

Perception and Knowledge of Primary Health Care Doctors Toward the Premarital Screening Program at the Ministry of Health, Jeddah- Saudi Arabia

Sana Sulaiman Al Zaidi¹, Nayef Abdulrahman AlJohani^{2*}

¹Senior Registrar Family Medicine, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia.

^{2*}Consultant Family Medicine, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia.

ABSTRACT

Background: The Ministry of Health launched the premarital counseling and screening program in 2004 in Saudi Arabia. It was first established due to the high prevalence of hereditary hemoglobin disorders. Every Saudi citizen has access to this service free of charge.

Objectives: To assess the knowledge of primary health care physicians towards the national premarital screening program at the Ministry of Health, Jeddah Saudi Arabia in March 2016 and to determine the factors associated with the primary health care doctors' perception and knowledge toward the premarital screening program.

Materials and Methods: A cross sectional study design was carried out among primary health care physicians in Jeddah, Saudi Arabia, March, 2016. A simple random sampling method was first used to identify primary health care centers from each sector. Data were obtained using self-administered questionnaire.

Results: This study included 151 physicians. Their ages ranged from 26–50 years, with a mean \pm SD age of 33.6 \pm 6.0 years. Overall, good knowledge (>75%) was reported among more than half of the respondents (53%), while poor knowledge (<60%) was reported among 23.2% of them. The majority of the physicians (98.7%) agreed that the premarital screening program was important, and 92.1% of them support the compulsory application of the premarital screening

program. Also, a majority of these physicians (90.1%) agreed that the premarital screening program plays a role in controlling the commonest hereditary diseases.

Conclusion: The results of present study revealed that the primary health care physicians' level of knowledge regarding the premarital screening program is deficient in some respects. In particular, physicians appear to provide differing responses in terms of how long the premarital test should remain valid, as well as pertaining to the meaning of incompatible test results. However, there was generally a positive perception toward the importance of this program and its compulsory application.

Key words: Primary Health Care, Premarital Screening, Knowledge, Perception.

*Correspondence to:

Dr. Nayef Abdulrahman AlJohani,
Consultant Family Medicine,
King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia.

Article History:

Received: 08-09-2019, Revised: 05-10-2019, Accepted: 02-11-2019

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2019.5.6.017	

INTRODUCTION

Hereditary diseases are diseases that are caused by mutant genes, and they may be transmitted from one generation to the next. These types of conditions are usually chronic in nature, in so far as they require continuous care and support. These types of diseases commonly lack definitive treatments, and the affected individual, as well as his or her family and/or community, most likely experience negative psychological, economic, and physiological impacts. These genetic diseases can result in the development of different chronic health issues. Moreover, a variety of genetic problems can be transmitted from a carrier parent through his or her offspring via a specific pattern of inheritance. These genetic diseases include thalassemia, hemophilia, sickle-cell disease, red cell enzymopathies, and

inborn errors of metabolism. The gene for sickle-cell disease was first discovered in the Eastern region of Saudi Arabia in 1963. Then, the gene for thalassemia was subsequently discovered by many investigators.¹

A premarital screening exam involves conducting a test prior to marriage to identify any genetic problems such as thalassemia and sickle-cell anemia, as well as to rule out certain infectious diseases, including hepatitis B, hepatitis C, and acquired immunodeficiency syndrome (AIDS)/human immunodeficiency virus (HIV). When conducting these tests, medical counseling is also offered as part of this program when delivering the results, as this can aid in creating a good future of new generations of children that are free of per-identifiable harm or sickness.²

Congenital and genetic abnormalities are common in Arab societies. As such, the premarital screening program is important for changing the general perception toward consanguinity. Such marriages are rare or may be forbidden in western societies, and they are commonly restricted by civil regulation and religious roles. The estimated rate of consanguineous marriages in the Arab region ranges from 25%–60%. Moreover, these types of marriages are encouraged by families and communities of this region.³

