The Effect of Consanguineous Marriage on Mental Health among the Students of the Shahrekord University of Medical Sciences

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ABSTRACT

Introduction: In Iran, after unintentional accidents, mental health problems are the second leading burden of disease. Consanguineous marriage is very common in Iran and the association between parental consanguinity and mental health is an important issue that has not yet been studied sufficiently in Iran.

Aim: To investigate the effect of consanguinity and the degree of relationship on different levels of mental health.

Materials and Methods: In this cross-sectional study, conducted in the Shahrekord University of Medical Sciences, two groups of students were enrolled. The first group consisted of 156 students that had consanguineous parent (case group) and the second group was 156 students whose parents had non-blood relationship (control group). The students were evaluated using General Health Questionnaire (GHQ-28). Statistical analysis was conducted by Pearson's correlation coefficient, independent t-test and the one-way analysis of variance. Odd ratio was used to estimate the relative risk.

Results: Over 30% of the individuals were suffering from mental health problems. The most and least common mental health problems in both groups were social dysfunction (54.5% in the case group and the control group 50%) and depression (15.4% in the case group and 17.3% in the control group), respectively. No statistically significant difference was observed in the frequency of overall mental health and its subscales between student with non-consanguineous parent (control group) and the students that had consanguineous parent (case group) (p>0.05) and the status of mental health was not significantly different among student with different degree of kinship (p>0.05).

Conclusion: The study revealed that social dysfunction was very common among the study students and also there were no relationship between parental consanguineous marriage and mental health. Parental consanguinity and genetic factors may not be the major causes of high prevalence of mental health problems in Iran and the effects of the environmental factors on these problems may be greater than those of the inherited ones.

INTRODUCTION

Based on World Health Organization (WHO), health is defined as "a complete state of physical, mental and social well-being and not merely the absence of disease or infirmity". Mental, physical and social health is essential issue and tightly interweaving strands for all individuals. Mental health that is "state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully and make a contribution to their communities" affects not only individuals but also societies and countries. Studies show that the problems of mental health is associated with children and adolescents, poor, unemployed, persons with low education, homeless, victims of violence, migrants and refugees, abused women, indigenous populations and the neglected elderly. Approximately 450 million people in the world are affected by mental or behavioral disorders [1]. According to the study conducted in 2004 about a fifth of the population of Iran at the age of 15 year and above suffers from mental disorder [2]. The prevention and treatment programmes in the field of mental health is needed to prevent disability adjusted life years and deaths, grow significantly the social capital, decrease indigence and advance development of country [1]. State of health depends on individual's gene, stages of development and the evaluation of that individual environment [3].

The terms inbreeding and consanguinity (from the latin consanguinitas) refers to unions between individuals who have at least one common ancestor, in the other hand applied to couples that are related as second cousins or closer [4]. The risk of genetic disorders in the offspring of consanguineous unions is higher than the offspring of unrelated couples (2–3% risk in children of unrelated couples and 4–6% in children of consanguineous couples) [5]. The most common type of consanguineous unions is first cousin union [6]. The closer the genetic relationship between couples, the greater is the probability that their children have identical copies of one or more harmful recessive alleles. For example, on average, 6.25% (1/16th) of gene loci of offspring of first cousins is homozygous [4] whereas for second cousins that is 1.56% (1/64) [7].

Consanguineous marriage is a traditional practice in many communities around the world, especially in the Middle East, West Asia and North Africa and emigrants from these communities are living in North America, Europe and Australia [8]. One of these communities with a high rate of consanguineous marriages is Iran [9]. A study conducted in 2004 indicated that 38.6% of all marriages in this community were consanguineous with a mean in breeding coefficient (alpha) of 0.0185 and the rate of consanguineous marriages among geographical regions and ethnic/religious groups were different and the most common form of consanguineous marriages was first cousin marriages, in 27.9% of all marriages [10].

Some studies have already been conducted on the relationship between parental consanguinity and mental retardation, mortality in fetus and infants and strabismus in Iran. The results of these studies revealed a relation between consanguineous marriages and mental retardation, mortality in fetus and infants and strabismus [11-13]. The association between parental consanguinity and mental health is an important issue, research in this field has not been done in Iran. Therefore, we decided to investigate the impact

of consanguinity and the degree of kinship on different levels of mental health such as: physical symptoms, anxiety, depression symptom and social function.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Shahrekord University of Medical Sciences (SKUMS) in autumn 2014. First, the study protocol was approved by the Ethics Committee of the SKUMS (ethics code no. 93-7-14). Moreover, the participants were ensured that information would be kept strictly confidential.

