandry	58 (98.3)	1 (1.7)	
Self-employed student	171 (94.0)	11 (6.0)	
Housewife	124 (93.9)	8 (6.1)	
Other	57 (81.4)	13 (18.6)	
	57 (95.0)	3 (5.0)	
Season of bite			0.194
Spring	103 (93.6)	7 (6.4)	
Summer	102 (88.7)	13 (11.3)	
Fall	147 (95.5)	7 (4.5)	
Winter	160 (93.0)	12 (7.0)	
Injury status			0.136
Deep	107 (95.5)	5 (4.5)	
Superficial	389 (92.0)	34 (8.0)	
Bite area			0.165
Leg	242 (94.5)	14 (5.5)	
Hand	191 (90.1)	21 (9.9)	
Head and face	19 (100.0)	0 (0.0)	
Body	60 (93.8)	4 (6.2)	
Type of biting animal			0.243
Domestic	446 (94.1)	28 (5.9)	
Wild	13 (86.7)	2 (13.3)	
Stray	31 (88.6)	4 (11.4)	

This issue can be related to inappropriate vaccination of dogs or lack of exact reporting during 2014. Moreover, results indicated that majority of animal bite cases took place in fall and winter seasons. This finding is in line with the findings of Yibrah and Damtie[13] and in contrast with results of the studies conducted in Nigeria, Tanzania, and New York.[14-16] Various factors including changing geographical situations of different areas and the changeable weather conditions of such areas will lead to seasonal changes of animal bite cases.

According to the current study's results, although the age range of patients was from 1 to 80 years, the animal bite incidence had the highest rate in people aged 21 to 60 years. Moreover, results revealed that majority of animal bite cases were men and the frequency of animal bite in men aged 13 to 20 and 21-60 years was higher than that in women. This was also confirmed by some other studies' findings.[2,3,17-21] Salve et al. reported that majority of animal bite cases referring to anti-rabies clinics were young men.[22] The higher prevalence of animal bite during a specific age range in men rather than in women can be due to some factors such as men's higher exposure to hazards, spending most of their time outdoors, and accepting the hazards.[2] Therefore, it can be concluded that affecting the active group of people in society, this disease can cause economical loss for the country.

According to the current study's results, in all ages, the injuries caused by dogs were greater than those caused by cats and other domestic or wild animals. That is to say, in the age range of 21 to 60 years, the frequency of injuries caused by dogs was greater than that caused by cats and other wild or domestic animals. However, in ages below 12 years, the injuries caused by cats were greater than those caused by dogs and other wild or domestic animals. Similarly, Moore et al. reported that the frequency of dog bites was higher than that of cat bites.[23] Dehghani et al. also confirmed that majority of animal bite cases took place by dogs, especially the domestic ones.[6] In another

study conducted in Shahrood, Iran, Amiri and Khosravi reported that 79.1% of animal bites were caused by domestic dogs.[24]

In their study, Ramos et al. indicated that 93.2% of cases in need of PEP were bitten by dogs.[20] The high rate of animal bites by dogs refers to the residents' interest for keeping dogs at home for protecting their sheep or cattle. Therefore, these people's high exposure to dogs can lead to injuries or damages caused by this animal. According to the reports recorded in the city's healthcare centers, playing with cats and disturbing them while eating food can cause injuries or damages to children.

Regarding the area of injuries caused by animal bites, hand injuries had the highest frequency among people aged 13 to 60 years; while in lower ages, like children, and higher ages, like the elderly, the frequency of injuries was higher in head and face. This finding was similar to the results of some related studies.[25-27]

In the study carried out by Ramos et al., the most common areas of injuries was legs,[20] but in the another study done by Dwyer et al., areas around head and neck were reported to be the most common areas of injuries caused by animal bites.[25] The high rate of head and face injuries in children refers to some factors such as their emotional relations with dogs, dogs' curiosity to know the human body, children's lack of knowledge and their inability for protecting against dog attacks, and keeping dogs at home.[28] Results indicated that for PEP, 92.9% of the cases referred to healthcare centers in less than 48 hours, but the rest of the cases referred after 48 hours. The reference of majority of animal bite cases for PEP in less than 48 hours is because of some factors including the high number of animal bites occurring in this area, people's awareness of the significance of quick treatment which is developed by health personnel's educational programs, and the high number of domestic animals such as dogs due to the specific working conditions in this area.

The frequency of delay in treatment was higher in housewives and children rather than men, and this finding corresponded to the results of a study carried out by Esmaeilzadeh et al.[2] Moreover, the results revealed that due to lack of awareness in exposing to animals, low educational level of housewives in this area, and long distances of healthcare centers to this area, we observed delay in treatment or PEP in these groups. Therefore, regarding animal bite hazards and consequences, there is a dire need to provide adequate education to these groups especially housewives.

Conclusion

According to the results of the current study, most of animal bite cases are observed in fall and winter seasons. In addition, individuals' gender and profession are among the most important factors associated with delay in PEP. Therefore, identifying the factors related to delay in treatment and providing people with the required education by health personnel are of considerable significance in preventing the unpleasant consequences.

Strengths and weaknesses of the study: As a strong point, since this is a population-based study, the results can be generalized to the whole area where the study was conducted. However, this is the first study carried out on animal bites in this area. That is why the imprecise reports recorded in healthcare centers of the area can be considered as the weak points of this study.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We would like to express our deep gratitude to the Vice-Chancellor of the Health Network for their warm welcoming, providing the research data, guiding the data collection, and providing other relevant information.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.331 Published by Vesnu Publications

Comparing the psychological well-being and lifestyle of social networks user and non-user female students of high school in Sanandaj, Iran

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Original Article

Abstract

BACKGROUND: Virtual networks are one of the social issues in the age of communication. The growing development of electronic communication networks among teens has brought about many tricks for the person. The purpose of this study was to compare the psychological well-being and lifestyle of social networks user and non-user female students of high school in district 1 of Sanandaj city, Iran.

METHODS: The research was of a causal type with a practical purpose. The statistical population of the study consisted of all social network user and non-user female students of a high school in district 1 of Sanandaj city in the academic year of 2017-2018. In order to do this research, 123 female students who were social networks users and 123 non-user female students were selected randomly by random sampling. The tools used were Ryff's psychological well-being scale (54-item version) and Miller-Smith lifestyle questionnaire. The data were analyzed by multivariate analysis of variance (MANOVA) via SPSS software.

RESULTS: The results of the analysis showed that there was a significant difference between the two groups in terms of psychological well-being (personal growth and domination components) and lifestyle ($P < 0.05$).

CONCLUSION: The tendency towards social networks is associated with a reduction in the mental well-being and lifestyle. Moreover, access to them for teenagers and young people is increasing, and they are more at risk than other people. Therefore, it is needed to plan the necessary psychological well-being of adolescents.

KEYWORDS: Psychological Well-Being, Life Style, Social Networks

Date of submission: 10 Sep. 2017, *Date of acceptance:* 18 Dec. 2017

Citation: Jadidi H, Rezaie R. **Comparing the psychological well-being and lifestyle of social networks user and non-user female students of high school in Sanandaj, Iran.** Chron Dis J 2018; 6(4): 179-83.

Introduction

In recent years, a pathological approach for studying human health has been criticized. In the 21th century, psychology has realized that man has to spend his rational energy on the positive aspects of his experience;[1] because at the onset of psychology, it focused more on negative emotions such as anxiety and depression, rather than on positive emotions such as happiness and satisfaction. Scientific texts also paid more attention to suffering than pleasure. Contrary to the view that health is defined as not having a disease, new approaches emphasize being good rather than bad or sick.[2]

Therefore, the absence of symptoms of mental illness is not a health indicator. However, compatibility, happiness, self-esteem, and positive attributes of this kind of health are the main goals of the person in life to boost his/her capabilities. In shaping the concept of psychological well-being, theories such as Maslow self-actualization theory, Rogers's theory of personality (fully functioning person), and Allport's trait theory (adult or elite man) have accepted this fundamental assumption and used it.[3]

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Ryff (1995) knows psychological well-being as "quest for perfection in order to realize the real potentialities of a person". The components of the psychological well-being of the Ryff model included: self-acceptance, purpose in life, personal growth, positive relationship with others, environmental mastery, and self-determination.[4]

Psychological well-being reflects how people feel about themselves and include emotional responses, life satisfaction, and judgment about quality of life. Low psychological well-being leads to depression and social isolation and a lack of sense of satisfaction and self-esteem.[5]

The term "social networks" was first proposed by Barnes in 1954 and has since become quickly a key to research and study. Social networks are a set of social institutions, including people and organizations which are connected to a set of meaningful social relationships and interact with each other in sharing values.[6]

In this research, our social networks are Telegram and WhatsApp. In addition, according to the average of the amount, social network users are students who use social networks more than 3.5 hours a day, and non-user students are those who spend less than 3.5 hours a day on social networks.

Adolescence is a stage of development (biological, psychological, and social) that the person passing through it enters a stage of life that is expected to incorporate attributes such as accountability, self-reliance, etc. into his/her personality and also be prepared to play social roles (wife, father or mother, etc.) and a special job role. The methods of social interaction, role-playing as well as being prepared for entering the community as an adult are things that anybody practices during his/her adolescence.

The excessive use of these networks can affect the other aspect of users' lives. This aspect can include the psychological well-being and the lifestyle of adolescents. The rapid development of social networks among adolescents has made questions about their potential implications for users and the communities. Somehow that speculation about the benefits and disadvantages of social networks for individuals, especially adolescents, is perhaps the most common concern of teachers, parents, the mass media, and social policymakers. In our society, these kinds of speculations and questions have caused a lot of intellectual engagement.

Materials and Methods

The purpose of this study was to compare the psychological well-being and lifestyle of social networking user and non-user female students of high school in district 1 of Sanandaj city. The research was of a causal type with a practical purpose. The statistical population of the study consisted of all female users and non-users of social networking at high school in district 1 of Sanandaj in the academic year of 2017-2018, that the total number of members in the statistical society was estimated as 3600. The sample number was obtained 246 people using the Cochran formula. In order to do this research, 123 female high school students who were social networking users and 123 female high school students who were social networking non-users were selected randomly by random sampling. We used quota sampling, given that high school students were in different educational levels and also with regard to the age difference of one to three years.

In this research, we used the 54-item Ryff scale and Miller-Smith lifestyle questionnaire for collecting data.

54-item Ryff Scale of Psychological Well-Being (RSPWB): The RSPWB is a self-report and closed-response test. Each of its questions is composed of a 6-degree spectrum (completely disagree, somewhat disagree, disagree, agree, somewhat agree, and completely agree). In this questionnaire, some questions are scored directly and some inversely.

Several studies have examined the psychometric properties of the short versions of the Ryff test. Ryff[4] in a research on adolescents and young adults obtained a reliability of between 0.93 and 0.86 for factors.

Miller-Smith Lifestyle Questionnaire: This questionnaire contains 20 questions, which the original questionnaire was translated into Persian and then into English.

The scoring is based on the Likert scale. Each question has five answers (always = 1, often = 2, sometimes = 3, rarely = 4, and never = 5).

The score between 20-45 represents a low lifestyle.

The score between 46-75 shows a medium lifestyle.

The score between 76-100 shows a high lifestyle.

Validity and reliability of the questionnaire were confirmed by the faculty members of Isfahan University of Medical Sciences, Isfahan, Iran, and its reliability was obtained 0.86 in a pilot study for about 20 patients with lung disease, and Cronbach's alpha was calculated higher than 0.5 for each question.

Data and extracted data were analyzed using descriptive and inferential statistics. In the descriptive statistics section, the mean and standard deviation (SD), and in the inferential statistics section, multivariate analysis of variance (MANOVA) and Mann-Whitney test were used for analyzing the data via SPSS software (version 22, IBM Corporation, Armonk, NY, USA).

Results

This study was performed on female high school students in district 1 of Sanandaj city. Of these students, 30 people (12.1%) were studying in humanities, 40 people (16.2%) in experimental sciences, 20 people (8.1%) in mathematics and physics, 50 people (20.3%) in the vocational school, 6 people (2.4%) in pre-university, and 100 people (40.6%) in the first grade of high school.

Percentages assigned to duration of using social networking (up to 3.5 hours a day and more than 3.5 hours a day) were 60.5% and 39.4%, respectively.

Table 1, based on the Wilks' lambda test which is equal to 0.43, and with a meaningful value of < 0.001, and a degree of freedom of 52.12, rejected the assumption of the averaging of the components of the psychological well-being of social networks user and non-user students. In other words, the six averages have a significant difference with regard to the social networks user and non-user students.

Moreover, in table 2, analysis of variance (ANOVA) of dependent variables in the levels of social networks user and non-user students indicated that the components of personal growth and domination of environment were significant (P < 0.050).

Table 2. Consistency of variance among the components of subjective well-being of social networks user and non-user students

Variables	Df	Df1	Df2	P
Self-autonomy	6.47	1	244	0.012
Personal growth	20.80	1	244	0.001
Environmental mastery	13.30	1	244	0.001
Purpose in life	0.16	1	244	0.690
Positive relations with others	0.06	1	244	0.810
Self-acceptance	1.05	1	244	0.310

Df: Degree of freedom

Table 3 shows that lifestyle in both groups of social networks user and non-user students is significantly different (P < 0.050).

Table 1. The result of Wilks' lambda test of subjective well-being of users and non-users of social networks

Test	P	Df	Hypothesis df	Error df	P	η^2
Wilks` lambda	0.43	52.12	6	239	< 0.001	0.567

Df: Degree of freedom

Table 3. Lifestyle in social networks user and non-user students using the Mann-Whitney test

Variable	Group	μ	σ	μ̄	T	P
Lifestyle	User students	48.02	18.90	87.09	-8.03	0.001
	Non-user students	70.91	18.07	159.91		

Discussion

Research results at Stanford University, California, USA, showed that Internet users spent less time with friends and family, shopping from stores, reading newspapers, and watching TV.[7]

Affonso points out that using the Internet causes a feeling of frustration, loneliness, anxiety, and in general, reduced mental health.[8] People who use the Internet more, in addition to its negative effects on their family life and having less time for talking to the family, have more feelings of loneliness, depression, lack of self-esteem, academic failure, etc.[9,10]

The findings of the present study were consistent with the findings of Kratzer and Hegerl,[11] Windham,[12] Shahbazirad and Mirderikvand,[13] Kajbaf et al.,[14] and Tamannai et al.[15]

One of the renowned researches has been the relationship between social networks and lifestyle changes, and in line with this research was a poll surveyed as 2000. The 2000 survey results indicated that people who have been members of social networks for a long time, dealt with more types of Internet activities. And increasingly, there has been increased presence in the Web, and their activities were reduced in the unofficial community, and in fact, social networks have become a central issue in building and recreating the lifestyle and activities of the user community.[16]

In a study by Afrasiabi et al. on the impact of cyberspace on the lifestyle of high school students in North Khorasan Province, Iran, there was a positive and significant relationship between lifestyle and cybersecurity components of students.[17]

Given that the present age is the age of information and communication and the elimination of temporal and spatial constraints through social networks, social networks play a major role in changing lifestyles, attitudes, beliefs, and identity of young people. No one can ignore the role of social networks and virtual communication over adolescence lifestyles.

Reducing social function can be explained when it comes to scale of psychological well-being. In terms of psychological well-being, the components of communication with others and social interactions, which are based on the existence and continuity of the psychological well-being of individuals, are seriously damaged due to the nature of their high use of the Internet.

When one takes on an overuse of the Internet, his time for communication with others and social interactions is reduced, and he loses the ability to adapt to his surroundings over time.

Since the use of social networks as mass media is at the very beginning of its formation, certainly, the high use of virtual social networks and the Internet will bring its own mental and physical crises, which if not timely detected and dealt with, it can face the mental health of the community with new challenges, and perhaps now that we are still at the beginning of using virtual social networks, the need for more and more research is felt.

Conclusion

In general, it can be argued that more tendency towards social networks is associated with the reduction of psychological well-being and lifestyle, this is while adolescence and young people's access to the Internet is increasing,[17] and they are more at risk than other people.[18] Enhancing self-awareness and self-control

in adolescents is very important and essential for the optimal use of new technologies. Moreover, awareness, information, and culture promotion, and expert monitoring of social networks can be two basic suggestions for virtual domain policymakers. So, using the opportunities and conditions that are created in social networks, the conditions for the development of healthy and without stress lifestyle for adolescents were provided.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We would like to thank all the students who helped us to complete this research. This article has been edited from a dissertation.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.333 Published by Vesnu Publications

Body mass index in children and its relation with socio-economic factors in West-Azerbaijan, Iran

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Original Article

Abstract

BACKGROUND: By the epidemiological transition, most of the developing countries still have malnutrition problem as well as different levels of obesity and overweight as most important risk factors of non-communicable and chronic diseases. Body mass index (BMI) is a suitable index for studying them. Thus, the aim of this study was to investigate the relationship between children's BMI and household socioeconomic status in West-Azerbaijan province, Iran, in 2015.

METHODS: This cross-sectional study was conducted on 1024 children aged 6-7 years who were assessed in Sanjesh Plan conducted by Organization of Exceptional Education and Training. To determine BMI, world health organization (WHO) Growth Reference (2007) was used. Then, to estimate the risk factors affecting BMI, chi-square test and categorical (multinomial) logistic regression were used.

