


Knowledge and attitude of Engaged and Recently Married Couples Toward Premarital Screening: A Cross-Sectional Study

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Abstract

Background and Objective: Despite that inherited (thalassemia and SCA) and infectious (hepatitis B, hepatitis C and AIDs) diseases and their risk factor consanguineous marriage are widespread among Yemen population, community-based awareness studies towards premarital screening (PMS) is extremely limited, so our study is designed to elicit knowledge and attitude of engaged and recently married couples in Taiz (Yemen) toward PMS. **Methods:** A cross-sectional study was conducted from April to September 2021 at Taiz. A well-structured questionnaire was designed and then delivered to participants to collect data. **Results:** The results revealed that majority of respondents (83.60%-94.18%) had knowledge about inherited and infectious diseases, respectively, and educational institution was the main knowledge source. Females had significantly higher knowledge than males ($P \leq .01$), except about AIDs since no difference ($P = .539$). The results also revealed that majority of respondents had positive attitudes toward PMS, except toward AIDs testing since 70% of males and 68.91% of females had negative attitudes. The majority of respondents agreed that screening reduces the diseases incidence. Approximately half of respondents (50.79%-56.61%) tend to go ahead for marriage in case of positive results for inherited and infectious diseases respectively. Making PMS as an obligatory step prior engagement was agreed by 47.62% of respondents (45.71% of males, 48.74% of females). **Conclusion:** A high level of knowledge and positive attitudes toward inherited and infectious diseases and PMS were reported. This knowledge reflected on the agreement of majority of respondents regarding PMS importance in term of reduction of diseases incidence.

Keywords

premarital screening awareness, premarital screening attitude, cross-sectional studies, consanguinity, communicable diseases, disease incidence

3-Question-and-answer

Q-1) What do we already know about this topic?

A-1) This topic has attracted the attention of the researchers and decision makers.

Q-2) How does your research contribute to the field?

A-2) Our research provides new information about PMS awareness among Yemeni.

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Q-3) What are your research's implications towards theory, practice, or policy?

A-3) Implementing educational program before establishing PMS program.

Introduction

Hemoglobinopathies and different types of infectious diseases are common in many Arab countries and accounted to be as causes of morbidity and mortality globally.¹⁻⁴ according to the World Health Organization (WHO), the carrier rates of major congenital diseases vary and common in the Eastern Mediterranean countries; alpha thalassemia (2-50%), beta thalassemia (2-7%) and sickle cell anemia (.3 and 30%).⁵ The Centre for Arab Genomic Studies reported that SCA and thalassemia are 2 of the 906 genetic diseases, which are endemic to Arab countries.⁶ in Yemen, the prevalence of sickle cell trait (Hb AS) and b-thalassemia trait is 2.2% and 4.4% with an estimated incidence of 20/10,000 and 11.3/10,000 of homozygous (Hb SS) and b-thalassemia respectively births.⁷⁻⁹ The consanguineous marriage is the main predictor and risk factor of genetic diseases,^{5,10} in the most Eastern Mediterranean countries the consanguinity rate is high and vary between 20-50%.⁵ The prevalence of consanguineous marriages among Yemeni people is 40%, of them 58% between the first cousins; furthermore its rate is increasing in the last marriage groups.¹¹ The treatment of genetic and infectious diseases are expensive and lead to a considerable stress for patients and their relatives; in addition to economical burdens on the health system, so the premarital screening is the best intervention that would help in diseases controlling and prevention^{12,13} and thus the premarital screening is mandatory for prospective couples in in 8 Middle Eastern countries.^{1,14,15}

To the best of our knowledge, no research study has been published addressing the knowledge and attitudes of engaged couples and recently married toward PMS and its consequences in Taiz. Knowledge and attitudes are the primary determinants that can help in reducing the incidence of inherited and infectious diseases. Thus, our community study is designed to elicit knowledge and attitude of engaged couples and recently married toward premarital screening and its consequences.

Materials and Methods

Study Design and Sampling: This is a cross-sectional study conducted from April to September 2021 in Taiz town, Yemen. 189 subjects were voluntary participated in this study. Taiz is one of the largest cities located in the central and southwestern of Yemen (44.01° E, 13.34° N), 280 km south of the capital Sana'a along the Red Sea coast overlooking the Bab Al-Mandab (about 1311 m above sea level).¹⁶ This study including; design, setting, analyses and reporting, was in

consistency to the guidelines of STROBE and criteria of the cross-sectional study.¹⁷

Data Collection: A well-structured questionnaire was designed and then distributed to collect the data. This questionnaire was mainly divided into 3 parts; Part 1: socio-demographic data about the study subject including age, gender, educational level, marital status, and income level. Part 2: knowledge of the subject about the inherited and infectious diseases that are related to PMS as well his information sources about these diseases. Part 3: attitude of subject toward conducting screening for genetic and infectious diseases as well his attitude toward screening results.