All students of the SKUMS (N:1960) comprised the study population. Sample size was determined to be 148 participants by a formula for cluster sampling considering $Z(1-\alpha/2) = 1.96$, $Z(1-\beta) = 0.84$ and $d = 0.23$. However, the researchers decided to enroll 156 participants. A stratified sampling method was adopted to determine the number of the participants enrolled from the four faculties under study.

The inclusion criteria were, being student of the SKUMS and completing the questionnaire voluntarily. The students who suffered from psychiatric disorders, took medications, or did not volunteer to complete the questionnaire were excluded from the study.

Students whose parents were relatives were assigned to case group and students with unrelated parents to control group. Couples that were related as second cousins or closer were considered to be consanguineous marriage [4]. The method of sampling was cluster and the number of the participants from each faculty was decided to be proportionate to the number of that faculty's students. As the desired number of participants was enrolled from a faculty, the researchers discontinued the questionnaire administration to that faculty's students.

Participants completed two questionnaires consisting of a Socio-Demographic Questionnaire (SDQ) and 28-item General Health Questionnaire (GHQ-28). The SDQ consisted of questions about age, gender, field of study, faculty, level of education, place of residence and parents relatedness. Degree of consanguinity was determined by genetic counselor as parents relatedness. GHQ–28 is a validated and reliable screening tool to investigate mental health. This questionnaire that was developed by Goldberg and Hillier (1979) consists of four subscales: somatic symptoms, anxiety/insomnia, depression symptoms and social function. The Persian version of this questionnaire with confirmed validity (84.2 %) and reliability (85%) according to Noorbala et al., study was administered to the participants [14]. In this study, we used a four-point Likert scale from zero to three with total score ranging from 0 to 84. Score 6 for each subscale and total score of 22 were considered cut-off points. These scores (6 and 22) and higher were determined to represent suspicious cases of mental disorders. Specificity, sensitivity and overall misclassification rate of the cut-off score 6 were 93.8%, 84.7% and 8.2%, respectively [2].

STATISTICAL ANALYSIS

A descriptive and inferential statistics measurement was used for data analysis. Independent t-test and the one-way analysis of variance (ANOVA) were applied to determine significant differences. Odd ratio was used to estimate the relative risk. Relationship between mental health and its subscales with variables was estimated using Pearson correlation. Data analysis was done using the statistical package for the socials sciences, version 19. Generally, a p-value less than 0.05 was considered statistically significant.

RESULTS

The [Table/Fig-1] sets out socio-demographic characteristic of sample. Data analysis showed that there is no significant difference in socio-demographic variable including, gender, field of study, faculty, level of education, place of residence and family income, between case and control groups (p> 0.05).

Demographic variables		Cases consanguineous parent n=156		Control non-consanguineous parent n=156		p-value
		n	%	n	%	
Gender	Male	29	18.6	30	19.2	0.885
	Female	127	81.4	126	80.8	
Field of study	Doctor of Medicine	27	17.03	39	25	0.851
	Nursing	8	5.1	11	7.1	
	Midwifery	37	23.7	30	19,2	
	Laboratory sciences	27	17.3	22	14.1	
	Radiology	11	7.1	6	3.8	
	Environmental health	7	4.5	7	4.5	
	Public health	33	21.2	33	21.2	
	Biology	6	28.8	8	5.1	
Faculty	Medicine	33	21.2	47	30.1	0.246
	Nursing	45	28.8	41	26.3	
	Paramedical Sciences	38	24.4	28	17.9	
	Health sciences	40	25.6	40	25.6	
Education	Licentiate degree	122	78.2	107	68.6	0.158
	Master's Degree	7	4.5	10	6.4	
	Doctorate	27	17.3	39	25	
Place of residence	Urban	121	77.6	131	84	0.151
	Rural	35	22.4	25	16	
Family income	≤ 278 US$	88	56.4	73	46.8	0.189
	> 278 US$–< 834 US$	61	39.1	77	49.4	
	≥ 834 US$	7	4.5	6	3.8	

[Table/Fig-1]: Demographic characteristic of sample.