The national pre-marital screening program was established as a method to prevent the development of certain genetic disorders (sickle-cell anemia and thalassemia) by detecting the carrier of a recessive gene. A Royal Decree was passed on 18/3/2002, which consisted of arranging a three-year health awareness program in partnership with the media to explain the advantages of said program, as well as to discuss the serious side effects of genetic and infectious disorders, preparing laboratory settings, in terms of equipment provision and staff, training, to facilitate the national premarital screening program, offering this program, as well as ensuring patient confidentiality, to all Saudis who wished to benefit from this new service and coordinating and organizing the activities between the Ministry of Health and the Ministry of Justice to make sure that the 'Ma'azon' explains the benefits of the national program to the involved couples. Then, over the course of the next two years, acceptance of the national program had increased and the number of individuals who benefited from it also increased. As such, a second Royal Decree was posted on 30/12/2003, which rendered the national premarital exam as a mandatory process for identifying common hereditary genetic disease prior to getting married. It was explained that this program does not aim to prevent marriages from occurring; it only serves as a means to prevent genetic disorders. In fact, the Ministry of Health originally founded this program to test for the sickle-cell gene and the thalassemia gene. Once testing is complete, couples will receive a certificate after counseling and the marriage will occur regardless of the results, but if only each couple agrees to continue with the process of marriage.⁴

At the present time, there are more than 100 health reception centers, 70 laboratories where testing is carried out, and 20 educational and genetic counseling clinics all around the country. Every Saudi individual has free access to this program.⁵

In 2004, the Ministry of Health announced that the total number of carriers of HIV was 11,000, with a prevalence of 0.011% among the Saudi population. The estimated prevalence rates of hepatitis B and hepatitis C are available, but these results do not target the members of the population that benefit from premarital screening.⁶ However, it should be noted that the mandatory premarital screening program tests for the hepatitis B virus and hepatitis C virus, as well as for HIV; this testing began in 2008.⁷

The Ministry of Health established the premarital screening program with numerous objectives that considered the ethical, religious, economic, and psychological aspects of the individuals and community it served. These objectives are summarized in the following points:

1. To minimize the distribution and frequency of genetic abnormalities in order to limit the burden on the community.
2. To decrease the disease burden affecting new children.
3. To increase the community's level of knowledge and awareness of hereditary diseases.

4. To help the community avoid the psychosocial problems that result from having a sick child in the family.
5. To decrease the economical problems that impact families with an affected child, and that also impact these children's health care providers.
6. To minimize the complications faced by affected children, their families, and their communities.⁸

The present study aimed to assess the knowledge of primary health care physicians towards the national premarital screening program at the Ministry of Health, Jeddah Saudi Arabia in March 2016 and to determine the factors associated with the primary health care doctors' perception and knowledge toward the premarital screening program.

SUBJECTS AND METHODS

The cross-sectional study was carried on in Jeddah. Jeddah is the major urban center of western Saudi Arabia and the largest port on the Red Sea. Moreover, it's also the largest city in Makah Al-Mukarama Province with estimated population of 4.2 million people. The city is divided into five major sectors. The north east and north west includes 10 primary health care centers, central sector contains 8 primary health care centers, south west contain 8 primary health care centers and finally the south east has 7 primary health care centers. This study investigates doctors from the Primary Health Care Centers associated with the Ministry of Health in March, 2016.

Based on power calculations of the Raosoft software, the sample size was 194 doctors, based on the following:

Primary population, 393 physicians from the Primary Health Care Centers of the Ministry of Health in Jeddah, Saudi Arabia, prevalence: 50%, confidence level: 95% and error: 5%.

A simple random technique sampling was used to obtain the required sample size. Eight Primary Health Care Centers were chosen randomly from each sector; a total of 39 centers were included in the study. From each Primary Health Care Center included in this study, physicians were chosen by convenience. The number of physicians responded to the questionnaire was 173, 22 of them had incomplete answers, after removing those data the sample size was 151.

A self-administered questionnaire validated by three different consultants from the Joint Program of Family and Community Medicine, Jeddah, Saudi Arabia was employed. The questionnaire contained three parts: a section pertaining to the respondents' socio-demographic data, a section that explored the physicians' perception of the premarital screening program, and a section that asked about physicians' knowledge of the premarital screening program. The questionnaire also had two types of questions: yes and no questions, and multiple-choice questions.

