Attitude and Awareness of Bahraini Medical and Non-Medical Students Towards Premarital Screening

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ABSTRACT

Background: The Kingdom of Bahrain was ranked among the 20 countries with the highest prevalence of inherited blood disorders. As a consequence, an obligatory law for premarital testing and counseling was passed by Bahrain`s Government to all couples who are planning to get married.

Objectives: To assess the extent of Bahraini university students` awareness and understanding regarding the premarital testing, and to determine their tendency of compliance with the premarital test results, and finally to compare the level of conversance amongst medical and non-medical students for both genders.

Study Design: Cross-sectional study.

Setting: Arabian Gulf University and Bahrain Teachers College.

Methods and materials: This study was conducted in Bahrain from July to September 2019. Data were collected using online questionnaires which were sent via social media to 313 students from both universities. Data were entered and analyzed using SPSS version 25.

Results: About 313 students were included in this study, and the majority were practically aware that the test was mandatory and that the compliance to its results was optional. According to the survey, more than fifty percent of non-medical students responded positively and stated that they would comply with the test`s results if both partners were carriers of the same hereditary disease. However, 80 (51.6%) medical students might have gotten married against the counselor's advice if they were under such a circumstance.

Conclusion: The results showed that students' major does not affect one's Knowledge and compliance to premarital test results.

Keywords: Attitude, Awareness, Bahrain, Students, Premarital screening

INTRODUCTION

Inherited blood disorders are considered a major health issue in the Middle East[1-3] especially in Arabian Gulf countries in which Bahrain is ranked among the 20 countries with the highest prevalence[3,4]. Previous studies showed that genetic diseases exerted an enormous burden on countries, emphasizing the need to lower the incidence of such diseases through continuing to educate the citizens about premarital testing and counseling[5]. As a result, in 2004 the Bahraini Government provided a free mandatory pre-marital screening and counseling to all couples willing to get married[4]. It has turned out beneficial, since in 2010 health officials in Bahrain declared that performing such screening succeeded in lowering the incidence of sickle cell disease, where a 70% drop was seen in cases over the last 25 years[3].

Many studies were done regarding this subject, which emphasized the extreme importance of premarital screening in eliminating genetic diseases. In 2011 a study was done in Saudi Arabia on couples who attended the premarital and genetic counseling clinics between the years 2004 and 2009. Test results were shared with all participants, and genetic counseling was offered for all at-risk couples. Marriage certificates were issued disregarding the results, and compliance with medical advice was voluntary. The results of the study were as follows, of all the participants examined, 70962 (4.5%) and 29006 (1.8%) were carriers or cases of sickle cell disease and b-thalassemia, respectively. The prevalence of sickle cell disease was sustained between 2004 and 2009, while the prevalence of B-thalassemia steadily decreased from 32.9 to 9.0 per 1000 examined persons. The frequency of at-risk couples was reduced by 60% between 2004 and 2009. More than 5-fold increase in the frequency of voluntary cancellation of marriage among at-risk couples was seen between 2004 and 2009. Fifty-eight percent of all detected at-risk marriages were from the eastern region and showed significant decline in case detection and increase in prevention over time compared to other regions of Saudi Arabia[6].

Another study was carried out in the United Arab Emirates in 2011. The study revolved around hemoglobinopathies being the most

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common detected single gene disease internationally. A DNA study was conducted for couples at-risk, where both declared to be carriers, diseased, or one is diseased, and the other is a carrier. At-risk couples were referred to Dubai Thalassemia Center (DTC) for genetic counseling which was done by a geneticist and a medical physician to make sure that they were fully aware of the risk of having an offspring with a serious condition. Data were gathered from UAE citizens who performed premarital screening between January 2007 and December 2010. The outcomes of the study were as follows, of the UAE citizens screened, 52.8% were male and 47.2% were female. The average age at marriage was 28.38 years for men, and 24.59 years for women. The studies showed that β-thalassemia minor was the first most commonly observed hemoglobinopathy, which showed a prevalence of 4.56%. whereas sickle cell trait was shown the second most common with a 2.9% prevalence[7].

During 1993-1994, a study regarding premarital counseling was performed in Bahrain to estimate the percentage of couples that had inherited hemoglobinopathies. Also, it attempted to measure the percentage of the consanguinity among those couples and the chance of inheritance of the affected gene to their offspring. Among 500 participants, 13% had SCD trait, 2% had B-thalassemia and 26% had G6PD deficiency. Regarding consanguinity, the study showed that 74.1% of the couples were relatives. Degree of relation varied, 23.2% were first cousins, 1.5% were second cousins while only 0.3% were distant relatives[1].