RESULTS: The results showed that obesity, overweight, and thinness were 2.5%, 12.7%, 5.2% in girls, and 4.4%, 12.3%, and 1.8% in boys, respectively, which were statistically significant. Of all the variables studied, insurance, occupation and education level of parents, birth order, and number of household members were not statistically significant. The rest of indicators such as gender, location of residence (city or village), ethnicity, and development degree were statistically significant.

CONCLUSION: Since analysis showed that BMI had relation with development degree and location of residence, it can be said that West-Azerbaijan is at the median of transition. Therefore, health policy makers should pay enough attention to prevention of obesity and overweight as well as elimination of thinness and malnutrition.

KEYWORDS: Body Mass Index, Overweight, Thinness, Socioeconomic Status, Preschool Children

Date of submission: 11 Sep. 2017, *Date of acceptance:* 28 Dec. 2017

Citation: Hosseini SF, Arab M, Emamgholipour-Sefiddashti S, Rahimifroushani A. **Body mass index in children and its relation with socio-economic factors in West-Azerbaijan, Iran.** Chron Dis J 2018; 6(4): 184-91.

Introduction

Nowadays, with the epidemiological transition, the world is experiencing chronic and non-communicable diseases. Overweight and obesity have been considered as major risk factors for cardiovascular disease (CVD), some cancers, and diabetes in recent decades. Industrialization and urbanization have changed the lifestyle and affected the risk factors.[1]

Developing countries are at different levels of epidemiological transition based on the performance of their health systems. Most of them still have the problem of malnutrition because of unequal distribution of income, low education or cultural problems. On the other

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hand, these countries are facing the levels of overweight and obesity simultaneously; moreover, the burden of overweight and obesity now is changing its direction toward poor people.[2] Overweight is not limited only to adults, and is also an emerging health problem in children even in developing countries.[3]

Iran, as a country in the Middle East and North Africa (MENA) region, has a high prevalence of obesity and related diseases such as metabolic syndrome and diabetes in different age groups.[4-6] Body mass index (BMI) as an indicator of health is a good indicator to classify obesity, overweight, and thinness. There are special courses for the growth of overweight and obesity including prenatal, ages of 5-7 years, and adolescents.[7] Obesity and overweight in this period have been considered as one of the risk factors for non-communicable diseases in adulthood. Obesity in childhood compared with adult obesity has more adverse effects due to longer exposure;[8] so, the study of this indicator in childhood can be one of the needs of each community.

Given the contradictions that exist in research results from different countries and the importance of public health and the key role of prevention in promoting it, and also for reducing healthcare costs and considering the effect of different socio-economic status on BMI, it is essential to identify risk factors to prevent obesity epidemic in the country and to have healthy population. Since many factors are involved in obesity and overweight, accurate identification of effective factors can provide very bright prospects of the nature of this phenomenon for the health policymakers, health officials and planners, and all those working in the healthcare field.

According to the literature review done, no study assessed the BMI based on data of the Health Assessment Plan (Sanjesh Plan) and also on pre-school children in West-Azerbaijan province, Iran. Therefore, the aim of this study was to investigate the relation between children's BMI and socio-economic status of their households and other factors among all pre-school children born in 2008-2009 who were assessed in the Health Assessment Plan (Sanjesh Plan) in West-Azerbaijan province in summer of 2015.

Materials and Methods

The study design was cross-sectional and it was a part of Health Assessment Plan of pre-school children (6-7 years old) in West-Azerbaijan province. Plan is done every year by the Organization of Exceptional Education of Iran. The reference population of the study included all children who had participated in the Plan. The number of province cities was 17 that both rural and urban areas were considered. The sample size was determined using Cochran formula, so to raise the power of the study, it was multiplied by 1.5 then using proportional sampling and considering the number of all children participated in the Plan in each city, the number of sample (600) was divided into proportions; since one city had very small proportion and its sample size was only 5, 25 persons were added to the sample size of each city to be sure that each city had at least 30 individuals, so that parameters could be estimated more accurate; therefore, final sample size was estimated as 1024 persons. Data were provided for the study in Excel file that had been collected during 2015 summer. Individuals were selected from the file by random number generation method using Microsoft Excel software (version 2007) for each city separately. BMI was calculated as weight in kilograms divided by the square of height in meters; weight and height of children were measured by scale and meter accurately, then the classification of BMI for each child was determined by standard cut-offs of World Health Organization (WHO) Growth Reference (2007). Other data included gender, location of residence (city or village), education and occupation of parents

separately, having basic and supplementary insurance, city of residence, number of household members, and birth order were asked from parents, all data were entered in electronic system. Development degree was extracted from article that determined this factor.[9] BMI based on WHO Growth Reference (2007) included 5 categories as sever thinness, thinness, normal, overweight, obese (http://www.who.int/growthref/en/).

Number of household members and birth order were categorized based on the frequency of quartiles; thus, first quartile was considered as first category, second quartile as second category, third quartile as third category, and fourth quartile as fourth category, so that frequency of data in each category was almost equal and analysis was done more accurately. The majority of ethnicity of province cities was Kurd and Turk, so ethnicity was classified in 3 categories included Kurd cities, Turk cities, and mixed cities (Turk and Kurd together).

Chi-square test was applied to analyze differences between proportions of variables' categories and BMI categories. Variables that their reported probability values (P-values) were lower than 0.05 were selected as significant. Among 12 variables, 6 variables included having basic and supplemental insurance, occupation and education of fathers, occupation of mothers, and birth order were not statistically significant. Statistically meaningless variables were excluded step by step. Estimates of association of BMI with significant variables including gender, education of mothers, number of household members, location of residence (city or village), ethnicity of each city, and development degree of city were performed by calculating the odds ratios (ORs) in logistic regression tests for categorical outcomes (multinomial) and the corresponding 95% confidence interval (CI) in two levels. First, the variables one by one and then all significant variables including gender, location, ethnicity, development degree altogether were entered in regression with fixing effect of each other. P-values were based on two-sided tests, the established statistically significant level was 5%, and the likelihood test was used to assess significance. SPSS software (version 16, SPSS Inc., Chicago, IL, USA) was used for all analyses.

Results

The distribution of all 1024 pre-school children by gender was 545 (53.2%) boys and 479 (46.8%) girls. The number of children living in the urban area was 811 (79.2%) and in the rural area was 213 persons (20.8%). 91.41% of children had basic insurance and only 12.3% of children had supplemental insurance. Percentage of households with 1-3, 4, 5, and 6-13 members were 25.00, 46.00, 18.36, and 10.64, respectively. This province has 17 cities whose ethnicities are Kurd and Turk, and some cities have Kurd and Turk together. Number of cities that had Kurdish people was 5, 7 cities had Turk, and 5 cities had Kurd and Turk together. Cities, based on development degree, had 3 categories as 18.94% developed, 15.04% semi developed, and 66.02% undeveloped. The results showed that percentage of children that had obesity, overweight, thinness, and sever thinness were 3.5, 12.5, 3.0, 0.4, respectively, and other children (80.6%) were normal; therefore, overweight and obesity were more than thinness and sever thinness in this province.

Among 12 variables that their relationship with BMI was assessed using chi-square test, 6 variables including education and occupation of fathers, occupation of mothers, having basic and supplemental insurance, and birth order were not statistically significant. Results showed that obesity, overweight, and thinness (with sever thinness) in girls were 2.5%, 12.7%, and 5.2%, respectively, and in boys 4.4%, 12.3%, and 1.8%, respectively. These differences between girls and boys were statistically significance (Table 1).

Then 6 statistically significant variables from chi-square test were analyzed one by one using multinomial logistic regression. In this step, 2 variables including education level of mothers and number of household members were not statistically significant.

Table 1. Results of chi-square test for association between the categorical variable of body mass index (BMI) and independent variables

Other variables \ Category of BMI	Thinness [n (%)]	Overweight [n (%)]	Obese [n (%)]	Chi-square	df	P
Gender						
Boy	10 (1.80)	67 (12.30)	24 (4.40)			
Girl	25 (5.20)	61 (12.70)	12 (2.50)	11.31	3	0.010
Location						
Village	11 (5.20)	42 (19.70)	4 (1.90)			
City	24 (3.00)	86 (10.60)	32 (3.90)	17.45	9	0.001
Education level of mothers						
Illiterate/elementary	20 (3.80)	79 (15.00)	12 (2.30)			
Middle school	7 (3.70)	18 (9.50)	6 (3.20)			
High school/diploma	4 (1.70)	26 (11.14)	10 (4.40)			
Academic	4 (5.30)	4 (5.30)	7 (9.30)	21.06	9	0.012
Education level of fathers						
Illiterate/elementary	21 (5.20)	53 (13.10)	10 (2.50)			
Middle school	8 (3.10)	34 (13.00)	8 (3.10)			
High school/diploma	3 (1.30)	31 (13.80)	11 (4.90)			
Academic	3 (2.30)	10 (7.60)	7 (5.30)	14.27	9	0.113
Occupation of mothers						
Employed	4 (5.80)	7 (10.10)	5 (7.20)			
Unemployed	31 (3.20)	121 (12.70)	31 (3.20)	4.61	3	0.203
Occupation of fathers						
Employed	18 (2.50)	86 (12.00)	28 (3.90)			
Unemployed	11 (5.50)	32 (15.90)	3 (1.50)			
Unknown	6 (5.70)	10 (9.40)	5 (4.70)	12.07	6	0.060
Having basic insurance						
Social security	6 (2.20)	37 (13.60)	10 (3.70)			
Iran health	8 (4.20)	28 (14.70)	9 (4.70)			
Other insurances	17 (3.60)	54 (11.40)	13 (2.80)			
Without insurance	4 (4.50)	9 (10.20)	4 (4.50)	5.77	3	0.123
Having supplementary insurance						
Yes	2 (1.60)	12 (9.50)	8 (6.30)			
No	33 (3.70)	116 (12.90)	28 (3.10)	5.77	3	0.122
Number of household members						
1-3	7 (2.70)	23 (9.00)	15 (5.90)			
4	21 (4.50)	59 (12.50)	16 (3.40)			
5	3 (1.60)	26 (13.80)	5 (2.70)			
6-13	4 (3.70)	20 (18.30)	0 (0)	18.00	9	0.035
Birth order						
First	17 (3.60)	58 (12.20)	17 (3.60)			
Second	13 (3.80)	44 (12.80)	15 (4.30)			
Third	4 (3.10)	15 (11.50)	4 (3.10)			
Fourth-tenth	35 (3.40)	11 (15.30)	0 (0)	5.16	9	0.820
Ethnicity of each city						
Kurd	7 (2.40)	25 (8.70)	11 (3.80)			
Turk	17 (4.60)	15 (4.10)	10 (2.70)			
Kurd and Turk	11 (3.00)	88 (23.80)	15 (4.10)	75.49	6	< 0.001
Development degree						
Developed	1 (0.50)	83 (42.80)	0 (0)			
Semi-developed	6 (3.90)	7 (4.50)	6 (3.90)			
Undeveloped	28 (4.10)	38 (5.60)	30 (4.40)	207.10	6	< 0.001
Total	35 (3.40)	128 (12.50)	36 (3.50)			

BMI: Body mass index; df: Degree of freedom

Table 2. Results of multinomial logistic regression for the association between 3 categories of body mass index (BMI) and all 4 independent variables together

Category of thinness and sever thinness	OR	AOR	P	95% CI
Gender				
Boy	0.34	0.32	0.004	0.15-0.69
Location				
Village	1.96	2.26	0.037	1.05-4.87
Development degree				
Developed	0.18	0.09	0.028	0.01-0.77
Semi-developed	0.92	0.91	0.868	0.32-2.59
Category of overweight/obesity based on BMI				
Ethnicity				
Kurd	0.36	1.07	0.799	0.60-1.93
Turk	0.19	0.45	0.040	0.21-0.96
Development degree				
Developed	6.43	5.40	< 0.001	3.10-9.43
Semi-developed	0.82	1.54	0.295	0.68-3.50

BMI: Body mass index; OR: Odds ratio; AOR: Adjusted odds ratio; CI: Confidence interval

Then, other 4 variables that were significant including gender, location of residence (city or village), ethnicity, and development degree of cities were altogether assessed in the multinomial logistic regression with fixing effect of each other, that the results have been provided in table 2.

Finally, using multinomial logistic regression, thinness in boys was approximately 3 folds lower than girls (95% CI = 0.15-0.69). In rural areas, thinness was 2 folds more than city areas (95% CI = 1.05-4.87). And in developed cities, thinness was 11 folds lower than undeveloped cities (95% CI = 0.01-0.77).

Based on ethnicity, Turkish cities had obesity and overweight 2 folds lower than mixed cities (Turk and Kurd) (95% CI =0.21-0.96). Based on development degree, obesity and overweight were 5 folds more in developed cities than undeveloped cities (95% CI =3.10-9.43).

Discussion

In this study, overweight and obesity were more than thinness and severe thinness, that this result is consistent with results of other studies at the same age such as Danielzik et al.[10] and Mendez et al.[11] studies. Kelishadi et al. also showed that thinness was lower than overweight and obesity, they assessed BMI rates at the national level at ages of 6-18 years in 2007, and found that percentage of obesity in 6-year-old children was 4.87% and overweight was 9.99%,[12] that its comparison with the present study reveals a lower obesity and a higher percentage of overweight in this province compared to the national level.

In our study, thinness in boys was lower than girls that is consistent with the study of Jazayeri in Tehran, Iran, that revealed that the percentage of obesity and overweight of 6-year-old boys was higher than girls at the same age.[13] On the contrary, Mendez et al. study in Mexico showed that more proportion of girls were obese,[11] and also Gerdin et al. study on Swedish children showed that at the age of 7, girls were more obese or overweight than boys,[14] which presents that the obesity based on gender is different between different geographic locations which is likely due to different cultures and geographic conditions.

In this study, thinness in rural areas was higher than the urban areas, which is consistent with Mei et al. study.[15] It was showed that overweight rate in urban areas was higher than the rural areas, which can be due to more evident changes in the urban lifestyle toward using fast foods and also decreased physical activity of children in the

urban areas.

The education level of parents was obtained as a significant and important variable in many studies such as Lamerz et al. study.[16] However, in this study parents education was not significant. In comparison to Lamerz et al. study, the insignificance of these variables may be due to the difference in the percentage of parents' education level in various studies. Percentage of the education level of Lamerz et al. study and the present study shows that almost 50% of German parents and about only 10 percent of West-Azerbaijan parents are university-educated. It can be said that only the level of university education, not any educational levels of parents, can be effective on the BMI, so this variable is not statistically significant in this study; because in our study the majority of parents' education level is lower than the university level, while in Lamerz et al. study the majority of parents had the university degree, so in Lamerz et al. study parents' education level had a relationship with BMI of children.[16]

About job of parents, there was no significant relationship between fathers and mothers occupation with BMI of their children, that the results are consistent with Lamerz et al.[16] study.

This study showed that ethnicity can be effective on BMI. This result is consistent with Mirmohammadi et al. study[17] that showed that BMI in Turk boys was higher than other ethnicities, but Mendez et al.[11] study did not show any relation between BMI and ethnicity.

In Karimi and Ghorbani study on 6-12 years old children in Semnan province, Iran, which has the highest development degree between all provinces of Iran, percent of obesity and overweight was 8.3% and 11.1%, respectively.[18] Compared to West-Azerbaijan province that has the lowest development degree among other provinces, obesity is higher and overweight is lower than the present study, so that it can be a confirmation for economic development effect on BMI; therefore, it can be said that by developing and industrialization, West-Azerbaijan will face more obesity and overweight.

About development degree of cities, the number of obese and overweight children in developed cities was higher and thinness (with sever thinness) was lower than undeveloped cities, that is consistent with the WHO statement according to which, overweight and obesity are risk factors whose prevalence has been confirmed in developing countries that are involved in socio-economic transition.[19] Salehiniya et al. study on children under 5 in Tehran also showed that obesity in the north of Tehran was more than the south, that reflects the impact of development on obesity.[20] Gontarev et al. study showed a significant relationship between socio-economic status and BMI in boys and girls.[21] Moreover, Popkin and Gordon-Larsen showed that nutrition transition had 5 stages and was in close relation with the demographic and epidemiological transition, so urbanization, economic growth, technological changes of work and food production, and massive growth of information are important in stages of nutrition transition.[2]

Overall, among 12 variables studied, finally 4 variables showed statistically significant relationship with BMI of children. At the end, using multinomial logistic regression, it was shown that thinness was less in boys. On the contrary, thinness was more in a rural area and obesity (and overweight) was more in those who live in cities with higher development degree.

Conclusion

We studied the BMI status in West-Azerbaijan and its relation with 12 variables. According to the results, obesity and overweight have significant relationship with development degree of each city, so considering the consistency of this issue with global transition, by developing economic situation of our

country in the future years, we will face more overweight and obesity and consequently non-communicable diseases associated with them. Therefore, the health policy makers should be aware of this province situation and pay attention to it for prevention and decreasing them.