The computer program, SPSS (Statistical Package for the Social Sciences) version 22 (IBM Corporation, Armonk, NY, USA) was used for the analysis. A *P*-value <0.05 was considered statistically significant. The Mann–Whitney U test and the Kruskal–Wallis test were used, as they were most appropriate for the data analysis as Physicians' total knowledge and perception scores were not-normally distributed, as evidenced by significant Kolmogorov–Smirnov test results. The knowledge score was computed as '1' if the correct answer was provided, and '0' if an incorrect or missing answer was provided. Then, the physicians' total scores were tabulated, where total responses ranged from '0' to '9'. The

percentage of the total score was then calculated. A 'poor' knowledge score was considered when a physician scored below 60%, while scores between 60%– 75% were indicative of physicians' 'fair' knowledge of the screening program, while those who scored more than 75% were considered to have 'good' knowledge of the program. The cut of point was measured based on the mean and the assumption on high and low levels of knowledge was drawn from previous studies.

For the perception questions, a score of '1' was given to positive responses toward the premarital screening program, while a score

of '0' was assigned to negative response. Then, the total score was computed for each physician (with total scores ranging from 0–5).

Research Committee Approval at the Joint Program of Family and Community Medicine, Jeddah, Saudi Arabia was obtained. Higher Authority Approval was obtained from the Ministry of Health. Written informed consent was also obtained from all participants. The questionnaire responses remained anonymous and they were coded by number to maintain the participants' confidentiality. Acknowledgment to all supervisor, advisors and participants

Table 1: Participants' demographic characteristics (n=151)

Variables		Frequency	Percentage
Age in years	26-30	62	41.1
	31-35	47	31.1
	36-0	18	11.9
	>40	24	15.9
	Range		26-50
	Mean ± SD		33.6±6.0
Sex	Male	38	25.2
	Female	113	74.8
Marital status	Single	30	20.0
	Married	109	72.2
	Divorced/widowed	12	8.0
Nationality	Saudi	135	89.4
	Non-Saudi	16	10.6
Years of practice after graduation	≤5	62	41.0
	6-10	51	33.8
	>10	38	25.2
	Range		1-25
	Mean ± SD		8.7±6.5
Job title	General practitioner	67	44.4
	Resident	25	16.6
	Specialist	36	23.8
	Consultant	23	15.2
Educational qualification	Bachelor degree	89	58.9
	Diploma	2	1.3
	Master	14	9.3
	Board	46	30.5

Table 2: Physicians' responses to the premarital screening knowledge questions

Statements:	Correct answer	
	Frequency	%
Do you believe that gene mutation may lead to hereditary disorders?	137	90.7
Do you believe that consanguinity can increase the risk of genetic disorders?	149	98.7
Do you believe that hereditary diseases can affect any system in the body?	148	98.0
If the results of the screening consisted of a hematological disease that could affect the next generation offspring, the decision of marriage is totally back to the couples.	149	98.0
A non-compatible test means that:		
When having a positive test in general, you should:	89	58.9
Which one of the following are parts of the national premarital screening program investigation?:	148	98.0
When having a positive infectious disease test, you should:	94	62.3
What is the accepted duration for the premarital test to remain valid?	57	37.7

RESULTS

The study included 151 physicians. Their ages ranged between 26 and 50 years with a mean \pm SD age of 33.6 ± 6.0 years. Females represented 74.8% of all participants. Most of them were married (72.2%), and the majority of the physicians were Saudi (89.4%). Their experience after graduation ranged between 1 and 25 years, with almost one-quarter of participants (25.2%) reporting experiences of more than 10 years. General practitioners represented 44.4% of all participants, while consultants represented 15.2%. More than half of the participants (58.9%) held a Bachelor's degree as the highest degree, while 30.5% held a Board degree (Table 1). Slightly more than one-third of the married physicians (35.5%) had premarital screening.

Based on an average estimation, approximately 47.7% of the physicians have seen more than 200 patients in the last three months; moreover, 13.9% of physicians have seen 50 patients or less within this same time period. Forty-seven percent of the physicians in this study spent an average of only 10 minutes with each patient.

A total of 22.5% of physicians received training courses about the national premarital screening program, as displayed in Figure 1. In almost all cases, the duration of the course was one day (n=33; 97.1%), with the exception of one case where the duration was 3 days. Only 11 physicians remembered when this course was held; their answers ranged between 2 and 10 years prior. Only 4 physicians, representing 2.6% of the participants in this study, reported working in a premarital screening clinic.