In 2011, a study was performed in Oman that described the knowledge and attitude regarding premarital carrier screening (PMCS). Self-administered surveys were distributed to a total number of 400 Omani adults aged 20-35 who attended to the primary healthcare institutions. The results showed that most of the participants (84.5%) considered that PMCS was necessary, and about half of them (49.5%) encouraged the view of making PMCS mandatory. On the other hand, approximately one third (30.5%) of the participants were against taking the blood screening test. In general, refusal to undergo pre-marital testing was more common in the female gender of a young age, or single, or received less education or had high income[8].

In 2016, a cross-sectional study was conducted on 809 students from Kuwait University. The aim of the study was to establish the level of knowledge, attitude and satisfaction among participants in regard to Premarital screening (PMS) program, and to discover the elements affecting knowledge, attitude, and satisfaction of the population regarding PMS program. Demographic factors such as marital status, healthcare workers and medical students, parents with higher education and family history of inherited disorders were associated with higher level of awareness about premarital screening and hereditary disease. The extent of attitude toward premarital screening program was markedly associated with female gender, marital status, higher level of education and higher financial status. Moreover, the study showed that more than 90% of the participants were dissatisfied regarding the premarital screening program[9].

The objectives of this study included measuring the level of understanding of Bahraini university students regarding premarital screening as well as determining the tendency of Bahraini university students' compliance with premarital testing results. In addition, comparing the awareness level between medical and non-medical university students and between both genders which was considered an integral part of this study.

ETHICAL CONSIDERATION

Ethical approval of the Research and Ethics Committee at the College of Medicine and Medical Sciences was endorsed before starting the study. The administration of AGU, and Bahrain Teachers College were informed about this study. Accordingly, the consent statement explained the aim of the study before proceeding, and the questionnaire was sent to the students online. Participation was totally optional, noting that it is a self-answered questionnaire; students were not under any pressure while answering the questions. Moreover, Confidentiality was considered a crucial element to the authors in proceeding the survey; consequently, the identity of the participants was not required.

METHOD

A descriptive, Cross-sectional study was conducted in two universities, Bahrain Teachers College (BTC) and Arabian Gulf University (AGU), specifically to Bahraini students. The study enrolled 313 students from both universities, 150 per major. BTC was chosen because it was the only non-medical institute in Bahrain that accepted Bahraini students only, and it had a total number of 1773 students. On the other side, AGU was a medical university with 401 Bahraini students. Hence 25% of total Bahraini students were taken from each major, that it was considered more suitable for the study. An electronic questionnaire was designed for that reason in Google Forms and was sent to students

Table 1: Demographic characteristics of students participating in the study (n=313)

		Arabian Gulf University		Bahrain Teachers College			
		No.	**%**	**No.**	**%**	**Total**	**%**
Age	20 or less	44	34.4	84	65.6	128	40.9
	21-23	93	58.1	67	41.9	160	51.1
	24 or more	18	72.0	7	28.0	25	8.0
Gender	Female	114	44.9	140	55.1	254	81.2
	Male	41	69.5	18	30.5	59	18.8
Presence of inherited disease in the Family	No	108	55.4	87	44.6	195	62.3
	Yes, 1st Degree Relative	20	33.3	40	66.7	60	19.2
	Yes, 2nd Degree Relative	11	42.3	15	57.7	26	8.3
	Yes, 3rd Degree Relative	16	50.0	16	50.0	32	10.2
Inherited Disease Present in the Family	Beta thalassemia	7	43.8	9	56.3	16	5.1
	Diabetes	4	25.0	12	75.0	16	5.1
	G6PD	12	66.7	6	33.3	18	5.8
	Sickle cell anemia	17	29.8	40	70.2	57	18.2
Total		155	49.5	158	50.5	313	100.0