Risk factors trend in West-Azerbaijan is consistent with the patterns that have been seen in other countries, as in developed countries first rich households and then the poor faced obesity and overweight. This presents an opportunity to intervene and prevent the onset of social inequalities that are likely to ensue by further economic development. The marked gender inequality in BMI needs further exploration. In rural areas, there is a serious need of planning for underweight girls. Given that almost 20 percent of children had abnormal BMI, so in the case of generalizing to the population, in fact, from 54700 first-grade students in this province in 2015 almost 10000 ones had abnormal BMI. This requires the attention of planners of health field for prevention of non-communicable and other diseases related with these risk factors.

Study strengths: -Using data of the Health Assessment Plan for the first time in West-Azerbaijan, so that this study can be performed every year because the Plan will be performed every year. Thus, the trend of BMI in this province and in all of Iran can be studied.

- Assessing the BMI and its relation to other factors for the first time in the province on both genders

Study weak points: Using ethnicity of each city instead of ethnicity of each child because of lack of data on the Plan.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We thank the Organization of Exceptional Education and Training of Iran as the trustee of the Health Assessment Plan and also the Assessment Office of West-Azerbaijan province for collecting and providing the needed data for the study.

This article derived from a Master of Science (MSc) thesis in Health Economics at Tehran University of Medical Sciences in 2015.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.348 Published by Vesnu Publications

Predicting marital adjustment based on psychological well-being and couples' happiness

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Original Article

Abstract

BACKGROUND: Marital adjustment is very important in family's mental health, and identification of effective factors is of great importance. Therefore, the purpose of this study was to predict marital adjustment based on the psychological well-being and happiness of couples.

METHODS: This was a correlational study. The statistical population of the study consisted of all second-grade married teachers in the city of Bukan, Iran, whose total number was 200. In this study, based on Krejcie and Morgan's table, the total sample size was 114. They were selected using available sampling method. For collecting data, Dyadic Adjustment Scale (DAS), General Health Questionnaire (GHQ), and Oxford Happiness Questionnaire (OHQ) were used. For data analysis, Pearson correlation coefficient and regression analysis were used and data were analyzed using SPSS software.

RESULTS: There was a positive and significant relationship between the components of psychological well-being and marital adjustment of couples; the results of regression analysis indicated that the variables of psychological health and couple's happiness had a significant role in explaining marital adjustment of couples. Beta coefficients of components of life satisfaction and marital adjustment ($P < 0.001$, $\beta = 0.27$) and well-being ($P < 0.001$, $\beta = 0.21$) were significant. Moreover, there was a significant negative relationship between happiness components with marital adjustment and the highest beta coefficients related to anxiety ($P < 0.001$, $\beta = -0.28$) and depression ($P < 0.001$, $\beta = -0.19$).

CONCLUSION: The mental health and happiness of couples have a significant role in explaining marital adjustment, which is effective in creating couples' satisfaction and consistency.

KEYWORDS: Family Conflict, Psychology Health, Happiness

Date of submission: 14 Sep. 2017, ***Date of acceptance:*** 20 Dec. 2017

Citation: Ghaderdost H, Kord B. **Predicting marital adjustment based on psychological well-being and couples' happiness.** Chron Dis J 2018; 6(4): 192-8.

Introduction

The family as the most basic community of the society is an institution that has many social roles, and as defined by the World Health Organization (WHO) as a primary social factor plays an important role in increasing the health and well-being of family members.[1] One of the areas of couple's adaptation in the family is successful and satisfactory marriage, which increases the level of stability and compatibility of couples. Undesirable relationships and conflicts among couples compromise the mental and physical health of couples.[2] If the couples have a favorable mental and social health, family members will enjoy better personal and social performance.[3] Zarei et al. showed that marital adjustment was very important in family's mental health, and satisfactory relationships among couples could be assessed through mutual interest, care, and emotional participation.[4] Several factors have an effect on marital adjustment,

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including factors such as socio-cultural, terrestrial, and individual characteristics. Research findings suggest that personality factors are an empirical predictor of marital adjustment.[5] In fact, marital satisfaction is a measure of the level of satisfaction of couples from each other and adaptation in common life, which has a beneficial effect on marital functions.

According to WHO, mental health is a form of well-being and recovery in which a person can fulfill his potential, live up to the stress of life, and have a constructive role in the community.[6] The main goal of psychological health is prevention of the disease and mental disorders. Anyone who can cope with his issues, himself, and others does not compromise himself, and does not cripple himself by inevitable conflicts. It can be said that he has the necessary psychological health. Hence, psychological health is considered to be the proper adaptation of the individual to himself and to the social environment that enables the individual to live without unnecessary pressure and conflicts and adapt to his social environment. Studies showed that marital satisfaction was predictable by mental health level; also, depression and anxiety had a significant negative correlation with marital satisfaction.[7,8] In this regard, Maltby et al. research findings showed that marital dissatisfaction was correlated with poor health status, depression symptoms, personality problems, inappropriate behaviors, and poor social status.[9] Therefore, lack of psychological health leads to social incompatibility, stress, and disability. These factors, in turn, contribute to the development of physical and psychological disorders, and also contribute to the induction of anxiety and reduction of the quality of life.

People who have high happiness, are calm, feel more secure, make decisions more comfortably, and have more participation and healthy, energetic and ultimately satisfying lives. Such people have a positive and more adaptive way of dealing with their life problems and have a lower level of stress and a stronger immune system.[10] The results of studies have shown the effect of happiness on improving sexual satisfaction,[11] marital satisfactions, and reduction of addiction tendency.[12] Happiness is a kind of positive and optimistic assessment of living conditions.[13] Research on happiness shows that people's thoughts and behaviors are often related to life satisfaction, as well as positive and negative affections.[14,15] People who are happy, adaptive, and helpful have a clear-cut view of things, pray, work directly to solve their problems, and seek help from others in the right time.[16] On the other hand, unscrupulous people think pessimistically, fall in imagination, blame others, and avoid work to solve problems.[17] In this regard, researches showed that happiness increased directly with health promotion, appetite, sleep, memory, family relationships, friendship, family status, optimism, and also with forgiving and increasing the quality of married couple relationships,[18,19] and they predicted happiness and satisfaction with marital life positively and significantly.[20] Findings of Korner et al. have shown that positive emotions and positive perceptions play a role in life satisfaction.[21] Happiness, therefore, as a self-discipline and appropriate mental perception of common life, greatly improves couples' adjustment and emotional management.[22] It also results in a sense of satisfaction and merit in them, as well as consequences such as psychological well-being. On the other hand, using the results of this study, it is possible to plan and execute various activities in the family, thereby increasing the efficiency of couple's life. The present study is aimed at investigating family policy makers in order to improve marital satisfaction and adaptation. Therefore, considering the important role of psychological health and happiness in promoting the health of people in society,

especially couples, this article aims to identify and determine the prediction of marital adjustment based on psychological well-being and happiness in order to answer the following hypotheses:

1- There is a meaningful relationship between the components of mental health and marital adjustment of couples.

2- There is a significant relationship between the components of happiness and marital adjustment of couples.

3- The share of prediction of components of psychological health and happiness in marital adjustment of couples is significant.

Materials and Methods

This was a correlational study. The statistical population of the study consisted of married teachers of secondary schools of Bukan County, Iran, whose total number was 200. Based on Morgan's table, the total sample size was 114, which were selected using the available sampling method of estimated volume. The couples attended the research with satisfaction. The response time for the set of questionnaires was 30 minutes. Regarding the variables, psychological health and happiness were pre-defined variables and marital adjustment was the criterion variable. The following tools were used to collect data:

Dyadic Adjustment Scale (DAS): DAS was established by Spanier in 1976 to measure the compatibility between couples living together. Factor analysis shows that this scale measures four dimensions: marital satisfaction, marital solidarity, marital consent, and affection. Spanier estimated the validity of this scale to be in a total of 96.0, indicating a significant internal consistency.[23] In order to determine the reliability of the questionnaire, a re-test method was performed with a one-week interval on a sample of 15 couples. The correlation coefficient between two scores during two runs was 0.81. In this research, the amount of alpha coefficient of adjustment questionnaire was 0.89, which indicated that this questionnaire was appropriate.

General Health Questionnaire (GHQ): GHQ is used to assess mental health. The questionnaire has 28 items which is developed by Goldberg and Hillier and consists of four subsets: sexual syndrome, anxiety, impaired functioning and social function, and depression.[24] The GHQ is based on the self-report method, in which the responses provided to each test item are in a 4-point Likert scale indicating the degree of discomfort from (no) to (very). The score assigned to each of the materials varies from 0 to 3; so, the total score in this questionnaire changes from 0 to 84. The coefficient of validity of this questionnaire was obtained as 0.70, 0.93, and 0.90, using three methods of test/retest, split half, and Cronbach's alpha tone, respectively. In order to evaluate the validity of this questionnaire, two methods of concurrent validity and correlation of subsequently with total score were used, which concurrent validity was obtained 0.55, and in the subclass correlation method a total score of 0.72 to 0.87 was calculated.[25] In this research, the alpha coefficient of the questionnaire was calculated to be 0.86, which indicated that the reliability of this questionnaire was appropriate.

Oxford Happiness Inventory (OHI): OHI was created by Argyle et al.[26] The method of constructing it was that the researchers reversed the Beck Depression Inventory (BDI) statements by consulting with Aaron T. Beck, and obtained 21 statements. Subsequently, 11 statements were added to these 21 ones and finally, the OHI with 29 items was finalized. In the following years, the questionnaire was modified and released as Oxford Happiness Questionnaire (OHQ). The results of factor analysis revealed five factors of life satisfaction, self-esteem, subject well-being, satisfaction, and positive mood.

Scoring: In this questionnaire, each item contains 4 terms: the first term has the score of

zero, the second has the score 1, the third has the score 2, and the fourth has the score of 3. The score a person earns is a score between 0 and 87. The higher the score, the higher the happiness, and vice versa.

Validity and reliability of OHQ: To verify the validity and reliability of OHQ, a sample of 142 Iranian men and 227 women aged 18 to 53 years with an average age of 25 years completed OHI, Eysenck Personality Inventory (EPI), and BDI. An examination of the inner consistency of the OHI showed that all of the 29 propositions of this list had a high correlation with the overall score. Cronbach's alpha for the whole index was 0.91. Pearson correlation between the OHI with the BDI and the sub-scales of extroversion and neuroticism were -0.48, -0.45, and -0.36, respectively, confirming the convergent and divergent validity of the OHI. The validity of this scale has been confirmed in various studies, including Alipoor and Noorbala study with an alpha coefficient of 0.90.[27] In this research, the alpha coefficient of the questionnaire was calculated to be 0.88, indicating the suitability of the questionnaire.

Results

Of 114 participants, 58 were men and 56 were women, and all were teaching at secondary school. The mean age of the subjects was 38.6 [standard deviation (SD) = 0.22]. In order to study the hypothesis of coherence in the correlation matrix of pre-defined variables, there was no simple and multiple linear relationship among predictive variables.[28] In other words, the correlation was not higher than 0.75.

Therefore, none of the variables were deleted from the final analysis. Data were analyzed using Pearson correlation coefficient and multiple regression analysis by SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

As shown in the correlation matrix above (Table 1), the data below the diameter of the matrix shows the correlation between the dimensions of predictive variables with the criterion variable of the research. The common dispersion values (correlations) between variables are all meaningful. The highest correlation coefficient was found between the life satisfaction and marital adjustment (0.73) as well as the relationship between depression and marital adjustment (-0.46) in mental health.

Table 1. Descriptive indexes and correlation matrix of psychological health, happiness, and variance of marital adjustment (n = 114)

Varibles	Components	1	2	3	4	5	6	7	8	9	10	Mean ± SD
Happiness	Life satisfaction	1										2.86 ± 3.31
	Self-esteem	0.42*	1									11.88 ± 3.41
	Well-being	0.51*	0.43*	1								12.32 ± 3.47
	Satisfaction	0.60*	0.44*	0.51*	1							11.05± 2.64
	Positive mood	0.43*	0.38*	0.42*	0.47*	1						11.80 ± 3.70
Psychological health	Physical symptoms	0.36*	0.25*	0.31*	0.33*	0.21*	1					13.11 ± 6.05
	Anxiety	-0.35*	-0.25*	-0.45*	-0.48*	-0.49*	0.25*	1				15.85 ± 2.41
	Disorder in social functions	0.32*	0.25*	0.35*	0.41*	0.22*	0.31*	0.24*	1			13.25± 5.43
	Depressive symptoms	-0.41*	-0.46*	-0.38*	-0.27*	-0.44*	-0.21*	-0.45*	0.31*	1		14.04± 3.46
Marital adjustment		0.48*	0.41*	0.34*	0.39*	0.36*	0.34*	-0.28*	0.39*	-0.45*	1	106.27± 14.20

* P < 0.01
SD: Standard deviation

Table 2. Multiple regression analysis based on mental health components

Components	b	SE	Beta	T	P
Constant	109.48	7.66	-	14.28	< 0.001
Physical symptoms	0.86	0.19	0.15	2.14	0.050
Anxiety	-0.91	0.47	-0.28	-3.48	< 0.001
Disorder in social functions	0.88	0.21	0.30	3.66	< 0.001
Depressive symptoms	-0.77	0.32	-0.19	-2.62	0.020

SE: Standard Error

In addition, the table above shows that all dimensions of the predictor and criterion variables are mutually correlated and have a significant correlation. Of course, there was a meaningful and negative relationship between anxiety and marital adjustment. Regression analysis was used to investigate the impact and share of each of the components.

The study of the predictive part of mental health components in marital adjustment was used for analyzing regression analysis.

The results of table 2 showed that all beta coefficients of mental health components, including disorders in social functions, anxiety, depressive symptoms, and physical symptoms, were 0.30, -0.28, -0.19, and 0.15, respectively, which were significant (P ≤ 0.010). Therefore, all components of mental health played a role in predicting marital adjustment of couples (P ≤ 0.010). It is worth noting that the relationship of anxiety and depression with marital adjustment was negative and significant.

Similarly, table 3 shows that beta coefficients of life satisfaction and well-being are 0.27 and 0.21, respectively, which are significant (P ≤ 0.010). Therefore, among the five components of inner happiness, only the components of life satisfaction and social welfare have a significant role in couple's adaptation.

Discussion

The purpose of this study was to predict marital adjustment based on the psychological well-being and happiness of couples. The results show that there is a positive and meaningful relationship between the dimensions of psychological health and marital adjustment of couples. The results of this hypothesis are consistent with the findings of Manwell et al.,[3] Zarei et al.,[4] and Myers.[29] In explaining the findings of this hypothesis, it should be acknowledged that the psychological health of couples is predictive of marital adjustment; the more they get mental health, the more marital adjustment increases. As much as healthy physical symptoms and desirable social function are higher in individuals, it can be said that couples have more marital adjustment; and in the case that marital depression is lower, marital adjustment is more. In this regard, Shahi et al. have shown that marital satisfaction is predicted by the level of mental health of the individual, and depression and anxiety are inversely and significantly related to marital satisfaction.[7] Beirami showed that marital dissatisfaction was correlated with poor health status, depression symptoms, personality problems, inappropriate behaviors, and poor social status,[30] which is consistent with Heiman et al.[11] study.

Table 3. Multiple regression analysis based on happiness components

Components	b	SE	Beta	T	P
Constant	60.50	0.37	-	9.45	< 0.001
Life satisfaction	1.15	0.37	0.27	3.19	0.002
Self-esteem	0.36	0.63	0.10	1.07	0.440
Well-being	1.02	0.35	0.21	3.07	0.002
Satisfaction	0.79	0.50	0.15	1.58	0.015
Positive mood	0.55	0.34	0.14	1.61	0.080

In explaining the findings of this hypothesis, it must be said that the happiness of couples is an important factor in their marital adjustment. That is, the more couples enjoy happiness, the higher their satisfaction and compatibility with marriage will be. On the other hand, the existence of satisfaction with life, well-being, satisfaction, and positive mood in couple's life can be effective on their compatibility in life, and consequently their quality of life increases. Thus, people with positive emotions, such as happiness in their lives, are painted. A person, who is happier, feels more relaxed and secure, makes decisions more comfortably, works more, has more favorable participation, and consequently has a healthy, energetic, and more satisfying life. Research findings suggest that positive perceptions and rejoicing have a positive impact on self-esteem, sense of competence, and psychological well-being and adaptation.[21,22] Another study by Bridges et al. revealed that unsuspecting people usually had pessimistic thoughts, fell into imagination, experienced more rumination, blamed themselves and others, and avoided working to solve problems.[17]

The findings of this study are descriptive. Therefore, it cannot be said that the variables of this study are the only variables that are involved in the prediction of marital adjustment of couples, and other factors that can influence its explanation should be considered. Moreover, the research is correlational; therefore, the inference of causal results should be taken with caution.

Accordingly, it is suggested that in future studies, this study should be studied in the form of experimental and interventional research and their findings should be compared with the results of this study. Since the sample group of the study is married couples working in a teacher's profession, caution should be taken in generalizing their results to non-employed couples or those working in other organizations; the other limitation of this study is related to the spatial scope of research (Bukan city). Therefore, generalization to couples working in other cities with different cultural characteristics should be carried out with caution; hence, research with a larger sample size and a wider geographical range is recommended.