Table 2 summarizes the physicians' responses to 9 questions that explored their knowledge of the premarital screening program. The majority of respondents correctly recognized that

consanguinity can increase the risk of their offspring developing genetic disorders (98.7%). Moreover, 98% believed that hereditary diseases can affect any system in the body, and 98% also agreed that if the screening results indicated the presence of a hematological disease that could affect the next-generation offspring, the decision to marry rests in the couple's hands. Furthermore, 98% answered that sickle-cell screening, thalassemia, hepatitis B virus surface antigen, hepatitis C virus, and HIV screening, as well as complete blood counts should be part of the national premarital screening program investigation, while 90.7% agreed with the statement that genetic mutations may lead to the development of hereditary disorders in offspring. Almost two-thirds of the physicians (62.3%) correctly knew that in the event of a positive infectious disease test result, they should repeat the test for confirmatory purposes and they should then refer the patient to a specialty clinic, where the condition can be followed up and managed. The premarital certificate will not be issued at that time. More than half of the physicians (58.9%) also correctly knew that in the event that a positive test result is received in general, they should disclose the result to the positive partner only. At that point, they should then ask for permission to inform the other partner. Fewer than half of the physicians in this study (45.7%) correctly recognized the meaning of non-compatible test results, and slightly more than one-third of these physicians (37.7%) were familiar with the currently accepted duration that the premarital test results remained valid.

Overall, good knowledge (a score $>75\%$) was reported among more than half of the physicians in this investigation (53%), while poor knowledge (a score $<60\%$) was demonstrated among 23.2% of physicians, as illustrated in Figure 2.

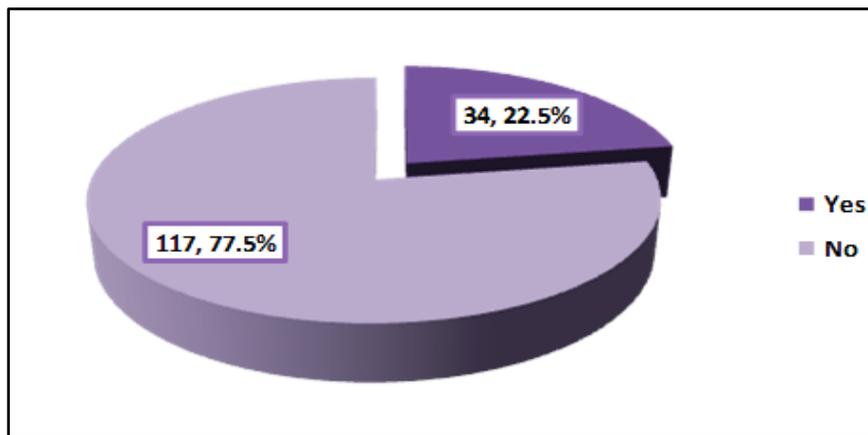


Fig 1: Participants' history of attending training courses on premarital screening program

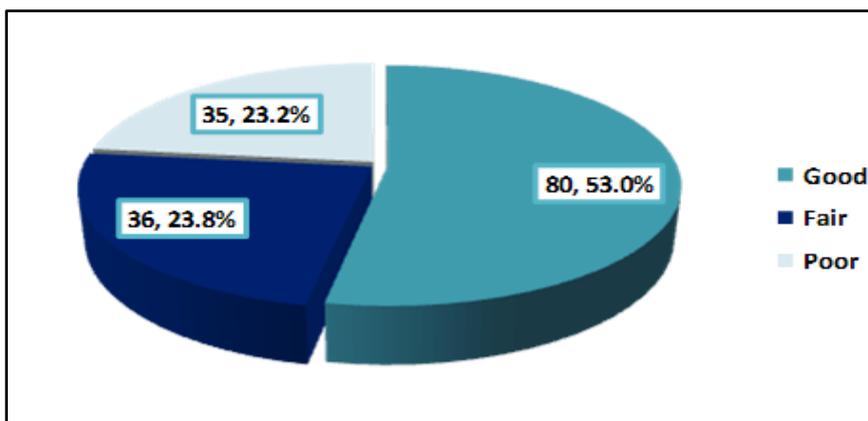


Fig 2: Physicians' overall knowledge of the premarital screening program.