Data Analysis: SPSS (version 21) software program was recruited for data analysis. Descriptive statistics were performed for to know the characteristics of the study participants. Independent-Samples T Tests were conducted to compare the variables between the male and female groups. One-Way ANOVA Tests were done to the variables with more than two-level. The Odds Ratios (ORs) was calculated to determine for knowledge and attitudes of respondents by gender.

Results

Socio-demographic characteristics of study subjects: 220 questionnaires were delivered to the study subjects, but only 189 of them were adequately filled and returned the questionnaires to the response rate became 86%. The number of females participated in this study were more than males; 119 (62%) vs 70 (38%). The most of the respondents were more younger where 78.8% (104 females, 45 males) were aged 15-25 years while 21.2% (15 females, 25 males) were aged 26-35 years; [Table 1](#). The marital status of the most study participants were betrothed (who are in the initial step before getting married and officially not married according to Islamic culture) with 59.8% in comparison to the recently married subjects (who get married not more than 5 years ago) 20.6% and engaged subjects (who are in the last step before getting married and officially married according to Islamic culture) 19.6%. According to the education level, no differences between males and females but there was a significant difference in their income ($P = .004$). 48.7% of the participants are engaged or get married from their relatives and 45% are cousin's parents. The results showed that no differences between males and females regarding their relativity to their partners as well as between their parents. Most of the respondents (68.9%) have no inherited diseases in their family and (73.5%) of them didn't screen for inherited diseases, in the same trend, majority of the respondents (87.8%) have no infectious diseases and (56.1%) of them didn't screen for infectious diseases

Knowledge of study respondents about diseases related to premarital screening: The awareness of the study respondents about reported inherited and infectious diseases were very high (83.60-94.18%); [Table 2](#). The females could be more

Table 1. Socio-Demographic Characteristics of Study Subjects by Gender, Taiz, 2021.

Characteristics		Male (N = 70); n (%)	Female (N = 119); n (%)	Total (N = 189); n (%)	P value
Age	15-25	45 (64.3)	104 (87.4)	149 (78.8)	<.001
	26-35	25 (35.7)	15 (12.6)	40 (21.2)	
Marital status	Recently married	18 (25.7)	21 (17.6)	39 (20.6)	.135
	Engagement	9 (12.9)	28 (23.6)	37 (19.6)	
	Betrothed	43 (61.4)	70 (58.8)	113 (59.8)	
Education level	Secondary	14 (20.0)	41 (34.5)	55 (29.1)	.161
	Diploma	6 (8.6)	6 (5.0)	12 (6.4)	
	Bachelor	46 (65.7)	68 (57.1)	114 (60.3)	
	Above	4 (5.7)	4 (3.4)	8 (4.2)	
Income	Low	8 (11.4)	33 (27.7)	41 (21.7)	.003
	Moderate	47 (67.1)	76 (63.9)	123 (65.1)	
	High	15 (21.5)	10 (8.4)	25 (13.2)	
Partner's relativity	Yes	33 (47.1)	59 (49.6)	92 (48.7)	.501
	No	37 (52.9)	60 (50.4)	97 (51.3)	
Cousin's parents	Yes	34 (48.6)	51 (42.9)	85 (45.0)	.301
	No	36 (51.4)	68 (57.1)	104 (55.0)	
Has inherited disease in family?	Yes	15 (21.5)	36 (30.3)	51 (26.9)	.390
	No	53 (75.7)	77 (64.7)	130 (68.9)	
	Unknown	2 (2.8)	6 (5.0)	8 (4.2)	
Previously did testing for inherited diseases?	Yes	12 (17.1)	32 (26.9)	44 (23.3)	.107
	No	55 (78.6)	84 (70.6)	139 (73.5)	
	Unknown	3 (4.3)	3 (2.5)	6 (3.2)	
Have infectious diseases	Yes	3 (4.3)	3 (2.5)	6 (3.2)	.052
	No	55 (78.6)	111 (93.3)	166 (87.8)	
	Unknown	12 (17.1)	5 (4.2)	17 (9.0)	
Previously did testing for infectious diseases?	Yes	16 (22.9)	43 (36.1)	59 (31.2)	<.001
	No	36 (51.4)	70 (58.9)	106 (56.1)	
	Unknown	18 (25.7)	6 (5.0)	24 (12.7)	

likely to have higher knowledge about the thalassemia and SCA more than male by 3.32 and 7.02 times with a significantly difference $P = .004$ and $<.001$ respectively; [Table 2](#). As well, The females could be more likely to have higher knowledge about the inherited hepatitis B and hepatitis C more than male by 4.29 and 8.63 times with a significantly difference since P values equals .005 and $<.001$ respectively while no significantly difference between females and males in their knowledge about the AIDs ($P = .539$).