Conclusion

In general, according to the findings of this study, the psychological health and happiness of couples have a significant contribution in explaining marital adjustment and are effective in creating couples' satisfaction and adjustment. Consequently, it is recommended that family managers and planners provide mechanisms that enable couples to train and improve their abilities and capacities in terms of satisfaction with life, well-being, and positive relationships and attitudes.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We would like to thank all the students who helped us complete this research. This article has been derived from a dissertation.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.350 Published by Vesnu Publications

Study of obesity-preventive food behaviors in women of Sanandaj County, Iran

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Original Article

Abstract

BACKGROUND: Obesity is one of the major health problems and eating disorders around the world that has adverse consequences such as behavior change, increasing urbanization, reducing physical inactivity, and inappropriate lifestyle. The present study aimed to determine preventive behavioral obesity in women of Sanandaj County, Iran, in 2015-2016.

METHODS: This was a cross-sectional study. The population included the women aged 18 to 64 years old in Sanandaj, Iran, of them 500 persons were selected by multistage cluster sampling. The method of the study was interviewing with the participants. The data were collected using a questionnaire including 13 questions regarding obesity-preventive eating behaviors. Scoring questionnaire was based on 1 and 0. Questions that were consistent with obesity-related nutritional behavior got a positive score (1) and questions that were against with obesity-related nutritional behavior did not receive any score (0). The collected data were analyzed using SPSS software.

RESULTS: The average score of obesity-preventive eating behaviors was 58.68 ± 17.38. Less than 39% of the subjects had good obesity-preventative food behaviors and more than 53% had moderate obesity-preventative food behaviors. There were statistically significant differences between obesity-preventative food behaviors and economic status (P = 0.040), age group (P = 0.001), and marital status (P = 0.006).

CONCLUSION: The findings of the study indicated that the most of the subjects did not have a good and healthy diet; therefore, it is necessary to hold training classes in order to change their behaviors in this regard.

KEYWORDS: Obesity, Body Mass Index, Feeding Behavior, Healthy Diet, Women

Date of submission: 15 Sep. 2017, ***Date of acceptance:*** 22 Dec. 2017

Citation: Vahabi A, Roshani D, Sayyad S, Salavati S, Hajisahne S. **Study of obesity-preventive food behaviors in women of Sanandaj County, Iran.** Chron Dis J 2018; 6(4): 199-204.

Introduction

Obesity is one of the major health problems and nutritional disorders around the world, which has adverse consequences on changes in behavior, urbanization, physical inactivity, and lifestyle.[1] This problem is on the rise and has affected all age groups; so that, obesity can be considered as the most widespread epidemic of the 21st century, which is growing rapidly.[2]

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Rapid changes in eating food patterns and trends toward consumption of high-calorie food, low value of nutrients, reduced physical activity, and increase in drug use among developing countries will make them more likely to face the epidemic of chronic diseases in the future years, including those associated with high-calorie intake.[3] It is anticipated that from 1990 to 2020, deaths from chronic diseases will increase by 77 percent, with most cases reported in developing countries.[4]

One of the factors that contributed to 21% of the world's breast cancer deaths was obesity.[5]

The World Health Organization (WHO) has identified obesity as a pandemic, and nearly two billion people aged 18 and more around the world were overweight and more than 600000 people were obese in 2014.[6] The overweight and obesity assessment criterion is Body Mass Index (BMI). For people who are considered obese, BMI is greater than or equal to 30 kg/m^2, and for those who are overweight, it is equal to 25-29.9 kg/m^2.[7] In Iran, like many developing countries, obesity and its problems have plagued many people.[8]

Azizi et al. conducted a study among women in district 13 of Tehran City, Iran. They reported that only three years later, the prevalence of obesity in them increased by 6.0%. In Canadian women, after 14 years, the rate was 6.7%, for Spanish women, after 9 years, it was 9.9%, and for New Zealand women, after 9 years, it increased by 9.4%.[9] A study conducted in Iran indicates that the prevalence of overweight and obesity is increasing at an alarming rate, with the prevalence of obesity and overweight in Iranian adults being 23% and 40%, respectively.[10] The study of Rezazadeh et al. has shown that BMI and waist circumference have a reverse relationship with the healthy diet pattern and a direct and positive relationship with the unhealthy food pattern.[11] A study by Azerbaijan et al. revealed that the prevalence of obesity and overweight was directly related to eating food while watching TV, drinking drinks, eating chips and prepared foods, and sleeping.[12] Another study by Mirmiran et al. on the women over 16 years old has reported low dairy consumption as a cause of high BMI.[13] Azizi et al. have also reported the use of simple sweets and sugars as a factor in the prevalence of obesity in women compared to men.[14]

The prevalence of obesity in Iran seems to be rising, and people's lifestyles and dietary habits are among the most influential factors in this problem. On the other hand, literature review showed that a study in this regard has not been carried out on women in Sanandaj City, Iran. Therefore, this study was carried out to determine preventive behavioral obesity and its related factors in women of Sanandaj County in 2015-2016.

Materials and Methods

This was a cross-sectional study. The population was the women aged 18-64 years old in Sanandaj County. Using the standard deviation (SD) of the similar study,[15] with a confidence interval (CI) of 95% and an accuracy of 0.04, the sample size was obtained 500. The subjects were collected based on the population of Sanandaj City and Sanandaj villages by a multistage cluster sampling. The data collection method was interviewing with the subjects. The data gathering tool was a questionnaire used by Mataji Amirrood et al.[2] A questionnaire including 13 items was designed to examine obesity-preventing food behaviors. Scoring for this questionnaire would be 1 and 0. Responses consistent with obesity-controlling food behavior would get score 1, and opposite responses to obesity-controlling food behaviors would get a score of 0. The overall score of each person would vary from 0 to 13. Earning a higher score indicates that such a person has a good food behavior. The inclusion criteria were the women between 18 to 64 years old, resident in Sanandaj city, and cooking food for the family; and exclusion criteria were lack of entry criteria and reluctance to collaborate on the study. The collected data were analyzed using SPSS software (version 20, IBM Corporation, Armonk, NY, USA). For describing the data, frequency, mean, and SD, and for data analysis, correlation coefficients and analysis of variance (ANOVA) were used.

Results

Of 500 questionnaires, 455 cases (91%) had the characteristics of entering the study and were analyzed.

Table 1. Mean and standard deviation (SD) of obesity-preventative food behaviors in women of Sanandaj County in terms of occupation and place of residence

Variables		Mean ± SD	F	P
Place of residence	Sanandaj city	58.38 ± 17.72	1.850	0.170
	Sanandaj villages	59.63 ± 16.29		
Job	Employee	58.86 ± 18.26	1.350	0.250
	Housewife	58.62 ± 17.10		

SD: Standard deviation

The mean age of the subjects was 33.87 ± 10.75 years. Their minimum and maximum age was 18 and 64, respectively. 346 people (76%) lived in Sanandaj City and the rest lived in the villages of Sanandaj. 100 subjects (22.0%) were unmarried, 328 were married (72.1%), 12 (2.6%) were widows, and 15 (3.3%) were divorced. In terms of educational level, 33 cases (7.2%) were illiterate, 60 (13.2%) had elementary, 64 (14.1%) had secondary, 130 (28.6%) had high school, and 168 cases (36.9%) had academic education. In terms of economic situation, 190 ones (41.8%) of them were weak, 191 (42.0%) were moderate, and 74 (16.2%) were good. 40 (8.8%) subjects had weak obesity-controlling food behaviors, 241 (53.0%) had moderate obesity-controlling food behaviors, and 174 (38.2%) had good obesity-controlling food behaviors. Mean score of obesity-preventative food behaviors in women was 58.68 ± 17.38 out of 100, and it was 7.63 ± 2.26 out of a total score of 13. The results of the study showed that 59.8% of the participants had obesity-preventing dietary behaviors and 40.2% had inappropriate behaviors that could lead to obesity. In table 1, mean and SD of job and place of residence and their relation with obesity-preventative food behaviors in the women of Sanandaj County is showed.

The results of this table indicated that mean and SD of employed women and the residents of Sanandaj City were higher than the others, but there were not any statistically significant differences between these variables and obesity-preventative food behaviors (P > 0.050).

In table 2, mean and SD of level of education, economic status of the family, and age and their relationship with obesity-preventative food behaviors in the women of Sanandaj County is showed.

Table 2. Mean and standard deviation (SD) of obesity-preventative food behaviors in women of Sanandaj County in terms of level of education, marital status, economic status of the family, and age

Variables		Mean ± SD	F	P
Level of education	Illiterate	60.37 ± 14.02	1.340	0.250
	Elementary	54.10 ± 16.15		
	Secondary school	58.53 ± 17.95		
	High school	60.06 ± 16.48		
	Academic	58.97 ± 18.72		
Economic status	Weak	57.25 ± 17.02	3.090	0.040
	Moderate	58.40 ± 17.13		
	Good	63.10 ± 18.45		
Age group	18-22	50.66 ± 17.98	4.990	0.001
	23-27	60.17 ± 16.45		
	28-32	61.99 ± 18.09		
	33-37	58.90 ± 15.23		
	≥ 38	59.44 ± 17.22		
Marital status	Unmarried	53.38 ± 18.09	4.230	0.006
	Married	60.37 ± 17.15		
	Divorced	57.95 ± 15.35		
	Widow	57.69 ± 11.60		

SD: Standard deviation

There were statistically significant differences between obesity-preventative food behaviors and economic status (P = 0.040), age group (P = 0.001), and marital status (P = 0.006). There was no statistically significant difference between obesity-preventative food behaviors and level of education (P > 0.050). Tukey's statistical test showed that there was a significant statistical difference between married and unmarried women (P = 0.002). In age group, the significant statistical difference was showed between 18-22 years old women and all age groups examined (P < 0.001). Tukey's statistical test also showed that there was a significant statistical difference between families with weak economic situation and those with good economic situation (P = 0.040).

Discussion

This study, which studies the obesity-preventive food behaviors in the women of Sanandaj County, indicated that more than 50% of the subjects had moderate obesity-preventive food behaviors and more than 38% had good and adequate obesity-preventive food behaviors. This finding suggests that a small number of subjects have poor obesity-preventive food behaviors.

The findings of this study are consistent with the results of the study by Mataji Amirrood et al.[2] The difference between two studies was that in their study, fewer percent of the subjects had appropriate obesity-preventive food behaviors, but in the present study, the percentage of people who had better obesity-preventive food behaviors was higher. The score obtained from 13 questions of obesity-preventive food behaviors was similar to the findings of the study by Mataji Amirrood et al.[2]

The study by Evans et al. has shown that family support for women is a significant effective factor in their dietary habits.[16] Findings from the study by Vander Wal, who studied the role of family and peer support in relation to BMI and unhealthy weight control behaviors among adolescents, has shown that boys and girls who had problem with their parents and had low levels of support or frequent confrontations with school educators were more likely to take unhealthy weight control behaviors than other groups.[17] The findings of the present study showed that rural women in Sanandaj compared to urban women had more susceptible obesity-preventive food behaviors. However, no statistically significant difference was observed between them. The reasons for this difference can be due to the fact that urban women are less active and are more likely to use fast foods, while rural women may have a weaker economic situation and cannot afford high-quality foods, or there is less food available in the villages. Another study was conducted by Stanton et al. in a sample of rural youth to explore the relationships between primary social support sources around adolescents (family and friends) and dietary behaviors (fiber and fat intake), which showed that the expression of family and friends' support has been a significant predictor of fat and fiber consumption.[18]

The findings of the present study showed that married women had better healthy food behaviors than the others. This finding is consistent with the findings of Heiydari et al.[19] In explaining of this finding, it can be argued that married women have better family security and they have their husbands support, and this support will enable them to eat foods that have better nutritional value. This also helps them to control their weight, and it is less likely to become obese. It seems that married women have more experience in cooking, and this causes them to have better food behaviors. Other studies also emphasize the role and impact of parents' nutritional habits, especially mothers, on their children, reflecting the fact that parents in many cases have an important and crucial role for their children.[20-24]

Conclusion

The findings of this study indicate that women play an important role in the life of families and their social support, especially by family members and friends, can play an important role in the development of proper nutritional behaviors. Educational classes for families, especially for parents, are recommended at health centers in order to educate them about the important role of their families and relationships among their family members in institutionalizing appropriate obesity-preventive behaviors.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We would like to express our gratitude to all the respectable women who gave us their time to answer the questions. We also would like to thank Social Determinants of Health Research Center for collaborating on approval of this research project. The financial support of this research has been provided by Vice Chancellor for Research and Technology of Kurdistan University of Medical Sciences with ethics No. 1394/316.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.351 Published by Vesnu Publications

The effect of amniotic membrane on growth, proliferation, and survival of the myeloma cells and examination of genes related to proliferation (BCL2), implantation (CXCR4), and cell cycle stop (P21 and P27)

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Original Article

Abstract

BACKGROUND: The myeloma cell is not able to grow and proliferate out of bone marrow (BM) media, and in laboratory conditions its survival is low. We considered to use an environment that has the same conditions as body physiological conditions. In this study, the effect of the amniotic membrane (AM) on the growth and proliferation of myeloma cells were evaluated.

METHODS: This study was performed on plasma cells derived from BM aspiration (primary cells) in 3 patients with multiple myeloma (MM). Plasma cells of these patients were isolated by magnetic-activated cell sorting (MACS) technique and cultured in different environments of AM for two consecutive weeks, and then were examined by qualitative polymerase chain reaction (PCR) technique for expression of genes related to proliferation [B-cell lymphoma 2 (BCL2)], implantation [chemokine receptor type 4 (CXCR4)], and cell cycle stop (P21, P27).

RESULTS: Isolated plasma cells were cultured in 3 different groups for 2 weeks. The most cell proliferation was observed in the medium containing Roswell Park Memorial Institute (RPMI) medium from amniotic cultures and plasma cells [an environment without fetal bovine serum (FBS)]. All genes were expressed on day zero (on the day of isolation). On the day 4, proliferation genes (BCL2) and implantation genes (CXCR4) had an expression in the control group without FBS medium, but P21 and P27 genes had no expression.

CONCLUSION: The best environment for the growth and maintenance of plasma cells in vitro is the use of RPMI from the AM (without FBS) in which plasma cells can be kept alive for 10 days.

KEYWORDS: Amniotic Membrane, Multiple Myeloma, Cell Cycle

Date of submission: 15 Sep. 2017, ***Date of acceptance:*** 17 Dec. 2017

Citation: Moallemi M, Kaviani S, Abroun S, Bakhtiari M. **The effect of amniotic membrane on growth, proliferation, and survival of the myeloma cells and examination of genes related to proliferation (BCL2), implantation (CXCR4), and cell cycle stop (P21 and P27).** Chron Dis J 2018; 6(4): 205-13.

Introduction

Multiple myeloma (MM) is a type of plasma cell malignancy that accounts for about 10% of blood cancers. Patients with MM suffer from osteoporosis and severe bone pain. Other MM symptoms include the secretion of osteoclast activating factors (OAF) from malignant plasma cells, renal impairment due to increased calcium levels and Bence-Jones protein (BJP) excretion, anemia due to replacement of malignant cells in the bone marrow (BM) and consequently hematopoiesis impairment, and recurrent infections due to inefficient production of immunoglobulins (Igs).[1]

MM microenvironment consists of clonal plasma cells, extracellular matrix (ECM), proteins, and stromal cells of BM.[2]

Myeloma cells express chemokine receptor type 4 (CXCR4), which binds to stromal cell-derived factor 1 (SDF-1), leading to the localization of myeloma cells in BM. SDF-1 is

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expressed in stromal cells of BM, and by signaling through CXCR4, it causes the migration and implantation of hematopoietic cells. SDF-1 increases the Interleukin-6 (IL-6) and, as a result, increases the proliferation of the myeloma cells.[3]

One of the most effective cytokines in the growth of myeloma cells is IL-6, which by phosphorylation of the Janus Kinase-Signal Transducer and Activator of Transcription protein (JAK-STAT) and Mitogen Activated Protein Kinase (MAPK) pathways, causes the growth of myeloma cells and acts as autocrine. Other cytokines that affect myeloma cell growth include insulin-like growth factor 1 (IGF-1), tumor necrosis factor (TNF), IL-10, IL-15, IL-21R, IL-21, and interferon alfa (IFN-α).[4,5]

Myeloma cell growth is an angiogenesis-dependent process controlled by pro-angiogenic agents. One of these factors is vascular endothelial growth factor (VEGF) with a high binding affinity to VEGF receptor (VEGF-R).

For starting the process of angiogenesis, the VEGF and epidermal growth factor (EGF) are essential, and myeloma cells secrete VEGF directly.[6,7]

As mentioned, the myeloma cell needs proper environment and conditions to maintain its survival. The close interaction of myeloma cells with BM stromal cells, growth factors, and various signaling pathways plays a very important role in the development of myeloma. Given that outside of this environment and in vitro, the myeloma cell is unable to grow and reproduce and will not survive, and on the basis of many previous studies about MM done on the cell line, there is no strong data on the primary cell; so, we decided to design a suitable environment similar to physiological environment of the body for growth and reproduction of myeloma cell. As a result, the effect of amniotic membrane (AM) on growth, proliferation, and survival of myeloma cells has been investigated.