Table 2: Participants' knowledge regarding pre-marital testing

		Arabian Gulf University		Bahrain Teachers College				
		No.	**%**	**No.**	**%**	**Total**	**%**	**P value**
Premarital Screening Test	I Don't Know	12	57.1	9	42.9	21	6.7	0.301
	Mandatory	137	50.0	137	50.0	274	87.5	
	Optional	6	33.3	12	66.7	18	5.8	
Cost of Premarital Testing	Expensive	4	80.0	1	20.0	5	1.6	0.183
	It is Free	124	50.8	120	49.2	244	78.0	
	Reasonable	27	42.2	37	57.8	64	20.4	
The Test Involves Screening for	Genetic Blood Disorders	51	52.6	46	47.4	97	31.0	0.272
	Infectious and Genetic Blood Disorders	100	47.4	111	52.6	211	67.4	
	Infectious Diseases	4	80.0	1	20.0	5	1.6	
Probability of getting an affected offspring when both spouses are carriers of SCA	25%	105	86.1	17	13.9	122	39.0	< 0.0005
	50%	40	40.8	58	59.2	98	31.3	
	75%	10	10.8	83	89.2	93	29.7	
Probability of getting an affected offspring when one spouse is affected while other is carrier of SCA	25%	19	43.2	25	56.8	44	14.1	0.222
	50%	104	53.3	91	46.7	195	62.3	
	75%	32	43.2	42	56.8	74	23.6	
Current Prevalence of SCA in Bahrain	10,000 - 15,000	85	49.7	86	50.3	171	54.6	< 0.0005
	Less than 5000	23	31.9	49	68.1	72	23.0	
	More than15,000	47	67.1	23	32.9	70	22.4	
Current Prevalence of Beta Thalassemia in Bahrain	1000	64	61.5	40	38.5	104	33.2	0.003
	150	19	33.9	37	66.1	56	17.9	
	300	72	47.1	81	52.9	153	48.9	
Preferable Testing Time	After Everything has Been Prepared	3	100.0	0	0.0	3	1.0	0.207
	Before the Marriage Arrangements	147	49.2	152	50.8	299	95.5	
	It Doesn't Matter	5	45.5	6	54.5	11	3.5	
Setting of premarital screening	Approved Private Hospitals	2	33.3	4	66.7	6	1.9	0.005
	both	119	45.9	140	54.1	259	82.7	
	Primary Health Care Centers	34	70.8	14	29.2	48	15.3	
Idea about Complication arising from Diseases Included in Screening	No	21	22.1	74	77.9	95	30.4	< 0.0005
	Yes	134	61.5	84	38.5	218	69.6	
Premarital testing decreased the spread of hereditary diseases in Bahrain	Strongly Agree	107	45.5	128	54.5	235	75.1	0.036
	Agree	38	59.4	26	40.6	64	20.4	
	I Don't Know	10	71.4	4	28.6	14	4.5	
Commitment to the Test Results	I Don't Know	13	37.1	22	62.9	35	11.2	0.298
	Mandatory	34	51.5	32	48.5	66	21.1	
	Optional	108	50.9	104	49.1	212	67.7	
Total		155	49.5	158	50.5	313		

Table 3: Commitment to pre-marital test results depending on participants' educational degree

		Arabian Gulf University		Bahrain Teachers College				
		No.	**%**	**No.**	**%**	**Total**	**%**	**P value**
Getting married despite Incompatible Results is a Wrong Decision	Strongly Agree	96	50.3	95	49.7	191	61.0	0.414
	Agree	48	51.6	45	48.4	93	29.7	
	I Don't Know	11	37.9	18	62.1	29	9.3	
Undergoing Premarital Testing if it is Optional	No	2	28.6	5	71.4	7	2.2	0.262
	Yes	153	50.0	153	50.0	306	97.8	
Participant's Compliance to the Test Result if both Carriers	Maybe	80	62.0	49	38.0	129	41.2	0.001
	yes	69	39.9	104	60.1	173	55.3	
	no	6	54.5	5	45.5	11	3.5	
Compliance to the Test Results if One of the Couple is a Carrier	Maybe	59	42.1	81	57.9	140	44.7	0.003
	yes	13	37.1	22	62.9	35	11.2	
	no	83	60.0	55	39.9	138	44.1	
Total		155	49.5	158	50.5	313		

by years' representatives via social media platforms, mainly through WhatsApp. The questionnaire was written in both languages, Arabic and English and it was divided into three parts, demographic data (age, gender, academic major), background knowledge on premarital screening and their attitude towards the results of the test.

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. All the qualitative variables were presented as count and percentage. Chi-Square test was utilized to measure the association between knowledge and attitude towards premarital test according to students' major.

RESULTS

The total number of participants enrolled in the study were 313 students, 155 students were from Arabian Gulf University and 158 students from Bahrain Teachers college. There were 114 female participants from AGU (73.5%), while there were 140 (88.6%) female students from BTC. Regarding the age, most of the participants were from the young adult age group, which ranged from 21-23 years old, 93 (60%) students were from AGU and 67 (42.4%) students were from BTC. One hundred and ninety-five students stated that there were no inherited diseases in their families, 108 (70%) students were from AGU while 87 (55%) students were from BTC. On the other hand, 40 (25.3%) non-medical students stated that they had a family history of sickle cell anemia, while only 17 (11%) medical students had positive family history of inherited blood disorders. Refer to table 1 for further information.