Table 3 presents the association between the physicians' demographic characteristics and their knowledge level of the premarital screening program. Older physicians, i.e. those aged over 40 years, had the highest knowledge score (mean rank: 96.4), while those aged between 26 and 30 years had the lowest score (mean rank: 59); this difference was statistically significant ($p < 0.001$). Divorced/widowed physicians had a higher knowledge score of the premarital screening program when compared to singles (mean ranks: 113.7 and 64.8, respectively); this difference was statistically significant ($p = 0.003$).

Moreover, Saudi physicians had a significantly higher knowledge score about the premarital screening program when compared to that of non-Saudis (mean rank: 79.2 versus 49.2, respectively; $p = 0.008$). Physicians who had more than ten years of experience after graduation had a significantly higher knowledge score (mean rank: 96.2) compared to those with less experience ($P < 0.001$). Similarly, consultant physicians had the highest premarital screening knowledge score (mean rank: 124.3), while general practitioners had the lowest score (mean rank: 55.8); this difference was also statistically significant ($P < 0.001$). Also physicians holding a Board degree had a significantly higher premarital screening knowledge score when compared to those holding a diploma/Master's degree (mean ranks: 112 and 54.1, respectively; $P < 0.001$).

As seen in Table 4, those physicians who did not perform premarital screening examinations had significantly better knowledge of this program when compared to those who actually performed it (mean ranks: 71.9 versus 55, respectively; $P = 0.009$). In Table 5, physicians who encountered between 51 and 100 patients in the last 3 months had the highest level of premarital screening knowledge (mean rank: 101.7), while the lowest knowledge level was reported among those who encountered more than 200 patients in the last 3 months (mean rank: 59.4); this difference was statistically significant ($P < 0.001$). Physicians who spent an average of more than 15 minutes with their patients recorded significantly higher premarital screening knowledge scores when compared to other physicians (mean rank: 98.7; $P < 0.001$). Moreover, those physicians who worked in a premarital screening clinic had a significantly better knowledge score than those physicians who did not work in these clinics (mean ranks: 124.3 versus 74.7, respectively; $P = 0.022$).

Attending training courses on the national premarital screening program was significantly associated with a doctor's ability to possess good knowledge about it (mean ranks: 122.1 and 62.1 for physicians who attended these courses and those who did not, respectively; $P < 0.001$). However, it should be noted that the number of courses offered was not a significant predictor of knowledge scores (Table 6).

Table 3: Association between the physicians' demographic characteristic the knowledge of premarital screening program

Variable	Median	IQR	Mean Rank	P-value	
Age (years)	26–30 (n=62)	66.7	55.6–77.8	59.0	<0.001*
	31–35 (n=47)	77.8	66.7–100	82.5	*
	36–40 (n=18)	88.9	66.7–100	90.6	
	>40 (n=24)	100	66.7–100	96.4	
Sex	Male (n=38)	88.9	66.7–100	86.9	0.069*
	Female (n=113)	66.7	61.1–88.9	72.3	
Marital status	Single (n=30)	66.7	55.6–88.9	64.8	0.003**
	Married (n=109)	77.8	66.7–100	74.9	
	Divorced/widowed (n=12)	100	88.9–100	113.7	
Nationality	Saudi (n=135)	77.8	66.7–100	79.2	0.008*
	Non-Saudi (n=16)	66.7	55.6–66.7	49.2	
Years of practice after graduation	≤5 (n=62)	66.7	55.6–77.8	60.8	<0.001*
	6–10 (n=51)	77.8	66.7–100	79.5	*
	>10 (n=38)	100	66.7–100	96.2	
Job title	General practitioner (n=67)	66.7	55.6–77.8	55.8	<0.001*
	Resident (n=25)	77.8	61.1–88.9	73.1	*
	Specialist (n=36)	83.3	66.7–100	84.7	
	Consultant (n=23)	100	100–100	124.3	
Educational qualification	Bachelor's degree (n=89)	66.7	55.6–77.8	61.4	<0.001*
	Diploma/Master's degree (n=16)	66.7	55.6–83.3	54.1	*
	Board (n=46)	100	88.9–100	112	

*Mann-Whitney test; **Kruskal-Wallis test

Table 4: Association between physicians' previous history of performing the premarital screening examination and their knowledge of this process

Previous history of premarital screening	Median	IQR	Mean Rank	P-value*
Yes (n=78)	77.8	63.9–88.9	55.0	0.009
No (n=43)	88.9	66.7–100	71.9	

*Mann-Whitney test.