AM has been used for many years as clinical scaffolds as well as cellular scaffolds due to its many biological properties.

Finally, in order to investigate the proliferation, implantation, and apoptosis of myeloma cells, the gene expressions associated with these processes have been evaluated.

Materials and Methods

The AM sample was taken in sterile conditions from healthy women during cesarean section with patients' satisfaction in Bahman Hospital, Tehran, Iran. The AM sample was transferred to the laboratory under sterile conditions inside a 50ml Falcon tube containing sterile phosphate-buffered saline (PBS) buffer and antibiotic at 4 °C (with ice). After clearing the AM, the curtain was cut into small pieces using a razor blade and a pencil, then placed in Roswell Park Memorial Institute (RPMI) 1640 medium flasks and cultured for 10 days at 37 °C in an incubator. The RPMI medium was then collected and stored at -80 °C.

BM aspiration samples of patients with MM, referring to the hematology department of the Army and Imam Khomeini Hospitals, Tehran City, based on the patients' satisfaction and permission of the Medical Ethics Committee, were collected to 6 cc in sterile vacuum tubes containing ethylenediaminetetraacetic acid (EDTA) as an anticoagulant and transferred to a university lab in an ice bag.

All of these patients were suspected as cases of MM. Therefore, to confirm the presence of myeloma cells, the results of flow cytometry analysis and aspiration smear were revised.

The mononuclear cells (MNCs) of the BM were separated by ficoll based on the difference in density with other blood cells.

BM aspiration specimens were diluted (1:7) in sterile PBS. Then, the diluted sample was slowly transferred into the ficoll (the same volume of the sample), so that it was not mixed with the ficoll. In the next step, the Falcon tube containing the blood and ficoll was

centrifuged for 35 minutes at 445 rpm at 20 °C without brake and acceleration. After the four-layer centrifugation in the Falcon tube consisting of 1) plasma, 2) MNCs, 3) ficoll, and 4) red blood cells (RBCs) and neutrophils, we gently separated the MNCs and accurately transferred them to a 50ml conical Falcon tube.

The cells were washed with 40 ml of PBS buffer, completely mixed, and then centrifuged at 3000 rpm for 10 minutes at 20 °C. Then, we discarded the supernatant precisely.

To remove the platelets, we remixed the cells in 50 ml buffer, and after centrifugation at about 200 g for 10-15 minutes at 20 °C, carefully removed the supernatant (this step increases the cell's purity).

We mixed the cell pellet for later use in a proper volume of buffer.

Plasma cell isolation with Syndecan-1 (CD138) index using magnetic-activated cell sorting (MACS) technique: At this stage, the rapid operation and keeping the cells cool prevented non-specific labeling of the cells.

At first, 8 µl of CD138 microbial antibody was added to the pellet in dark and mixed, and the falcon tube containing the sample was completely covered with foil. The specimen was placed at 2-4 °C for 15 minutes. Then, the cells were washed with sterile PBS buffer (1-2 ml) and centrifuged for 10 minutes at 20 °C with 300 g. Supernatant was discarded precisely. At the next step, we passed the cell pellet from the LS column.

Plasma cell culture in different environments from AM: 1. The first group, which was the control group, contained RPMI, 10% fetal bovine serum (FBS), and plasma cells.

2. The second group contained RPMI derived from AM cultures, 10% FBS, and plasma cells.

3. The third group contained RPMI derived from AM cultures and plasma cells.

Cell count using Neubauer chamber slide: Under sterile conditions by slow pipetting, 10 µl of the suspension was removed from the medium and the same volume of trypan blue 0.4% solution in isotonic buffer with PH = 7 was added. So, the cells were diluted 2 times. Then, both sides of the Neubauer slide were filled with it, and we waited a few moments to settle down the cells and then studied it with a light microscope at 20 magnification.

Preparation of cellular deposition of the isolated plasma cells for extraction of ribonucleic acid (RNA): Some amount of the sample was poured into 1.5ml microtubes and centrifuged at 3000 g for 10 minutes at 20 °C.

RNA extraction: 1 ml of RNX-Plus was added to the suspended or sediment cells, the cells were transferred to a 1.5ml microtube, and vortexed for 1 minute; after the vortex, the mixture was placed at room temperature for 5 minutes.

The homogenized solution was transferred to a 1.5ml microtube and 200 ml chloroform was added to each ml of RNX-Plus; tubes were recapped firmly and mixed vigorously with hand or vortexed for 15 seconds, then incubated for 5 minutes at 4 °C. It was then centrifuged for 20 minutes at 4 °C at 12000 g. The three layers formed after centrifugation were the upper aqueous or blue phase containing RNA, the intermediate layer containing deoxyribonucleic acid (DNA), and the underlying layer or the organic phase containing proteins.

Then, the RNA-containing aqueous phase was transferred to a 1.5ml RNase-free microtube by means of RNase-free micropipette tips such precisely that there was no contact with the intermediate layer. The same as the volume of the aqueous or upper phase, 100% isopropanol was added to the microtubes, then gently mixed and placed overnight at -80 °C.

Samples were taken out of the freezer and then centrifuged at 12000 rpm for 20 minutes at 4 °C.

To completely remove chloroform, RNA extract was washed with 70% ethanol. In order to wash RNA, 1 ml of 70% ethanol per each ml

of RNX-Plus was added to each microtube, and the contents of the tubes were well mixed. Then, microtubes were centrifuged for 20 minutes at 4 °C with 12000 g, and supernatant solution was excluded.

RNA should not be completely dried because its solubility is reduced. For partial drying, the microtube tip was opened for a few minutes and before complete evaporation of ethanol, RNA was dissolved in 20 µl of RNase-free distilled water. Then, the microtube was incubated for 10 minutes at 55 to 60 °C.

Quantitative evaluation of the extracted RNA: Optical absorption of RNA samples was read by a biophotometer at wavelengths of 280 nm/260 nm and 260 nm/230 nm.

To read the concentration and absorption of the sample, we dissolved 1 µl of the sample in 49 µl of RNase-free water and multiplied the obtained concentration in the dilution factor (50). So, we would find out 1 µl of the dissolved RNA had how many micrograms of RNA. To determine the purity of RNA, the optical absorption in 280 nm/260 nm should be more than 1.8. If the light absorption of 280 nm/260 nm is less than 1.8, it indicates the RNA contamination with the protein, and it should be re-purified.

The optical absorption of RNA samples at a wavelength of 280 nm/260 nm was between 1.80 to 1.95, indicating the high purity of the RNA samples.

RNA was stored at -80 °C. If the RNA is precipitated in ethanol, it will not lose its integrity for a long time at -20 °C.

Synthesis of complementary DNA (cDNA): Using the cDNA kit (purchased from Yekta Tajhiz Azma Co., Tehran, Iran), the cDNA was built from RNA according to the manufacturer's kit.

To say briefly, at first, 1 µl of random hexamer was added to an RNA-containing solution, and the microtube was incubated for 5 minutes at 70 °C, the buffer mixture was prepared according to protocol:

4 µl = first standard buffer

1 µl = deoxynucleoside triphosphate (dNTP)

1 µl = moloney urine leukemia virus (M-MLV)

We poured the buffer mixture into each tube and filled the volume up to 20 µl. If the volume does not reach 20 µl, it should be filled with distilled or sterilized water to 20 µl. Then the microtubes were spinned shortly and incubated for one hour at 42 °C. The cDNA was maintained at -20 °C.

Polymerase chain reaction (PCR)

All the reagents and solutions used in PCR were stored at -20 °C in freezer. To carry out the PCR, the reagents and solutions were removed from the freezer and placed on the ice. After defrosting of the reagents, Master Mix was prepared according to the number of the samples.

The PCR solution contained 10 µl ampliqon Master Mix, 0.5 µl primer, 1 µl cDNA, and 8.5 µl distilled water (Table 1).

Table 1. Specifications for utilized primers

Name	Sequence	Products length
CDKN1A-F(P21)	CCA GCA TGA CAG ATT TCT ACC	150
CDKN1A-R(P21)	AGA CAC ACA AAC TGA GAC TAA GG	150
H CXCR4(F) Both variants	CGC CAC CAA CAG TCA GAG	176
H CXCR4(R) Both variants	AAC ACA ACC ACC CAC AAG TC	176
H-P27-F	CA ACC GAC GAT TCT TCT AC	204
H-P27-R	TGT ATA TCT TCC TTG CTT CAT C	204
H-BCL2-F	CAGGATAACGGAGGCTGGGATG	70
H-BCL2-R	AGAAATCAAACAGAGGCCGCA	70
HPRT1-F	CCT GGC GTC GTG ATT AGT G	125
HPRT1-R	TCA GTC CTG TCC ATA ATT AGT CC	125

Electrophoresis of PCR samples on an agarose gel: To prepare 30 ml of agarose solution, we added 0.6 g of agarose powder to 30 ml of Tris/Borate/EDTA (TBE) buffer at a concentration of 1X in a 100 ml Erlenmeyer flask, allowing it to be produced. Then, we boiled the suspension in the microwave until it was cleared and all agarose particles were solved in.

Then we placed the gel tray in a flat area and placed the comb on the gel tray. When the molten agarose temperature dropped slightly and there was no vapor, 2 µl of the green viewer dye was added to the agarose solution and dissolved.

We poured the agarose solution in the gel tray and carefully removed the gel comb after solidifying, and placed it in the electrophoresis tank containing TBE buffer at a concentration of 1X, so that the surface of the gel was completely covered by buffer.

Then, we added 10 µl of each PCR product in wells. A well is assigned as the DNA molecular weight index, which determines the size of the PCR product.

The Mini Run Gel Electrophoresis System has two potential differences between 50 V and 100 V. The device was set to 50 V. Due to the negative charge of DNA and thus moving toward the positive pole in the electric field, the gel was placed in the tank in an order that the wells were placed on the negative pole. As the green viewer dye reached the end of the gel, we turned off the device and placed the gel on the digital gel documentation device and took a photo after adjusting it (Ethic code: IR.TMU.REC.1394.65).

Results

After separating plasma cells (with CD138 index) by MACS technique, a flow cytometric technique was used to determine the purity of the cells. The results are as follows (Figures 1 and 2):

Flow cytometric evaluation results of plasma cells after isolation

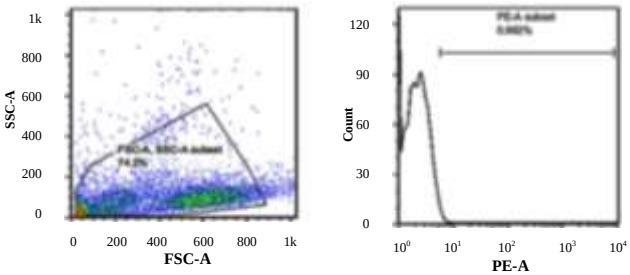

Figure 1. Flow cytometric evaluation results after the isolation stage (first patient control group)

The results of cell culture in the AM environment and the effect of AM on growth and maintenance of myeloma cells

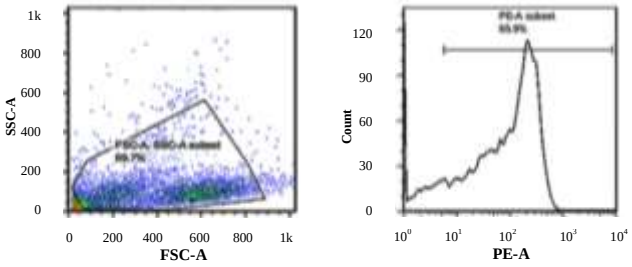

Figure 2. Flow cytometric evaluation results after the isolation stage (first patient test group)

After isolating the plasma cells using the MACS technique and verifying it with flow cytometry, the myeloma cells were cultured in an AM containing medium in 3 different groups for 2 weeks. By trypan blue staining, the number of cells was counted per well every other day and their growth curves were plotted.

The first group or control group contained RPMI, 10% FBS, and plasma cells. The second group contained RPMI product of AM culture, 10% FBS, and plasma cells. And the third group contained RPMI product of AM culture and plasma cells.

The results showed that the AM medium without FBS (containing RPMI derived from AM culture and plasma cells) was more effective on the growth, survival, and proliferation of myeloma cells, and they survived for 10 days. These results were

almost the same in all 3 patients (Figure 3).

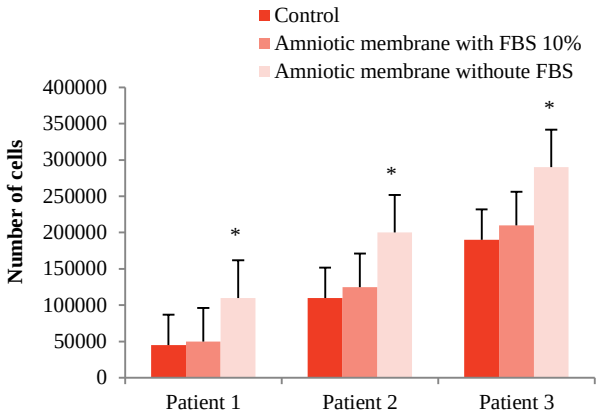

Figure 3. Plasma cell culture results of 3 different patients in different amniotic membrane (AM) environments

Results of gene expression in plasma cells of individuals with MM: In order to examine the expression of genes associated with proliferation [B-cell lymphoma 2 (BCL2)], implantation (CXCR4), and cell cycle control (P21 and P27) on day 0 (day of isolation) and on day 4 of cell culture, after preparation of cDNA from extracted RNA from the cells of the sample, PCR was performed using specific primers of each of the genes, the sequences of which were listed in the previous section. After electrophoresis of PCR products and gel photocopying with digital gel documentation, the results were as follows. The results of the expression of genes in the plasma cells of the 3 patients were similar (Figures 4-9).

Results of genes expressions in plasma cells of patients: On day zero (isolation day), BCL2, CXCR4, P21 and P27, as well as Hypoxanthine-guanine phosphoribosyltransferase (HPRT) genes had expression. On the day 4, control group cells expressed BCL2, CXCR4, and HPRT genes, but P21 and P27 genes had no expression.

Similarly, the cells in AM medium without FBS (containing RPMI produced from AM culture and plasma cells) expressed BCL2, CXCR4, and HPRT genes and did not express P21 and P27 genes.

Results of gene expression in first-line plasma cells

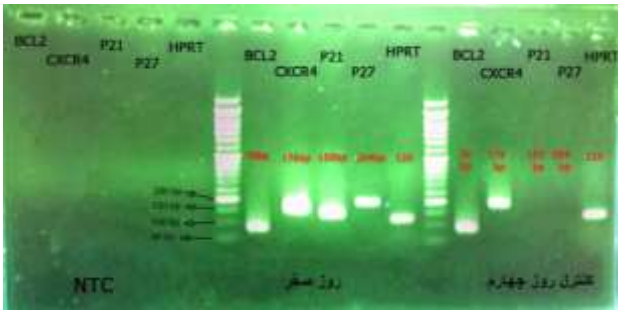

Figure 4. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of the patients with multiple myeloma (MM) (first patient) on the day 0 (the day of cell separation), and on the day 4 in control group

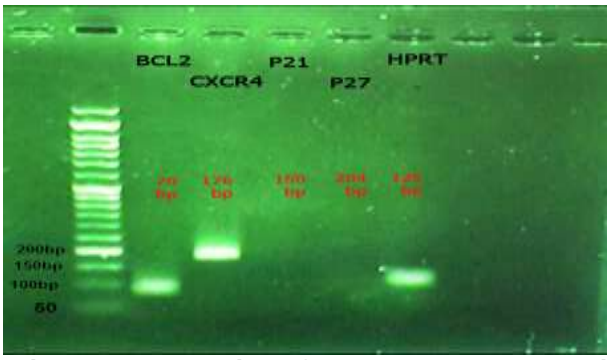

Figure 5. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of individuals with multiple myeloma (MM) (first patient) on fourth day of cell culture (FBS-free group)

Results of gene expression in the second patient

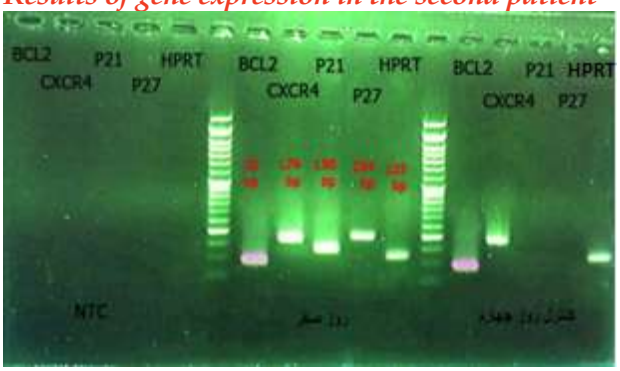

Figure 6. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of the patients with multiple myeloma (MM) (the second patient), on the day zero and on the fourth day of cell culture