The student's age ranged from 18 to 39 years, and the mean (±standard deviation) age of the students in the case and control groups was 21.21±2.76 and 21.83±3.93, respectively, with no significant difference between the two groups (p>0.05).

Descriptive analysis and estimation of odd ratio are showed in [Table/Fig-2]; this results suggest that more than 30% of the individuals (the both case and control groups) were suffering from mental health problems. The most common mental health problems in the both groups was social dysfunction subscale (54.5% in the case group and the control group 50%) and the least in the depression subscale (15.4% in the case group and 17.3% in the control group). A statistically significant difference in frequency between the two cases and control groups were not observed in the overall mental health and its subscales (p> 0.05).

	Control non-consanguineous parent n=156				Cases consanguineous parent n=156				p-value	Odds ratio (CI % 95)
	N	%	Mean	SD	N	%	Mean	SD		
Anxiety/ insomnia	57	36.5	4.96	3.73	46	20.5	5.33	4.3	0.424	0.726 (0.452-1.167)
Severe depression	27	17.3	3.24	4.08	24	15.4	2.98	3.96	0.574	0.896 (1.584 -0.476)
Somatic symptom	47	30.1	5.35	3.63	53	34	5.39	4	0.929	1.193 (1.921- 0.741)
Social dysfunction	78	50	7.29	3.87	85	54.5	7.29	3.31	1	1.197 0.767-1.868)
GHQ-28 total scale	59	37.8	21.0	13.19	54	43.6	20.63	12.5	0.69	0.87 (0.548-1.382)

[Table/Fig-2]: The frequencies, means and Standard Deviations (SD) of the GHQ-28 total scale and its subscales in control (non-consanguineous parent) and case (consanguineous parent) groups and estimation of odd ratio.

According to [Table/Fig-3] no statistically significant difference in frequency of the overall mental health situation and its subscales was observed among individuals of first cousin marriage, second cousin marriage and distant relative (p> 0.05).

The mean and standard deviation scores of overall mental health and its subscales among individuals of first cousin marriage, second cousin marriage and distant relative are showed in [Table/Fig-4]. According to analysis of variance, there is no significant difference (p> 0.05).

Statistical analysis with Pearson correlation coefficient revealed that no relationship between mental health and its subscales with variables including age, number of children, number of consanguineous marriage in relatives and grade point average in the both case and control groups (p> 0.05) [Table/Fig-5].

	First cousins		Second cousins		Distant relative		p-value
	N	%	N	%	N	%	
Anxiety/insomnia	28	29.8	7	35	11	26.2	0.768
Severe depression	16	17	1	5	7	16.7	0.338
Somatic symptom	30	31.9	10	50	13	31	0.287
Social dysfunction	46	48.9	12	60	27	64.3	0.223
GHQ-28 total scale	32	34	6	30	16	38.1	0.783

[Table/Fig-3]: The frequencies and percentages of the GHQ-28 total scale and its subscales in first cousin, second cousin and distant relative.

	Degree of consanguineous	Mean	SD	p-value
Anxiety/insomnia	First cousins	5.00	3.83	0.946
	Second cousins	4.70	3.63	
	Distant relative	5.00	3.64	
Severe depression	First cousins	3.90	4.42	0.567
	Second cousins	2.10	2.05	
	Distant relative	3.17	3.56	
Somatic symptom	First cousins	5.02	3.99	0.336
	Second cousins	6.25	2.65	
	Distant relative	5.81	4.47	
Social dysfunction	First cousins	7.11	3.58	0.684
	Second cousins	7.60	2.85	
	Distant relative	7.57	2.87	
GHQ-28 total scale	First cousins	20.21	13.58	0.852
	Second cousins	20.65	8.83	
	Distant relative	21.55	12.12	

[Table/Fig-4]: Means and Standard Deviations (SD) of the GHQ-28 total scale and its subscales in first cousin, second cousin and distant relative.

DISCUSSION

This study is the first investigation of association between consanguinity marriage and mental health problems in Iran. According to the World Health Report 2013, more than 25% of total disability and 10% of the global burden of disease belong to mental, neurological and substance use disorders. In Iran after unintentional accidents, mental health problems have second place on the list of the burden of disease [15]. Because of high prevalence and huge burden associated with these diseases, mental health problems are considered as a health priority and investing in mental health to diminish disability and deaths associated with these disorders can produce massive returns [1].