Table 5: Association between physicians' clinical experience and their premarital screening knowledge

Clinical experience		Median	IQR	Mean Rank	P-value
Average number of patients encountered by physicians in the last 3 months	≤50 (n=21)	77.8	66.7–100	83.1	<0.001*
	51–100 (n=31)	100	77.8–100	101.7	*
	101–200 (n=27)	77.8	66.7–100	85.1	
	>200 (n=72)	66.7	55.6–77.8	59.4	
Average time spent with one patient (minutes)	5 (n=20)	66.7	55.6–88.9	64.9	<0.001*
	10 (n=71)	66.7	55.6–77.8	61.5	*
	15 (n=17)	88.9	66.7–100	92.2	
	>15(n=43)	100	77.8–100	98.7	
Ever working in a screening clinic	Yes (n=4)	100	91.7–100	124.3	0.022*
	No (n=147)	77.8	66.7–100	74.7	

*Mann–Whitney test; **Kruskal–Wallis test

Table 6: Association between physicians' attendance at a premarital screening course and their premarital screening knowledge

Courses related to the national program of premarital screening		Median	IQR	Mean Rank	P-value
Attended training courses about the national premarital screening program	Yes (n=34)	100	97.2–100	122.1	<0.001*
	No (n=117)	66.7	55.6–77.8	62.6	
Number of courses	One (n=20)	100	88.9–100	16.3	0.499**
	Two (n=71)	100	100–100	19.3	
	Three (n=17)	100	100–100	19.3	

*Mann–Whitney test; **Kruskal–Wallis test

Table 7: Physicians' responses to the premarital screening perception questions:

Question	Frequency	%
▪ Do you believe that the premarital screening program plays a role in controlling the commonest hereditary diseases?	136	90.1
▪ Do you think that the premarital screening program is important?	149	98.7
▪ Do you believe that the national premarital screening program lacks some hematological and infectious diseases, and that it needs to be upgraded for further testing?	45	29.8
▪ Which of the following tests should be included in the national premarital screening program? (n=45)		
Syphilis	39	86.7
Syphilis and gonorrhea	5	11.1
VDRL	1	2.2
▪ Do you support the compulsory application of the premarital screening program?	139	92.1
▪ What would your decision be if your own premarital screening results were positive?		
-Cancel the engagement	92	60.9
-Continue with the process	59	39.1
▪ If your answer was to continue the process, what are the reasons underlying your decision?		
Emotional reasons	30	50.8
Spiritual reasons	8	13.6
Other	21	35.6

Perceptions Toward the Premarital Screening Program

As shown in Table 7, the majority of physicians (90.1%) agreed that the premarital screening program plays a role in controlling the development of the commonest hereditary diseases, and 98.7% of physicians also agreed with the notion that the premarital screening program is important. Less than one third of physicians (29.8%), particularly females, believed that the national premarital screening program lacks some hematological and infectious diseases and that it needs to be upgraded for further

testing; in particular, 86.7% of physicians stated that syphilis should be tested. Moreover, 92.1% of the participants support the compulsory application of the premarital screening program. When asked what they would do if their own premarital screening results were positive, 60.9% of physicians stated they would cancel their engagement, while the remaining 39.1% will opt to continue with the marriage process, mostly for emotional reasons(50.8%).

As shown in Table 8, females had significantly higher perceptions toward the premarital screening program when compared to males (mean ranks: 80.2 and 63.7, respectively and p-value of 0.027).

Other studied demographic characteristics (age, marital status, nationality, experience, job title, and educational qualification) were not significantly associated with physicians' perceptions toward the premarital screening program.

Table 8: Association between physicians' demographic characteristics and their perceptions of the premarital screening program