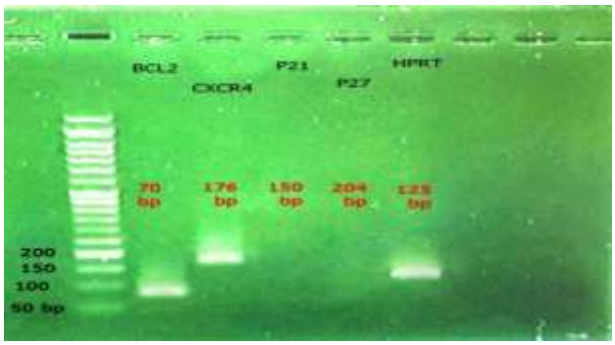

Figure 7. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of individuals with multiple myeloma (MM) (the second patient) on the fourth day of cell culture (FBS-free medium)

The results of gene expression in the plasma cells of third patient

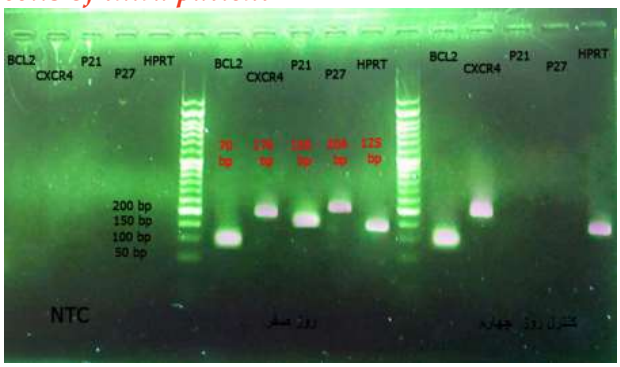

Figure 8. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of the patients with multiple myeloma (MM) (third patient) on the day 0 and fourth day of cell culture (control group)

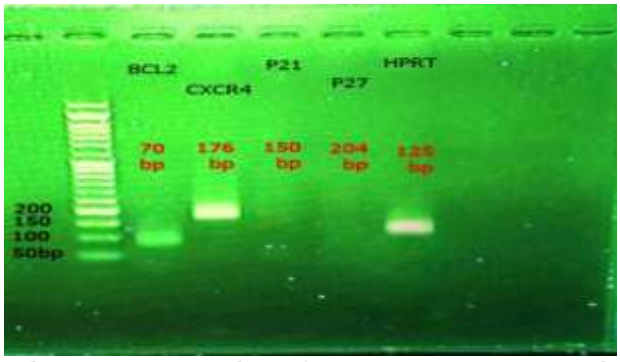

Figure 9. Expression of BCL2, CXCR4, P21 and P27, and HPRT genes in plasma cells of patients with multiple myeloma (MM) (third patient) on the fourth day of cell culture (FBS-free medium)

Discussion

MM is a malignancy associated with plasma cells. It is believed that this disorder is caused by genetic damages such as chromosomal translocations. In addition to genetic changes, the microenvironment of the BM plays a role in the pathophysiology and malignant growth of myeloma cells. The result of the interaction between the BM and the myeloma cells is the expression of factors that indirectly increase the growth of myeloma cells by stimulating vascularisation or acting directly as growth factors for the malignant cell.[8]

The interaction of myeloma cells with BM stromal cells causes adhesion, drug resistance, and activation of signal transmission pathways, which lead to progression of cell cycle development and protection of cells against apoptosis.[9] The myeloma causes production and activation of osteoclasts, so eliminating bone regeneration. Otherwise, osteoclasts by means of intercellular direct interactions cause the myeloma cells' growth and survival.[10]

The most known growth factor of myeloma cell, IL-6, is thought to play a very important role in pathogenesis and malignant growth of myeloma cells.

Growth factors and cytokines such as IL-6, IGF-1, VEGF, TNF-α, transforming growth factor beta (TGF-β), SDF-1, fibroblast growth factor (FGF), and IL-21 are considered as a part of the pathogenesis of MM which promote survival, growth, and migration of the myeloma cells as well as the vascularization in microenvironments of the BM.[11]

Considering myeloma cell properties and the role of the microenvironments of BM in survival of the myeloma cells, due to the presence of growth factors and signaling pathways, it is suggested that in vitro growth and proliferation of myeloma cells need a suitable environment similar to body physiologic conditions, so that the myeloma cells can survive long outside the body in

order to conduct more research on primary cells and obtain more beneficial results in treating this disease.

AM has been used in cellular scaffolds for many years due to its various biological properties and also in clinical studies and specifications. AM can also be used in cell therapy, because it has the characteristics of pluripotent stem cells, the ability of differentiation and low immunogenicity, and production from the placenta, a post-partum discarded tissue. Epithelial and mesenchymal cells of AM contain a variety of regulatory mediators that promote cell growth, multiplication, differentiation, and epithelialization, and also inhibition of fibrosis, immune rejection, inflammation, and bacterial invasion.[12]

The specific structure and biological survival of the AM in addition to the AM matrix and its components, including growth factors, have made it an ideal scaffold in tissue engineering.[13,14] AM matrix contains many growth factors including EGF, keratinocyte growth factor (KGF), hepatocyte growth factor (HGF), FGF, platelet-derived growth factor (PDGF), VEGF-R3, TGF-β, and EGF. These growth factors create a natural treatment environment that accelerates treatment and also imitates stem cell niches in growth under laboratory conditions. AM secretion of VEGF and HGF leads to a good balance between TGF-1 and TGF-3 and prevents scar formation in the wound, and this property is done by tissue regeneration instead of promoting scars and fibrosis, and in this way, it can help in wounds treatment.[15]

Possibly, the presence of these growth factors in the AM can play an effective role in the proliferation of myeloma cells. In this study, the growth and proliferation of plasma cells isolated from BM aspiration of 3 patients with MM (using MACS technique) were studied for two consecutive weeks in 3 different groups of AM. Because of the presence of complement components and other invasive factors that affect cell growth, inactive FBS was used. The result of this study showed that the growth and proliferation of cells in the first week had an increasing process and the highest increase in the number of cells was observed in day 10 in the AM medium without FBS (containing RPMI produced from AM culture and plasma cells). In the second week, we saw a declining trend in the number of cells. In this study, we used the qualitative PCR method to show that plasma cells isolated from BM aspiration expressed reduction-related genes (BCL2) and implantation-related genes (CXCR4) on the fourth day of cell culture, and genes related to cell cycle control (P21 and P27) were not expressed; this was an indication of myeloma cell proliferation in the AM environment. Plasma cell culture was first launched in the 1970s with the aim of conducting research on MM disease. Plasma cell culture has since been carried out for various purposes, such as the assessment of plasma cell malignancies, autoimmune diseases, and human therapeutic antibody production.

Conclusion

In general, the results of this study are very valuable findings applicable in designing of a suitable environment similar to the physiologic of the body, provided for growth, proliferation, and survival of the myeloma cells, and also for further assessment.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

This research was sponsored by the Medical College of Tarbiat Modarres University, and was based on the master thesis in the field of laboratory hematology and blood bank.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.358 Published by Vesnu Publications

Parents' experience of pediatric cancer: A qualitative study

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Original Article

Abstract

BACKGROUND: Suffering from life-threatening diseases such as cancer, due to its impact on the patients and their next of kin causes myriads of changes in the structure and function of the family. The objective of this study was to clarify parents' experiences of childhood cancer.

METHODS: This qualitative study was conducted through purposive sampling method. Semi-structured interviews were conducted with 20 parents whose children were diagnosed with cancer in the oncology department of Besat Hospital in Sanandaj City, Iran. Interviews were transcribed and analyzed through Benner's thematic analysis.

RESULTS: During data analysis, 4 main themes emerged including destroyer and terminator of life, horror and hope, disturbance of normal life, and gaining valuable experience.

CONCLUSION: Parental roles, routine care of a child with cancer, and facing multiple treatments and childcare problems threatened parents' compliance with the condition of the disease or treatment, and thus, parents sought social support. Therefore, more attention should be paid to the parents' probable reaction and different life dimensions. To make healthcare more effective, providing necessary psychological, mental, and emotional support and increasing parental hope is necessary. Parents of a child with cancer should be assisted in preventing some healthcare problems and coping with their child's illness.

KEYWORDS: Cancer, Qualitative Research, Parents, Diagnosis

Date of submission: 17 Sep. 2017, *Date of acceptance:* 15 Dec. 2017

Citation: Moridi G, Valiee S, Fathi M, Nikbakht-Nasrabadi A, Khaledi S. **Parents' experience of pediatric cancer: A qualitative study.** Chron Dis J 2018; 6(4): 214-24.

Introduction

Cancer is one of the leading causes of death in the world; thus it is called the new epidemic of our time after heart disease.[1] Among childhood chronic diseases, cancer has become the most important because it is prevalent and has a major impact on the life of the child and the family.[2] Cancer is the third leading cause of death in Iran after heart disease, accidents, and other natural phenomena,[3] and the second leading cause of child death in Third World countries.[4] This disease accounts for about 4% of the deaths of children under the age of 5 years and 13% of children aged 5 to 15 years in the Iranian population.[5]

The development of life-threatening diseases such as cancer, due to their effects on the patient and his/her relatives, causes many changes in the structure and function of the family.[2] Today, the role of parents, especially mothers, is increasingly being addressed as a primary caregiver. Therefore, parents are faced with many complex problems due to changes in their parental role.[6] For example, long-term exposure to cancer treatment in childhood causes stress and has negative impact on the quality of life (QOL) of parents.[7] Cancer causes a disruption in the patient's life plan and that

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of every family member, and thus, challenges the entire family.[8] The role of family members as caregivers has a positive impact on their adaptation to illness,[9] and these caregivers play a central role in managing various aspects of the patient's care.[10]

When a child develops an illness, various factors in his or her family change. The daily activities of the family which were previously planned to meet the needs of the family change in order to meet the current needs of the child; therefore, family caregivers of patients are called hidden patients.[11] Caregiver personality traits, stressors, stress assessment, coping strategies, and social support affect the QOL of caregivers.[12]

Caregivers of cancer patients may face many physical, social, and economic problems in their care process, and their family life, marital affairs, occupation, health, and social life are negatively affected by caring for the patients.[13] Cancer in children may have adverse effects on the parents' job opportunities,[14] and causes a high socioeconomic burden due to its high fecundity, the high cost of treatment, long hospitalization, and psychological problems in the patient and his/her family.[15]

The mental and psychological effects of childhood cancer in the family are sometimes more disabling than the physical nature of the disease, and since parents are considered to be family pillars they must maintain family coherence through adaptation to the illness.[16] In parents' experience of childhood leukemia, the main theme appeared to be the deadlock in the parents' life.[17] Considering the abstract nature of this subject, the qualitative study of the experiences of parents can lead to a deeper understanding. Qualitative research provides a good opportunity to generate deep knowledge of nursing through the experiences of individuals[18] and facilitates the collection of data which provide an understanding of the meaning of phenomena from the perspective of individuals. Indeed, this type of research responds to the questions of individual experiences through the explanation of motives, attitudes, reactions, and perception.[19]

Other related articles have presented some aspects related to the effect of cancer on the family, but there is not adequate material regarding parents' experiences. Considering this lack of material and the heavy burden of this disease, the question that arises is "How is the first experience of having a child with cancer?" Considering this question, the most suitable method for this study was a method that could illustrate the nature of the phenomenon in its natural context, along with its structure and the factors affecting its formation. Therefore, the present study was designed in a qualitative way. This study aimed to explain parents' experiences of childhood cancer.

Materials and Methods

Considering the research question, this qualitative study was carried out using phenomenological methods.

Through purposive sampling method, 20 mothers and 4 fathers whose children were diagnosed with cancer in the oncology department of Besat Hospital in Sanandaj, Iran, were selected and participated in the study. The study inclusion criteria were parents' willingness for participation, ability to communicate, age of more than 18 years, and having a child with cancer who was newly diagnosed and undergoing treatment. The newly diagnosed treatment course may vary in different individuals and cancers, and usually, in different studies, the duration of stress disorder is considered 2-3 months after the diagnosis of the disease.[20] Therefore, in this study, parents of children who were diagnosed with and treated for cancer during the last 3 months were selected as participants in the study. This study was conducted in 2017.

The main data collection method used was in-depth semi-structured interviews. The researcher referred to the oncology ward and

interviewed the participants after obtaining informed written consent. All interviews were recorded on tape, and immediately after completion of each interview, the text was fully transcribed. In some cases, informal interviews were also used. The interview began with a general and simple question about the diagnosis of a child's cancer and ended with more specific questions. The duration of each interview was 45 to 70 minutes, depending on the situation. In order to keep the identity of the participants confidential, they were given a number from 1 to 20. Moreover, to increase the credibility of the findings regarding the correctness of the interpretations and the coding process, a number of faculty members familiar with the method of analyzing qualitative research were consulted with.

The thematic analysis method was recommended by Benner[21] as the method of data analysis. In this method, first, data analysis should be started, and then, having effective flexibility at all stages, each stage of the development of work should be guided.[22] However, in general, information management includes classification and ranking of primary data, modification and moderation of categories, integration of both initial and meaningful themes, presentation to an expert group, extraction of main themes (general), re-presentation to the expert group, and ultimately, the explicit and unambiguous expression of the underlying structure of the phenomenon, i.e., the parents' experience of their child's cancer in the studied subjects. To obtain a general understanding of the text of the interviews and the transcribed information, they were read several times. In this method, the comprehensive comprehension of the text is more important than understanding sentences, paragraphs, and metaphors. A regular and continuous movement from the components to the whole text, and vice versa, is imperative and emphasized in order to create a general perception of that text.[21]

The information coding steps included the following steps.

1. Classification of raw data by reviewing and retrieving texts transcribed from the interview tape, written descriptions of the participants, and other available documents in order to achieve a general perception of the concepts and phenomena examined
2. Extraction of important data and determination of the similarities and differences between meanings and primary raw texts
3. Setting the meanings and concepts extracted in the previous steps
4. Classification of meanings and concepts in the primary categories

This study was approved by the research committee of Kurdistan University of Medical Sciences, Iran (no.1394.97). This study was approved by the Ethics Committee of Kurdistan University of Medical Sciences, with the code of ethics no. IR.MUK.REC.1394.97. All participants were volunteers, and written consent was obtained from each of them in which the voluntary nature of the participation was mentioned. The participants were assured that they could leave the study at any time even after they had signed the consent form. They were assured that their care would not be affected if they chose not to participate in the study. They were also assured of data confidentiality; this meant that their names and other significant details, which might reveal their identity, would not be published in the study report. All the participants' names were changed into codes during the transcription of the interviews, data was locked in separate locations and the coded information was used for data analysis and discussions.

Results

In order to explain the experiences of parents of children with cancer, similar sentences and phrases were first extracted from the responses, and then, were classified in terms of concepts and themes.

Table 1. Categories and subcategories

Primary code	Subcategory	Category
Life terminator	Life destroyer and terminator	Destroyer of life
Life destroyer		
Terrible and invincible	Terrible and invincible	
Horror of death	Horror	Horror and hope
Desperation		
Hopelessness		
Huge shock		
Hope for God's mercy	Hope	
Trust and faith in absolute divine power		
Huge problem	A mountain of problems in life	Disturbance of normal life
The ill child's problems		
Family problems		
Neglecting of ordinary life	Neglecting life	
Self-neglect		
Neglecting other children		
Gaining experience for compatibility with the present problems	Gaining experience for compatibility with problems	Gaining valuable experience
Gaining experience for compatibility with future problems		

The participants included 20 women and 4 men aged 27 to 53 years with the mean age of 40 years, and their education level ranged from illiterate to undergraduate degree. Finally, they were interviewed, and the 4 categories of destroyer and terminator of life, horror and hope, disturbance of normal life, and gaining valuable experience emerged as main themes with 40 primary codes and 8 subcategories (Table 1).

Most of the participants who had a child newly diagnosed with cancer stated that cancer was an enervating disease and for those suffering from cancer, the probability of death is high. Participant number 3 stated: "Cancer is like a black plague that destroys everyone who gets it." Another participant also said: "Cancer is a crippling and destructive creature" (P13). Another participant said: "I have always been horrified by cancer. I thought of it as a scorpion or crab in my body eating and destroying the organs, and it reminds me of a black and dark way" (P5). With regard to the horrified and invincible subcategory, participant number 11 declared: "Cancer seems to me like a very big and horrible monster that is very powerful and difficult to defeat." Another participant also stated: "I am horrified by this terrible disease and I see it as a competitor who cannot be defeated. Treatment is very difficult and long, and it is impossible to defeat it "(p6).

One of the other main categories that the participants acknowledged was horror and hope. Horror had 4 subcategories of huge shock, desperation, horror of death, and hopelessness. The shock caused by the diagnosis of a child's cancer, which is a severe blow, affects not only the parents, but also the child and all other family members. Participant number 5 affirmed: "The news of our child's cancer was the worst shock to us". Participant number 10 said: "When I discovered that my child had cancer, it was as if the whole world had crashed on my shoulders. It was really a very difficult moment. It was painful." Participant number 8 also said: "The news of my child's cancer was the worst news I had ever heard, I was shocked, and it was as if my world had been damaged."