The majority of students (87.5%), medical and non-medical- knew that the premarital screening was mandatory, while 108 (69.7%) medical students and 104 (65.8) non-medical students believed that commitment to its result is optional. One hundred (64.5%) medical students realized that the test included screening for both infectious diseases and genetic blood disorders, whereas 111 (70.2%) non-medical students realized that information. Furthermore, medical students were familiar with inheritance of sickle cell anemia as 86% of them answered correctly when they were asked about the probability of having an affected child if both parents were carriers of sickle cell anemia, whereas 89.2% of non-medical students answered incorrectly. Concerning the awareness of the blood disorders' prevalence in Bahrain; minority of students from both universities answered correctly. Fortunately, 128 (81%) non-medical students appreciated the significance of the premarital testing in decreasing the incidence of the inherited disorders. One-hundred and seven (69%) medical students acknowledged the premarital test's significant role in reducing the incidence. More than two thirds of medical students (86.4%) knew the complications arising from inherited diseases, whereas 84 (53%) non-medical students knew the complications. One-hundred and forty-seven (94.8%) students from AGU knew the preferable testing time is before marriage arrangements and 152 (96.2%) BTC students knew almost the same. Regarding the setting of premarital screening, 140 (88.6%) non-medical students knew it could take place in both private hospitals and primary health care centers, whereas 119 (76.8%) medical students knew it could be done in either place (Table 2).

Table 3 showed the attitude of 313 students in both Arabian Gulf University and Bahrain Teacher's College. Results indicated that 96 (61.3%) medical students had a positive attitude toward the test result and believed that proceeding marriage was definitely a wrong decision, and 95 (60%) non-medical students agreed as well. In addition, 153 (98%) medical students and 153 (96.8%) non-medical students approved on undergoing the premarital screening/getting screened even if it was not compulsory. More than half of the Bahrain Teachers College's students which count 104 (60.1%) would comply with the test results if both partners were carriers of the same hereditary disease. However, 80 (51.6%) students from Arabian Gulf University might have insisted on getting married against the counselor's advice. When it concerns to test results compliance, if one partner was a carrier of the hereditary disorder while the other was healthy, 83 (53.5%) medical students agreed to get married, whereas 81 (51.2%) non-medical students were hesitant and did not give a clear answer.

DISCUSSION

This research primarily focuses on the awareness and attitudes of Bahraini university students towards premarital screening in Bahrain. it was obvious that all participants; both medical and non-medical students in this study were generally aware that this test is essential in reducing the incidence of inherited diseases which indicated that university students were totally aware of the burden caused by genetic diseases. A similar result indicated that the students comprehended the importance of premarital screening to prevent the emerging future cases. Multiple previous studies in Saudi Arabia, Oman, Kuwait, Jordan, and Egypt showed similar findings[6,8-18]. This clearly endorses the vital role of premarital screening and counselling in all countries, especially where consanguineous marriages are quite common.

More specifically, it was shown that the general knowledge of premarital screening among both medical and non-medical students was satisfactory. Participants were fully aware of the requirement of premarital screening and they typically provided correct answers regarding setting, timing, cost and compliance to the test`s results. Similar research conducted on Riyadh University male students in 2015, which indicated that the majority of participants' responses were considerably similar to this current study[19]. Other studies conducted in Western Saudi Arabia in the years 2009 and 2017, which revealed insufficient knowledge scores among half of the participants contradicting the current study results[10,11]. Moreover, almost two thirds of this study sample concluded that the test comprised screening for both genetic and infectious diseases corresponding to the studies conducted in Riyadh and Egypt[15,19].

However, when it comes to comparing the knowledge of premarital screening between two majors, many studies were found to support that there is a variance in students' information based on the major they are studying. This was proved in Abha city, where a study was performed on medical and non-medical students[12]. It revealed that almost all medical participants had higher awareness levels regarding premarital screening. As well as in Oman, where research was carried out and appeared that medical students significantly scored higher compared to students from other non-medical majors in consonance with premarital screening[8]. Additionally, there was an Egyptian study signifying that the medical students were more knowledgeable about premarital testing than the other non-medical students[20]. Furthermore, a study conducted on Hadramout University students in Yemen demonstrated the presence of a significant difference between medical and non-medical participants in the aspect of knowledge toward premarital screening[16].

Upon commencement of this research, it was hypothesized that there might be a correlation between one's major and knowledge to genetic diseases. It was demonstrated when the participants were questioned about the probability of having a diseased child if both parents were carriers of sickle cell anemia. Majority of the medical students answered correctly whereas most of the non-medical students answered incorrectly. It is apparent in this statistic that the medical students' knowledge was acquired from medical studies. However, this is not considered sufficient evidence as almost identical percentages

were obtained from both medical and non-medical students. This was regarding the probability of having an affected child when one of the parents was affected with sickle cell disease and the other one is a carrier. This might indicate irrelevance of one's major with one's facts.