Variable		Median	IQR	Mean rank	p-value
Age (years)	26–30 (n=62)	80	80–100	72.5	0.175**
	31–35 (n=47)	80	80–100	86.6	
	36–40 (n=18)	80	80–85	70.3	
	>40 (n=24)	80	65–95	68.6	
Sex	Male (n=38)	80	60–80	63.7	0.027*
	Female (n=113)	80	80–100	80.2	
Marital status	Single (n=30)	80	75–100	72.3	0.756**
	Married (n=109)	80	80–100	76.3	
	Divorced/widowed (n=12)	80	80–100	82.2	
Nationality	Saudi (n=135)	80	80–100	77.8	0.107*
	Non-Saudi (n=16)	80	60–80	60.8	
Years of practice after graduation	≤5 (n=62)	80	80–100	72.5	0.214**
	6–10 (n=51)	80	80–100	83.9	
	>10 (n=38)	80	80–100	71.1	
Job title	General practitioner (n=67)	80	80–100	73.2	0.832**
	Resident (n=25)	80	80–100	81.6	
	Specialist (n=36)	80	80–100	76.0	
	Consultant (n=23)	80	80–100	78.1	
Educational qualification	Bachelor's degree (n=89)	80	80–100	76.6	0.100**
	Diploma/Master's degree (n=16)	80	60–80	56.9	
	Board (n=46)	80	80–100	81.6	

*Mann–Whitney test; **Kruskal–Wallis test

DISCUSSION

Online searches did not yield any national or international studies that discussed physicians' knowledge of and perceptions toward the premarital screening program. Most of the studies assessed the views and understanding of this program among the general population or between various student populations. Therefore, comparing the results of this current study with those of prior studies would be rather impractical. To the researcher's knowledge, the present study is the first of its kind to be conducted in the Kingdom of Saudi Arabia, as it investigates primary health care physicians' knowledge of and perceptions toward the national premarital screening program.

Primary care physicians' ability to possess good knowledge about – and positive perceptions toward – the national premarital screening program is essential to ensuring that this program becomes successful and effective throughout the country. Therefore, this study was designed to explore these physicians' understanding and views toward this screening program at the Ministry of Health, Jeddah, Saudi Arabia, as well as to assess any associated factors. Saudi Arabia and the Gulf Countries have a high frequency of consanguineous marriages. This has an effect on couples' offspring and results in high rates of genetic disorders.⁹ Thus, genetic diseases – particularly hereditary hematologic disorders – constitute a significant burden on public health in Saudi Arabia.¹⁰ Therefore, limiting these disorders and their associated complications could be achieved by implementing and refining the national premarital screening program.

This study revealed that physicians held positive perceptions toward the current premarital screening program, as the majority of respondents believed that the program plays a role in controlling the commonest hereditary diseases. In this vein, the respondents agreed with the idea that the premarital screening program is important. Similar positive attitudes were also reported among the general population in Saudi Arabia^{11,12} and worldwide.¹³ Enhance that this positive attitude will contribute to further development of the premarital screening program in Saudi Arabia.

Positive attitudes toward the program were also recorded in Oman among adults attending selected primary health care centers. In fact, 89.3% of the participants were aware of the national premarital screening program, and 84.5% of them believed that the premarital screening program is important. Similarly, the results from a study that was conducted in Oman among Sultan Qabus University students investigated their knowledge of and attitudes toward the premarital screening program. The findings highlighted that 79% of the students were aware of the national Omani premarital screening program¹⁴, these findings tie into the researcher's result when the majority of the participants believed in the importance of the premarital screening program.

In this study, the majority of physicians included in this investigation supported the compulsory application of the national premarital screening program. When compared to the findings some additional studies conducted in both Riyadh and Abha,

Saudi Arabia it was noted that the majority (as many as 70%–75%) of the general population also agreed with the concept of applying the premarital screening program to all couples preceding the marital process in Saudi Arabia.^{11,12,15,16}

When investigating the significance of the premarital screening program, a community community-based survey was conducted in Saudi Arabia, which reported that 94% of the general population considered that both the premarital screening program and the available counseling sessions were important for preventing genetic blood diseases. In this vein, 87% of the respondents favored the idea of making the program mandatory and including it as part of the marital process¹⁷ and to stress on this point in the current study, the researcher found a study that was done in Riyadh that compares the transmission of genetic hematological disorders over the first 6 years of implanting the premarital screening national program which was in regression manner¹⁸, unfortunately the researcher did not find any published data about the transmission of the infectious diseases because in this current study the 98.7% of the participants agreed that the national premarital screening program is important, moreover 90.1% of them believed that this program has a role in controlling the commonest hereditary diseases. A considerable proportion of the physicians in the current study believed that the national screening program lacks some hematological and infectious disease testing, and that it needs further upgrading. To support this idea, in Iran, the young adult population also expressed positive views toward the idea of using the premarital screening program to also test for hepatitis B infection.¹³ Contrary to the Iranian study, the findings of the present investigation highlighted that the respondents highly favored the idea of incorporating syphilis testing in addition to the tests that already included in the Saudi national premarital screening program. Further investigations are needed to explain this finding.