With regard to fear of death and desperation category, most of the participants

stated that they felt frustrated with the diagnosis of their child's cancer. Participant number 14 stated: "When the term cancer is used, the first thing that comes to everyone's mind is the idea of death and dying and feeling desperate and frustrated." Participant number 7 stated: "My heart was squeezed to such an extent that I felt that the world was small for me and that my child was dying. It made me crazy." Participant number 11 stated: "The news of my child's cancer was equal to a sense of worry, disappointment, and loss of my dearest." Participant number 9 also stated: "It is a very serious danger that you cannot cope with. You lose all hope, and you think your dearest will disappear due to this great danger and he cannot survive."

Hope for God's merci and trust and faith in absolute divine power were the sub-themes of horror and hope. Participants reported that on hearing that their child was diagnosed with cancer, based on religious teachings, they asked God to solve their problem because he was the supreme authority and they should trust him. Furthermore, most participants noted that the child's illness increased their hope and trust in God. Participant number 7 stated: "I had lost my heart at the beginning, but I soon realized that I had to do all I could by trusting in the merci of the Lord to help heal my daughter." The hope for God's mercy in most of the participants' statements was in the form of the need for words of hope, noticing God's merci, strengthening the morale of the child to continue treatment, and accompaniment and empathy in care and treatment. Participant number 11 explained: "I believe that the pain that God gives, will also be healed by him. Therefore, I ask for my child's health from God." Participant number 1 also stated: "My child's relative recovery is due to God's grace. He is omnipotent, and his kindness is given to everybody and this feeling makes me calm and gives me hope".

Another major theme of the study was disturbances in the normal routine of life, and most parents in the study acknowledged that their child's cancer caused them to encounter many problems in different aspects of life. This theme consisted of the 2 subcategories of a mountain of problems in life and neglecting life.

With regard to the mountain of problems, participant number 5 stated: "After my child developed cancer, we had a lot of problems. We had to leave the village and come to the city. My husband was a farmer and now he is unemployed. The cost of hospitalization and treatment of a child is very high for us, and besides the sadness of the child's illness, we have many problems in terms of the cost of the treatment and our life expenditure." Moreover, participant number 3 stated: "After the diagnosis of my child's cancer, our life was destroyed, our priorities changed, and all of our future plans were forgotten." Another participant (p9) said: "After the child's development of cancer, the parent feels like he/she is stuck in a hole full of problems, that he/she is lonely and there is no one to save him/her." Participant number 11 also said: "In addition to my sick child, I have two other children at home that are impossible to handle and I practically do not take care of them; my mother and my sister occasionally take care of them."

Neglecting life was the next primary theme about which participant number 2 stated: "My daughter's illness paralyzed the normal course of our life." Another participant stated: "All my life, priorities, and future planning were destroyed" (P14). In this regard, participant number 12 said: "We were always partying and traveling, but this interrupted everything. My husband's job has been closed for the past 3 months; when I was in the hospital, he was at home with my other children. We are constantly commuting between the house and the hospital." Participant number 6 explained her experience in this regard as: "All our connections with friends and relatives have been broken. Most of the time, my wife and I

do not have the time to talk to each other, there is no pleasure left in our life."

In general, limited social activity due to looking after the child was one of the problems that the participants experienced in the form of loss of occupational status, a reduction in the duration of their work, limitation in social activities outside the home, such as reduced contact with family and friends, and recreational activities and sports. This subcategory especially emerged among those parents' who had the assistance of other family members or close relatives in looking after their other children or immigrated here from their village and town.

The last theme was gaining valuable experience for parents of children with cancer which consisted of the 2 primary themes of gaining experience for compatibility with present and future problems.

Most of the participants acknowledged that having their children be diagnosed with cancer was a valuable experience for themselves and their children in the face of future problems, for example, participant number 12 stated: "In the face of future problems, we have learned to be more patient in comparison with those who have not had such experiences." Regarding the same issue, another participant affirmed: "It was a valuable experience, but experiencing such a thing was really difficult" (P15). Another participant stated: "Children with cancer become weaker, more agitated, and more restless due to long and hard treatment. Parents should be patient and calm so that they can help their children relax and tolerate the pain of treatment. In this experience, you will become more and more patient than the past, but the cost is the difficulty and suffering of this experience" (p16). Another participant also said: "I am sure if my child survives, he will be a very strong person in any problem. He could be unaffected by any problems and he can cope with any problem that occurs in the future" (P3).

In conclusion, the parents' experience of their child's cancer was that they considered cancer as the destroyer of life and believed that they had a disorder in their normal life. Although they were afraid of their child's treatment, they considered the experience as valuable.

Discussion

In this study, the destroyer of life emerged as one of the main themes and was confirmed by all the participants. The most common concerns of parents were identifying a child's cancer and having many problems, and challenges posed to the child's life and death. Moreover, the life-threatening nature of the disease was one of the most important concerns and one of the concerns of parents after the diagnosis of the child's cancer, especially the sense of imminent death and the close proximity of their child to death. The results of this study are similar to the results of a qualitative study by Jadidi et al.; they reported parents' complete helplessness and absolute frustration in continuing to live after hearing of their child's cancer and that they considered cancer equal to death.[17] These findings were also in agreement with that of the study by Streubert et al. which showed that the most notable concern of mothers of children with cancer was death.[22]

Similarly, a qualitative study reported that mothers of a child with cancer are exposed to a destructive experience in their families, and when the disease is diagnosed, they suffer from shock and disbelief and are forced to live with the extra burden on their shoulders.[23] Having a child with cancer changes the lives of parents and their mothers and families experience many physical and psychological stresses. The identification of the mothers' concerns by healthcare staff and planning for therapeutic interventions based on their needs and concerns is necessary. Therefore, in order to adapt to these problems, it is necessary for mothers to be supported by more family

members and nurses. Support from professionals ensures the parents confidence in conducting therapeutic and caring measures.

Mothers of a child with cancer noted fear of losing a dear child on the one hand, and belief in God and the mercy of God on the other hand as their experiences. The results of this study were similar to that by Bjork et al.,[24] Neil and Clarke,[25] Yeh,[26] in which the primary response of parents after a definitive diagnosis of blood cancers was fear and horror because they considered cancer as imminent deaths. In the Iranian-Islamic culture, which is more family-dependent, parents of a child with cancer are more likely to be affected by stress. Losing the child was reported as the parents' worst and biggest problem. All of the parents of a child with cancer were frustrated by their complete disbelief in the child's survival because of their negative perception of cancer, which was equal to death in their perspective.[27] Anxiety and fear of the future in the event of a recurrence of illness and the loss of a lovely child were expressed as parents' experience. Uncertainty of treatment is an important and recognized issue in the clinical and experimental literature. Because the parents' exposure to the diagnosis of their child's illness is an acute and stressful incident, it causes some symptoms in them. Since all of the participants in the study were Muslim, it is likely that using some strategies such as religious strategies can reduce their level of stress and concern. Patience is one of the most valuable beliefs of Muslims that helps them overcome difficult situations, and they see it as an action that gives value to human performance.[28] Nurses can use some coping mechanisms, such as supportive religious beliefs to reduce the harmful effects of cancer in parents.

One of the other aspects emphasized by the parents was God and seeking help from him for recovery. During this period, feeling hopeful and the search for meaning and purpose in life have a religious basis and faith and prayer are important sources of strengthening it.[29]

In the current study, the results showed that when the status of the child was getting worse, parents were more hopeful of God's help. The expression of trust in God and the belief that God is a superior and absolute force without any condition made all participants communicate with God and trust in him at the time of diagnosis and throughout the treatment process. To explain these findings, one can say that hope allows humans to overcome stressful situations and enables them to make a lasting effort to achieve their goals. The hopeful human does his best to achieve more goals.[24] Trust in God, which meant trust and reliance on his power, was a hard and unconditional support in difficult times. With faith, recourse, and trust in him, solid steps could be taken to tackle this massive problem because relying on God's power strengthened the will and decreased the effect of psychological stressors and made them more capable of achieving harmony and balance.[30,31] Tartaro et al. also talked about God, praying, and gaining power from God as the most common defense mechanism to deal with stressful situations.[32] Considering the results of this research, nurses can emphasize the importance of the role of prayer in maintaining health and enhancing effective coping strategies in life-threatening illnesses, such as cancer in children. Considering the Iranian people's belief in the hypothesis of prayer and its effectiveness, it is desirable to use this treatment method as a complementary treatment in combination with other kinds of therapies. Since this method may still be unknown to some and, as is the case for the presentation of any new method of therapy, its experimental stages and effectiveness must be institutionalized in the healthcare system. Thus, further studies on the efficacy of prayer, especially in chronic patients, are

recommended. Another concept emphasized by the mothers was disruption in the normal routine of life. Having a child with cancer caused many changes in both parents' lives and many psychological and social problems.

Most of the parents involved in the study pointed out that when they became aware of their child's cancer, they became conscious of serious family problems, the disintegration of their family, and their sense of helplessness and loss of life. They stated that they lost their normal life, had a sense of disability which disturbed the relationship between parents, they could not look after other family members, and they discontinued family and social relationships. In addition, it disrupted their occupational, social, and experiential experiences. All of these were in line with the findings of Bjork et al.,[24] Neil and Clark,[25] and Kars et al.,[33] which resulted in harm to the family and the marital relationship.

Miedema et al. stated that when a child is fighting cancer, all of the family gets involved in the issue, it disrupts life patterns, and the healthy children of this family also experience issues in facing the needs and wants of their sick sibling.[34] Syse et al. also argued that cancer significantly reduced the job opportunities and income of the parents and increased their psychological stress and caring responsibilities.[14] It has also been reported that with the diagnosis of childhood cancer, a major change occurred in the QOL of the family,[35-37] causing marital problems and divorce among parents of children with cancer. According to Cohen, economic problems among parents of children with cancer increased their psychological problems (stress) and affected the continuation of the treatment of the child from the financial perspective.[38] Similarly, Brown et al. stated that the existence of financial stress, job losses, and various other economic problems among cancer families has been proven.[39] One of the themes achieved from the results of a study on the experiences of parents of children with cancer in Lebanon was increased responsibilities of parents and the consequences for the family.[35] This study also found that fathers' experiences are largely related to financial problems and mothers' experiences are related to fatigue and the feeling of guilt for leaving their other children at home.[35] Therefore, during the treatment of the child with cancer, parents needed support and advice from the healthcare team and family members. The presence of family nurses and psychological counselors, and participation in groups with parents going through similar experiences can help in this regard because today only physical care is provided in many healthcare centers. Therefore, it is suggested that centers be establish for mental counseling for the parents so that parents and patients can better cope with sickness and obtain the ability to get back to normal life.

Gaining valuable experiences in dealing with problems and the increased suffering and responsibility of parents was another theme that increased the tolerance of both parents and the affected child. In this study, the changes resulting from cancer treatment and its implications were described as a continuous battle against cancer by the participants. This was also noted in the study by Behrman and Field, in which the parents of the affected child believed that the diagnosis of cancer in the child needed fighting.[40] The family's system was challenged with a new experience, and, on the whole, the child's illness was considered as a battle which required a continuous fight; they stated its consequences, and expressed hope for the future and planned for it.[40] As a result, as nurses are aware of the family's problems, they should help them reorganize roles, interactive patterns, and relationships within and outside the family to help them adapt to the new situation. Performing parental roles, routine care of the affected child, and confrontation with multiple childcare treatments threatened parent's

compliance.[41] Parents were seeking social support and, when their child was in the hospital, meeting the parents of other children with the same diagnosis, and who had gone through psychosocial problems, and were more experienced helped them become much more relaxed. In the present study, receiving emotional support and sympathy and empathy with other parents of a child with cancer in the hospital have been reported by the participants. Owens et al. also argued that parents of a child with cancer used parents with similar experiences as a supportive source[42] which was consistent with the results of the study by Jadidi et al.[17] Abu-Saad[35] and da Silva et al.[36] also acknowledged that the vast majority of mothers, although initially denied it and believed that their children did not have cancer, they finally came to terms with the issue and talking with other parents of a child with cancer helped them. Parents helped other parents through caring for other children with cancer and purchasing food for each other. Pediatric oncology nurses can provide parents with information about childhood cancer and child care methods. Through parental meetings and encouraging parents' participation in these meetings, these nurses not only provided them with the necessary information, but also helped parents to share their life stories and experiences with others. Perhaps through this method they will be able to meet the needs of their sick child in a more comfortable way.

Limitations and Recommendation: One of the limitations of this research can be the psychological state of the participants when responding to the researcher, which was beyond the control of the researcher. However, the researcher tried to overcome this limitation by providing a suitable and safe atmosphere for the parents. The other limitation was that the study was conducted in only one medical center in the capital of the province to which patients from different cities were referred for treatment; the long distance from home could affect part of their experience. Therefore, further studies on this issue with similar participants are recommended.

Conclusion

In this study, the experiences of the parents of a child with cancer were deeply analyzed with a qualitative approach. The 4 major themes of destroyer and terminator of life, horror and hope, disturbance of normal life, and gaining valuable experience were extracted. Issues such as various philosophical questions (life and death, faith, and hope) and being socially supported were parents' major concerns irrespective of advances in treatment. Childhood cancer was a severe emotional stressor for parents. Therefore, their possible reaction, as well as their different life dimensions should be addressed in order to increase parental hope. Spiritual, mental, and emotional support will make the healthcare services more effective, and help parents avoid some health problems and deal with illness and death. Nurses, physicians, psychologists, and mentors are required to train and enable parents to care for children with cancer.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

This research was the result of the approved and sponsored plan of the Kurdistan University of Medical Sciences, Sanandaj, Iran, with grant number1394.97. The authors wish to thank the medical staff of the oncology department of Besat Hospital in Sanandaj City. The researchers wish to express their appreciation to all the reverent parents, whose participation made this research possible.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.365 Published by Vesnu Publications

Staphylococcal protein A (spa) typing of Staphylococcus aureus isolates causing nosocomial infections

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Original Article

Abstract

BACKGROUND: Staphylococcal protein A (spa) typing is a typing method based on the DNA sequence analysis of staphylococcal protein A gene. The purpose of this study was to do molecular typing of Staphylococcus aureus isolated from patients in Toohid and Besat hospitals, Sanandaj, Iran, in 2014.

METHODS: Clinical specimens were collected from hospitalized patients over a period of 1 year. Staphylococcus aureus isolates were identified using culture and biochemical standard methods based on the Clinical and Laboratory Standards Institute (CLSI) guideline. spa gene patterns in Staphylococcus aureus isolates were identified using spa-typing techniques.

RESULTS: In total, 20 different patterns of spa gene were obtained in staphylococcus aureus isolates in this study, which included type t030 (6 cases), types t230, t459, and t701 (3 cases of each one), types t11332 and t304 (2 cases of each one), and types t325, t012, t1149, t1810, t197, t325, t7789, t808, t871, t937, t14896, t14913, t14928, and t14929 (1 case of each one). The highest prevalence belonged to types t030 (30.0%), and then, types t230, t459, and t701 (15.0% for each one). New types of t14896, t14913, t14928, and t14929 were identified during this study.

CONCLUSION: There were some well-known patterns of spa types, and also we identified new types that should be studied more to qualify. Analysis of these patterns can improve insight to design nosocomial infection control programs.

KEYWORDS: Staphylococcus Aureus, Epidemiology, Nosocomial Infections

Date of submission: 12 Sep. 2017, *Date of acceptance:* 15 Dec. 2017

Citation: Ramazanzadeh R, Darehshiri MH, Mirzaii M. **Staphylococcal protein A (spa) typing of Staphylococcus aureus isolates causing nosocomial infections.** Chron Dis J 2018; 6(4): 225-9.

Introduction

Staphylococcus aureus (S. aureus) is a commensal organism, and is responsible for a wide range of human diseases including serious nosocomial infections.[1-3] S. aureus is thought to be transmitted predominantly via direct contact, or via hands or droplet spreading, and indirectly through the fomites, and through the air in hospitals.[4]

S. aureus have several virulence factors such as surface immunoglobulin (Ig)-binding protein A (staphylococcal protein A or spa), that binds to IgG molecules, and therefore prevents phagocytosis of the bacterial cells by the host immune system.[5]

Different methods have been used to detect S. aureus strains such as spa typing, staphylococcal cassette chromosome mec (SCCmec) typing, pulsed-field gel electrophoresis (PFGE), and multilocus sequence typing (MLST).[6,7] It is shown that the spa type, in contrast to PFGE, can be used to study and determine both the molecular evolution as well as hospital outbreaks of S. aureus.[8]

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Typing the highly variable X region of the S. aureus surface protein A gene is one of the most common methods for genotyping.[9,10] This is due to the sequence data and ease of exchanging results via database available on the internet (http://www.spaserver.ridom.de).[11] spa typing is the method that has become increasingly popular during recent years.[12] spa typing has major advantages with the high discriminatory power, typing accuracy, speed, reproducibility, and ease of interpretation.[13-15] spa typing allows data comparison between clinical laboratories in the international and national levels.[16,17]

In the present study, the occurrence and characteristics of S. aureus isolates from the patients in different unit of hospitals was assessed using sequencing and spa typing method.

Materials and Methods

Bacterial isolates: In this cross-sectional study, clinical specimens were collected from hospitalized patients in Toohid and Beasat hospitals affiliated to Kurdistan University of Medical Sciences, Sanandaj, Iran, over a period of 1 year (in 2014).