Studies show that some genetic disorders require two copies of the defective gene, the possibility of this condition increased in consanguineous marriage so consanguinity study can be used to suggest autosomal recessive mode of inheritance [16,17]. Previous researches indicate that the risk of recessive disorders is increased in consanguineous marriages. Unfortunately, consanguineous

Variable		Control non-consanguineous parent n=156		Cases consanguineous parent n=156	
		Correlation coefficient	p-value	Correlation coefficient	p-value
Anxiety/insomnia	Age	0.012	0.886	0.104	0.196
	Number of children	-0.06	0.547	0.086	0.284
	Number of consanguinity on relatives	-0.073	0.365	0.004	0.963
	Average	-0.131	0.262	-0.034	0.746
Severe depression	Age	-0.103	0.201	-0.051	0.527
	Number of children	-0.106	0.187	0.025	0.761
	Frequency of consanguineous marriage among relatives	-0.40	0.681	0.001	0.986
	Average	-0.033	0.779	-0.028	0.787
Somatic symptom	Age	-0.046	0.569	0.155	0.053
	Number of children	0.003	0.968	0.077	0.447
	Frequency of consanguineous marriage among relatives	-0.047	0,564	-0.049	0.539
	Average	-0.039	0.739	-0.009	0.932
Social dysfunction	Age	-0.072	0.374	-0.005	0.946
	Number of children	-0.0.90	0,263	-0.024	0.770
	Frequency of consanguineous marriage among relatives	-0.113	0.160	-0.021	0.792
	Average	-0.010	0.932	-0.063	0.542
GHQ-28 total scale	Age	-0.062	0.445	0.062	0.440
	Number of children	-0.078	0.333	0.051	0.532
	Frequency of consanguineous marriage among relatives	-0.082	0.307	-0.020	0.808
	Average	-0.073	0.534	-0.031	0.762

[Table/Fig-5]: The correlation between the subscales and variables of age, number of children, frequency of consanguineous marriage among relatives and average also between GHQ-28 total scale and these variables in the case and the control groups.

marriages are very common in Iranian population (38% of all marriages); therefore, the investigation of the association between parental consanguinity and mental health is important issue that was not conducted in Iran already. In this study we evaluated the effect of parental consanguinity on college student mental health. This study demonstrated that the status of mental health was not significantly different between the case and control groups (p>0.05). This result suggests that consanguinity may not be associated with mental health problems and the mode of inheritance in these mental health problems may not have recessive or a multigenic pattern. Noorbala et al., study indicated that environmental factors including age, gender, education, occupation, place of residence and marital status had significant effects on mental health [14]. In this study, we evaluated the correlation between mental health and age, number of children and frequency of consanguineous marriage among relatives and found no significant association between mental health and these variables in consanguineous and non-consanguineous parents. In this study, we enrolled 18- to 39-year-old students, but in the study by Noorbala et al., the study population were 15 years and older; therefore, difference in age between the studied participants may account for inconsistency in the findings [14].

Also studies of Ahmed AH, Saugstad L and Chaleby K indicated that no significant association is between psychiatric disorders

such as schizophrenia and consanguineous marriage [18-20], so it can be compatible with finding of our study. The most common mental health problem in both groups was social dysfunction subscale and the least common problem was depression subscale; this finding is inconsistent with the study by Noorbala et al., [14]. Differences in age groups, education and other characteristic of samples can be possible reasons for these disagreements. The results of [Table/Fig-2] show that generally more than 30% of the individuals under study had mental health problems; previous epidemiological studies of mental health problems in Iran show rates varying between 11.9% and 23.8%. The cause of difference between rates of present study and other epidemiological studies may be difference in age groups, method and tools of screening and classification system.

A significant correlation was not observed between the subscales and variables of age, number of children, frequency of consanguineous marriage among relatives and average also between GHQ-28 total scale and these variables in the case and the control groups.

LIMITATION

The limitation of our study is that, this study was conducted using GHQ-28 that is a screening tool and is not an instrument to conduct structural interviews. Besides that, GHQ-28 has not been developed to investigate the prevalence of different disorders.

CONCLUSION

The study revealed that social dysfunction was very common among SKUMS students and mental health problems do not tend to occur more frequently in the children of consanguineous parents than in those of non-consanguineous parents. These results suggest that mental health problems may not have recessive or a multigenic pattern of inheritance.

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