The only significant factor in this study that affected the physicians' perceptions of the premarital screening program in this present investigation was female gender. Females tended to highly favor the national program when compared to males this could be explained by the fact that some of the infectious diseases in male has the highest prevalence than females such as HIV which was 3:1 male to female ratio affection.¹⁰ This result is contradictory to another study that was conducted in Nigeria, where males were two times more likely to have a positive attitude toward the mandatory HIV premarital testing¹⁹, this might be attributed to the prevalence of HIV among women according to the United Nations Aids Nigeria women carry the highest prevalence in HIV affection and that might explain why women are against adding this test in the program.⁹ In addition, a study in China evaluated the factors that influenced the population's participation in the premarital screening program before it became mandatory. The researchers found that older age and higher profession such as scientists and teachers contributed to increased participation in the program.²⁰ Nevertheless, in this study there were significant positive correlations between the level of knowledge and the level of education.

Regarding the respondents' overall knowledge of the national premarital screening program, it was found to be generally low, as 53% of the physicians demonstrated good knowledge, 23.8% exhibited fair knowledge, and 23.2% showed poor knowledge scores. The physicians' knowledge was particularly low with

respect to certain aspects, such as the accepted amount of time for which the premarital test would remain valid, as well as the meaning of a non-compatible test result. In fact, it seems that knowledge about non-compatible test results is generally low, as a study conducted at King Abdulaziz University, Jeddah, Saudi Arabia showed that only 38% of students knew the meaning of non-compatible results.¹⁵

Finally, in this study, despite the fact that the majority of physicians agreed on the importance of the national premarital screening program and its compulsory application, 39.1% reported that they will proceed with the marriage process, even if they received a positive test result due to emotional reasons, these reasons could be having a relationship with the infected partner or maybe due to our strict community is to not let the parents who arranged the wedding down so the other partner will continue in the process of getting married.

The results of the present study revealed that there attending courses on the premarital screening program did not affect the respondents' level of knowledge of or perception toward the initiative and this might be because of the timing of the lectures since it was minimally before 5 years or also it could be the short duration of the lecture which was mainly 1 day only. Also, in this study, the physicians' clinical experience, the average number of patients seen in the last three months, the average amount of time spent with one patient, and previous experience working in a premarital screening clinic did not have a statistically significant impact on the physicians' knowledge toward the premarital screening program and also this could be contributed to the lack of training programs that aware the physicians constantly about the premarital screening, as well as the un-relating type of cases that physicians face in the primary health care center so they will not be exposed to this area for a very long time. In addition, there actually undergoing a premarital screening exam did not affect the physicians' perceptions of this program and that could be attributed for the lack of the premarital counseling and educational program in addition to the screening test. However, some limitations should be mentioned. First, by conducting the study in one city of the Kingdom could affect the generalizability of the findings. Second, given that the study was cross-sectional in nature prevents it from determining a level of causality between the compared variables. Lastly, it would be difficult to compare the results of this study with those of other investigations, as other studies were performed with either the general population or university students, and so the physicians' perspectives are largely underrepresented.

In conclusion, primary health care physicians' knowledge on the premarital screening program in Jeddah, Saudi Arabia is lacking in some respects, as physicians are not aware of the currently accepted duration for which the premarital test results remain valid, nor are they able to accurately articulate the meaning of non-compatible test results. Younger, single, less experienced and less qualified general practitioners and non-Saudi physicians were also less knowledgeable about the program. However, despite this lack of knowledge, the physicians generally regarded the program, as well as its importance and compulsory application, in a positive light, highlighting that this program should be further developed as part of the marital process. Finally, it was observed that female physicians were more likely than males to have a more positive perception of the program.

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Source of Support: Nil. **Conflict of Interest:** None Declared.

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Cite this article as: Sana Sulaiman Al Zaidi, Nayef Abdulrahman AlJohani. Perception and Knowledge of Primary Health Care Doctors Toward the Premarital Screening Program at the Ministry of Health, Jeddah- Saudi Arabia. Int J Med Res Prof. 2019 Nov; 5(6):67-75. DOI:10.21276/ijmrp.2019.5.6.017