Totally, 97 clinical specimens including urine, wound, abscess, blood, and cerebrospinal fluid (CSF) were gathered, and 40 S. aureus strains were analyzed in this study. Bacterial samples were cultured on sheep blood agar (Oxoid, UK), and were assessed using laboratory standard methods such as colony morphology and a positive plasma coagulase reaction, as well as standard biochemical methods.[18] Thermonuclease (nuc) gene was used as a gold standard for confirmation of S. aureus isolates.[4] For further analyses, the isolates were sub-cultured on tryptic soy broth (Oxoid, UK), and stored with glycerol at -20 ˚C and -70 ˚C.

Antibiotic susceptibility tests were used according to the Clinical and Laboratory Standards Institute (CLSI) guidelines with Kirby-Bauer disk diffusion method.[5] Antibiotic disks including erythromycin, clindamycin, gentamycin, ciprofloxacin, trimethoprim/ sulfamethoxazole, teicoplanin, mupirocin, and oxacillin (Rosco Diagnostica, Denmark) were used based on laboratory standards. Polymerase chain reaction (PCR) for mecA gene was used as a conformational test with using specific primers.

Genomic DNA was isolated from overnight culture with Cinna pure DNA protocol (kit for the isolation of DNA from Gram positive Bacteria) (Sinaclon, Iran). DNA template was prepared, purified, and stored at -20 °C until needed.

PCR and DNA sequence analysis (spa typing): Molecular spa typing is a PCR- and DNA sequence-based method has been used for epidemiological investigations.[18-20] This technique allows inter-laboratory exchange of information by means of a standard software analysis package and central internet depository (www.spaserver.ridom.de).[21] spa type is a repeated sequences which compose 24 repeated nucleotides (eight codons). In order to do typing of the polymorphic region of protein A, the X region of the spa gene was amplified using spa gene F primer (5′-TAAAGACGATCCTTCGGTGAGC-3′) and spa gene R primer (5′-CAGCAGTAGTGCCGTTTGCTT-3′).[22,23]

PCR reactions were performed in 25 µl final volumes containing 3µl of purified DNA, 1 µl of each primer, 12 µl of Master Mix (Sinaclon, Iran), and 8 µl of distilled water. The PCR amplification conditions for SPA primer were as: the initial denaturation at 95 ˚C, 5 minutes, and next 35 cycles consisting of a denaturation step at 94 ˚C, 30 seconds, annealing at 60 ˚C, 1 minute, extension at 72 ˚C, 1 minute, as well as a final extension step at 72 ˚C for 10 minutes, and storage at 4 ˚C at the end. Amplified products were sequenced by Macrogen (South Korea). Analysis of DNA sequences was done using Choromas Lite

software (Technelysium Pty Ltd, Australia). For this study, PCR amplification and sequence analysis of 40 spa products were performed with a software, and considered in 'very good' or 'excellent' grades.

Results

Antibiotic resistance: From 97 S. aureus strains, 52 (54.2%) were resistance to erythromycin, 49 (51.1%) to clindamycin, 39 (40.1%) to ciprofloxacin, 12 (12.5%) to teicoplanin, 35 (36.4%) to gentamycin, 18 (18.8%) to trimethoprim/ sulfamethoxazole, 58 (60%) oxacillin, and 17 (17.7%) to mupirocin.

Diversity of spa types: The genomic diversity analysis of 40 strains of S. aureus was carried out using spa typing method. Samples were sequenced with the same primers as used in PCR. Overall, we identified 20 different spa types among the 40 S. aureus isolates (Table 1). These isolates constituted 44.3% of all methicillin-resistant S. aureus (MRSA) isolates, but 55.7% of MRSA isolates in this study.

Table 1. Specification of 97 Staphylococcus aureus strains with spa typing method

spa type	spa type repeat succession (n = 40)	Number of repeats
t14896*	04-21-12-17-486-17-12-12-17	1
t14913*	11-10-21-17-34-24-34-22-676	1
t14928*	04-21-12-41-486-17-12-17	1
t14929	08-34-17-17	1
t030	15-12-16-02-24-24	6
t325	07-12-21-17-34-13-34-34-33-34	2
t7789	08-16-34-24-17	1
t701	11-10-21-17-34-24-34-22-25-25	3
t871	15-12-16-17-24-24	1
t304	11-10-21-17-34-24-34-22-25	2
t1149	08-16-34-24-34-17-17	1
t808	08-16-02	1
t1810	04-21-12-41-20	1
t012	15-12-16-02-16-02-25-17-24-24	1
t230	08-16-02-16-34	3
t459	04-34-17-66-66-32-17-23-24	3
t11332	04-21-12-41-486-17-12-12-17	2
t197	11-10-34-24-34-22-25	1
t937	08-16-34-24-34-34-17-17	1

* New types identified in this study, and registered in the spa server (www.spaserver.ridom.de).

Discussion

S. aureus, specially MRSA strains, is one of wide spread infections in hospital and community.[1,19,20] Typing and analysis of S. aureus strains responsible for serious infections is now routine in many parts of the world.[23] To establish communication survey of pathogen strains together, molecular methods such as spa typing, MLST, and PFGE can be used.[17] Typing methods are being used as a tool to identify strains on the genetic characteristics basis. These techniques can show the relationship between strains and clones.[9] Among these techniques, spa typing with high discriminatory power (99.5%), is fast, easy, and inexpensive, and is able to determine the lineage of strains, and classify them.[11,24-26]

Moodle et al. studied 320 S. aureus isolates collected from South Africa. They found that the five most common spa types were t012 (n = 68), t037 (n = 77), t045 (n = 25), t064 (n = 68), and t1257 (n = 31), which made up 84% of the isolates.[16] According to previous studies, the most prevalent spa types were recorded different such as t008 (31.9%) and t002 (27.6%),[2] t7685 (11.5%), t230 (8%), and t1149 (8%),[7] t003 (22%), t151 (16%), and t008 (12%),[27] and t030 (43%)and t037 (43%).[15] In this study, four novel spa type (t14896, t14913, t14928, and t14929) were detected and registered on spa server. The highest prevalence was related to t030 (30%) and t459, t701, and t230 (15% for each one). According to reports, most of S. aureus were colonized in hospital personnel and fomites.[27,28] Spreading occur via direct contact or handling of contaminated materials. Therefore, in nosocomial infection, clonal transmission is the prominent factor.

Conclusion

There are similar patterns of spa gene which represents a common source of infection in hospitals, and analysis of these patterns can

help to break the chain of infection transmission in hospitals.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

This is a part of a MSc thesis in Kurdistan University of Medical Sciences. The authors wish to extend their gratitude to the Deputy of Research and Technology of this university for financial support. We also thanks to Dr. Moradi for statistical analysis.

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Chronic Diseases Journal

DOI: 10.22122/cdj.v6i4.367 Published by Vesnu Publications

The effect of job-stress on patient-safety in hospitals affiliated to Alborz University of Medical Sciences, Iran

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Original Article

Abstract

BACKGROUND: Patient-safety is one of the main pillars of healthcare. Given that nurses are the largest group associated with patients, so with safety harms, job-stress among then can reduce patient-safety in hospitals. The aim of this article was to investigate the effects of job-stress on patient-safety in hospitals affiliated to Alborz University of Medical Sciences, Karaj, Iran.

METHODS: In this cross-sectional study, data gathering tools consisted of a reliable researcher-made job-stress questionnaire, and a patient-safety checklist. 320 nurses in hospitals affiliated to Alborz University of Medical Sciences, who were selected using simple randomized sampling method, completed the questionnaire, and the checklist was filled by the researcher. Data were analyzed at two levels of inferential and descriptive statistics.

RESULTS: Job-stress and also patient-safety were at average levels in studied hospitals. Among the demographic factors, only the relationship between job-stress and marital status was statistically significant ($P < 0.050$). There were no significant relationships between different aspects of job-stress among nurses and patient-safety.

CONCLUSION: According to average level of job-stress among studied nurses, the quality of offered services would decrease and patient-safety would become undermined, if no action take place to reduce the job-stress among them. Therefore, it is necessary to increase nurses' physical, psychological, and social health to increase patient-safety.

KEYWORDS: Job-Stress, Patient-Safety, Hospitals

Date of submission: 20 Sep. 2017, ***Date of acceptance:*** 11 Dec. 2017

Citation: Najafi M, Pouragha B, Farzam SA, Vaziri-Seta M, Modabber MR, Rajaee R. **The effect of job-stress on patient-safety in hospitals affiliated to Alborz University of Medical Sciences, Iran.** Chron Dis J 2018; 6(4): 230-4.

Introduction

Being secure from any hazards and injuries during receiving health-care services is one of human rights, while medical errors is one of the major health-system challenges threatening patients all over the world.[1]

Patient-safety means no room for any medical errors and harms while providing health services and also not to getting any more damages during health-care is one of main components of the health-care itself.[2,3]

Medical errors, such as wrong type and wrong dosage of prescribed medications, or surgery at body part or using wrong

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mechanics for surgery, postoperative complications and misdiagnosis or delayed diagnosis and failure to diagnose and misdiagnosis, medical equipment and machinery failures that leads to misdiagnosis, and other factors such as hospital infections or accidently patient falls, bed sores, unsafe services that leads to unpleasant consequences for patients and their families and also causing psychological pressure for them and staff, eventually impose huge economic burden on health-care system and all community.

Patient-safety knowledge and patient-safety culture in health centers play an important and key role. Patient-safety culture can be define as accepting patient-safety as first priority and common value within organization, and also can define integrated pattern by individual and organizational behavior based on common values and beliefs continuously looking to minimize damages caused by providing patient-care process.[4,5]

Over past two decades, the idea that health-care system is not secure enough, and needs to be improved, had promoted globally as far as patient-safety be top priority for health systems and patients; moreover, worldwide efforts have become focus point -with World Health Organization (WHO) special emphasis- in order to reduce errors and mistakes, root and fix errors, and prevent it from happening again.[6]

Nurses are the largest group of human factors working in hospitals, directly associated and involved with patients, and as core elements of health-care have essential role in providing health-care progress, and since they are the direct way to deliver most of the services to patients, their act has important role to reach health-care purposes.[7-10] According to researchers, 90 percent of staff believes that nurses' first responsibility is patient's health.[10]

Although the hospitals, as competitive organizations, are putting the employees and specially nurses mental health as their priority to improve their effectiveness, but there are more psychological stress than expected for nurses and employees, and most of studies have suggested that nursing is stressful job.[11-13]

Nursing medical staff problems such as management pressures, lack of support and facilities, interpersonal conflicts, patient's death, high demands, and working extra shifts or secondary job. These difficulties may cause physical and psychological fatigue so exhausting, and stress will lead to low patient care performance.[14]

According to the importance of nurses at present health systems, this article discuss the importance of occupational stress on patient safety in order to examine the issues to improve patient safety in health care centers, as well as patient satisfaction.

Materials and Methods

In this cross-sectional study, the effect of job-stress on patient-safety in hospitals affiliated to Alborz University of Medical Sciences, Iran, containing three Rajaii, Bahounar, and Madani hospital was assessed.

Nursing staff in inpatient and other sectors of the hospital with least one year of work experience in that hospital who were interested in participating in the study were enrolled this research.

Cochran sampling technique was used to have a bulk of sample by using the formula, $n = (Z_{\alpha/2} + Z_{\beta})^2 \sigma^2/d^2$. Considering $\alpha = 0.05$ (confidence of 95%), $\beta = 0.2$ (test power of 80%), $\sigma = 30$, and $\delta = 4$ (relative error of 2.5%), the bulk of sample was calculated as 430 people, of which, 320 participants should complete the questionnaires. These participants were selected using simple randomized sampling method.

The data gathering tools consisted of a researcher-made job-stress questionnaire, and a patient-safety checklist.

Table 1. Describing the situation and dimension of job-stress among the studied nurses

Dimension	Mean	Standard division	Condition
Job-stress related to job-specification	1.55	0.30	Moderate
Job-stress related to management-organization factors	1.65	0.35	Moderate
Job-stress related to interpersonal communications	2.44	0.61	Moderate
Job-stress related to environment issues	1.75	0.46	Moderate
Job-stress related to patient-care factors	1.49	0.37	Moderate
Total	1.86	0.30	Moderate

The questionnaire consisted of simple questions such as age, sex, marital status, education, work experience, and employment status, as well as specific questions including the questions that legated to our research. The checklist also consisted of 44 items of all aspects of patient-safety. Content validity of the questionnaire and check list was assessed by professors and experts in medical and nursing schools of Alborz University of Medical Sciences, and the reliability was tested using Cronbach's Alpha coefficient test that was obtained as 0.98.

Participants completed the questionnaire, and the checklist was filled by the researcher. Distributing the questionnaires and collecting them was done by one the researchers, as well as completing the checklist; in items of checklist that needed some information from the patients, the data were gathered via asking them verbally.

After collecting and scoring the data, statistical analysis was done using descriptive statistics as well as t, ANOVA, and Spearman correlation coefficient tests via SPSS software (version 20, IBM Corporation, Armonk, NY, USA).

Results

In this study, 320 nurses in three hospitals were enrolled that 210 of them were women (65.6%) and 110 were men (34.4%). Most of the participates were at the age group of 26-34 years (53%), and least of them were at the age group of 22-25 years (21%). Moreover, most of the nurses had a work experience of 1-5 years (52%), whereas the least of them had more than 10 years of work experience (18%).

According to the findings of this study, job-stress was at moderate level among the studied nurses (Table 1).

Moreover, the patient-safety was in an average near to moderate status in all three studied hospitals (Table 2).

Table 2. The overall patient-safety situation in studied hospitals

Hospital	Mean	Standard division	Condition
1	1.45	0.10	Moderate
2	1.63	0.11	Moderate
3	1.75	0.12	Moderate
Total	1.75	0.11	Moderate

Spearman correlation coefficient test was used to investigate the relationship between job-stress among the nurses and patient-safety, and the relationship was not statistically significant ($r = 0.007$, $P = 928$).

In addition, the relationships between the different dimensions of job-stress among nurses and patient-safety were not statistically significant, too (Table 3).

Table 3. The correlation between the dimension of job-stress among nurses and patient-safety

Variable	r-value	P
Job-stress related to job-specification	-0.040	0.456
Job-stress related to management-organization factors	0.003	0.953
Job-stress related to interpersonal communications	0.049	0.686
Job-stress related to environment issues	0.006	0.831
Job-stress related to patient-care factors	-0.008	0.915

The amounts are the results of Spearman correlation coefficient test.

Discussion

Various studies that have been conducted in relation to patient-safety showed different aspects such as drug error, misdiagnosis, and failure of devices and equipment, that could lead to a mistake. In addition, there are cases of hospital infections, fall in the patient, bed sores, and wrong treatment, too.[15]

The results of this study showed that there was no relationship between the demographic specification of nurses and job-stress. This result is consistent with the results of Mahmoudi et al.[16] and Hazavehei et al.[17] studies; except that Mahmoudi et al. expressed a significant relationship between the gender and job-stress.[16] According to Mortaghi Ghasemi et al., there was only a significant relationship between the educational level and job-stress.[12]

We did not find any significant relationship between job-stress and work experience. Hashemi and Garshad found the same result in their research.[18] Cavalheiro et al. reported inverts relationship between work experience and job-stress.[19]

The results of this study indicated that the average level of job-stress among the studied nurses was moderate. The results of Faraji et al. study also indicated that most of the nurses (over 70%) experienced moderate and high job-stress.[20]

In this study, factors such as job-specification, management-organization factors, interpersonal communication, environment issues, and patient-care factors were the most prevalent causes of job-stress with a moderate situation. Rahmani et al. mentioned the heavy work load and responsibilities as well as physical environment as the causes of high level of stress.[14] Mortaghi Ghasemi et al. listed the most prevalent stressors as patient death, heavy work load, uncertainty about treatment, conflict with colleagues, lack of individual Insufficiency, and lack of support.[12]

Torshizi and Ahmadi in their study mentioned that the majority of nurses (65%) thought that the most effective factors on job-stress were physical environmental factors such as lack of suitable conditions like lack of air conditioning, noise control, and resting place.[21] They said that the most stressful factors were the low level of salaries and benefits, then the aspect of interpersonal communication, lack of adequate support from superiors, and the presence of visits in unforeseen hours.[22]

These finding could be used to promote the status of job-stress among the nurses in our country.

Our findings suggested that the patient-safety was in an average near to moderate status in all three studied hospitals, and job-stress among the nurses as well as different dimensions of it (job-specification, management-organization factors, interpersonal communication, environment issues, and patient-care factors) did not have any effect on patient-safety; while Colla et al. referred job-stress among the nurses as an effective factor on patient-safety.[22]

More studies should be done in Iran to clear the factors affecting patient-safety in our hospitals to promote them, and to reach a better condition of patient-safety. As the Deilkas and Hofoss study showed that serious interventions should be undertaken to promote the patient-safety culture. These interventions can be combined with scoring systems at different levels.[23]

Conclusion

According to our findings, job-stress was at moderate level among the nurses working in hospitals affiliated to Alborz University of Medical Sciences. Moreover, the patient-safety status was in an average near to moderate level. Intervention should be planned to promote the status of job-stress among the nurses, as well as patient-safety in these hospitals.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The authors would like to thank the participants, for sharing their experiences.

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