The reason behind the knowledge of the majority in this current study could be mostly referred to the great efforts made by the government of Bahrain to raise the awareness of the next generation, and to preserve the health of individuals and the society. Since this disease is widespread in Bahrain, it might also have contributed to the results obtained. Inheritance in one's family for example, could be observed and it might have been intriguing enough for the individual to self-study on the subject issue since this could have a negative impact on one's future family, considering that it increases the risk in a family for getting certain health conditions. An Egyptian study reported that there was a significantly higher level of knowledge regarding premarital screening in students with consanguineous parents in comparison to students' whose parents were not related[15].

With regard to participants' attitude towards premarital testing, the majority of participants showed an overall positive attitude that they chose to comply with the premarital test results and therefore showed a state of refusal to the idea of proceeding marriage in order to avoid any undesirable consequences in future. This is also shown in the Saudi research conducted in 2017, where half of the unmarried participants (all of which were females) shared the same belief[10]. In addition, another Saudi study conducted in 2019 found that the belief of majority of the participants was similar to the participants' belief in this study[14]. More than half of the non-medical students in this study would abide to the counselor's advice if the couple were carriers of the same hereditary disease. It seems that non-medical students' emotional intelligence was a factor in this decision which corresponds with both studies that were performed in Iran in 2012 and 2018[21,22].

Despite the medical students' initial beliefs, half of the participants might insist on getting married against the advice of the counselor even if the couple were carriers of the same hereditary disease. The same attitudes were seen in a Chinese study, which was directed on medical and non-medical students regarding smoking prevalence[23]. The study concluded no significant difference between medical and non-medical students in smoking prevalence. Proving that involvement in the medical field and understanding the risks of smoking did not affect the person's behavior towards smoking. The same attitude was also observed in this study when comparing the participants' majors in correlation to compliance. This was supported by another study conducted in 2009 on Saudi`s medical students, which showed that prevalence of cigarette smoking was extremely high[24]. On the other hand, a study in Egypt conducted on universities` medical students, and showed that only few of the participants smoked with the knowledge of smoking health hazards[25].

Nonetheless, in this study medical students justified their non-compliance due to the participants' background of the advanced medical procedures. For example, in vitro fertilization (IVF) and preimplantation genetic diagnosis (PGD) that could reduce the chance of getting an unhealthy child. It appears that medical students' choice was influenced by participants' understanding of medical advancements in artificial reproductive technology. Still, this does not correlate with the study conducted in Saudi Arabia, where many at-risk couples withdrew from their marrying decision[6]. This notion was also supported by three studies conducted in Saudi Arabia and Egypt in which half of the participants of each study had a positive attitude towards premarital screening[11,26,27]. Majority of the university students participating in studies conducted in Tabuk and Jordan also showed positive attitudes[17,28,29]. Contrarily, negative attitude towards premarital screening was noted in the participants of a Qatari research[30]. Also, another Saudi research conducted in 2006 found that majority of at-risk couples decided to marry irrespective of the incompatibility of results[31].

Alternatively, the participants' behavior shifted when a slight change in the situation appeared. If premarital screening's results revealed that one partner was healthy while the other was only a carrier for some hereditary disease, half of the medical students opted to marry. Additionally, medical students seemed to realize that the offspring would be healthy and that the probability of having a carrier child could possibly be low. Again, this implies that medical students understand how genetic diseases are inherited. While few of the non-medical participants were actually willing to marry despite the test results. The reason provided was that the child would not bear any consequences. On the other hand, a one third of the non-medical students stated that marriage was not preferable, which indicated obviously that non-medical students at some extent apprehensive about having an unhealthy offspring in future. This study implied that the participants, both medical and non-medical, had different perspectives, ideas and choices regarding the different situations proposed.

CONCLUSION

The study demonstrated an overall sufficient premarital screening test's knowledge among university students in Bahrain. The medical and non-medical participants displayed a varied levels of knowledge about the basic facts of the inherited blood disorders. The results showed that the students' major does not affect one's compliance to pre-marital test results. In conclusion, educational efforts provided by the concerned authorities should be further continued to prepare next generations in making informed decisions in the future. Just as importantly, long term campaigns and target-based programs for the local population should be taken into consideration intensively.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflict of Interest: None.

Competing Interest: None.

Acceptance Date: 18 July 2022

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