Attitudes of the study respondents towards PMS for related diseases: The results revealed that the majority of the respondents from either males (74.29%- 82.86%) or females (61.34%-68.91%) appeared to have positive attitudes (accept) towards testing for all studied diseases except AIDs, where the majority of respondents (70% of males, 68.91% of females) appeared to have negative attitudes (refuse) for AIDs testing ([Table 2](#)). As deduced from the results, the males could be more likely to have a positive attitude for thalassemia testing more than females by 3.05 times with a significantly difference $P = .002$, while no apparent significant difference between males and females regarding testing for the other diseases reported in the [Table 2](#).

Sources of knowledge about inherited disease (Thalassemia and SCA): The knowledge of the respondents about the inherited disease (thalassemia and SCA) is coming from different sources shown in the [Figure 1](#); it's clear that the educational institutions are ranked on the top and were the main source knowledge about thalassemia and SCA for the majority with 22-21 (~42.2%) out of 51 males and 67-63 (~60.7%) out of 107 females. Family and friends were equally ranked and were the second source (~19.6%) of males while only the family was the second source for females (~14.5%), followed by the social media source (~11.2%) of females. The social media was the fourth source for males (~10.7%) while friend was the fourth source for females (~10.3%). The health care providers and cultural-scientific journals were the last sources.

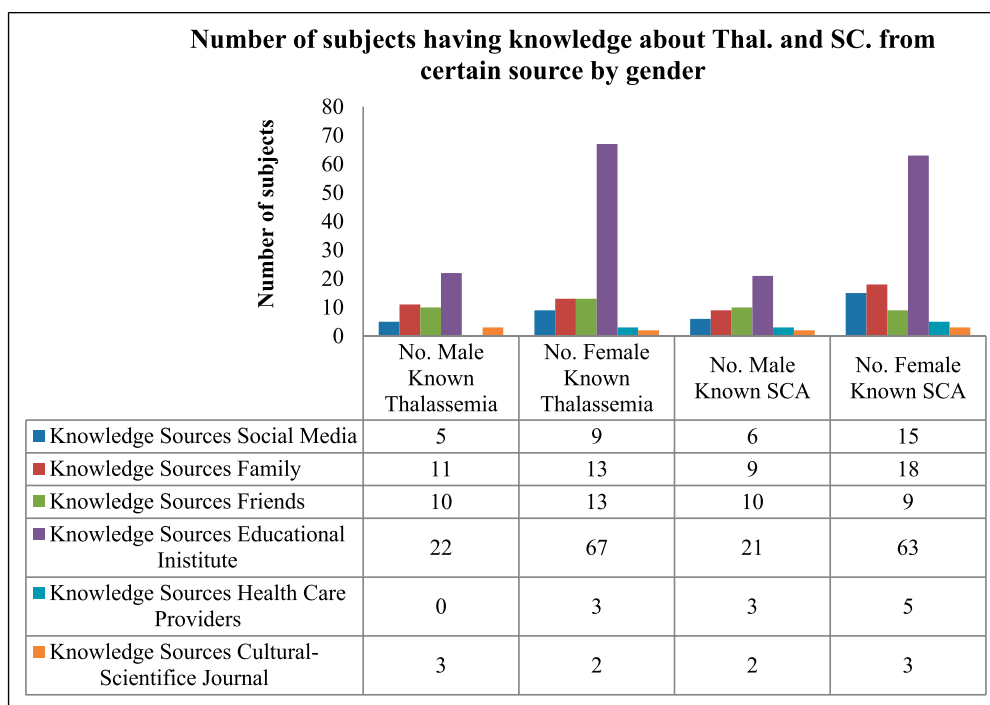
Sources of knowledge about infectious diseases (Hepatitis B, Hepatitis C and AIDs): The knowledge of the respondents about the infectious diseases (Hepatitis B, Hepatitis C and AIDs) is coming from different sources shown in the [Figure 2](#); it's clear that the educational institutions are ranked on the top and were the main source knowledge about Hepatitis B, Hepatitis C and AIDs for the majority with 26, 24 and 29

Table 2. Knowledge and Attitudes of Respondents About Diseases Related to Premarital Screening by Gender.

Item	Diseases	Knowledge/ Attitude ^a	Male (N = 70); n (%)	Female (N = 119); n (%)	Total (N = 189); n (%)	OR	P Value
Knowledge	Thalassemia	Have no knowledge	19 (27.14)	12 (10.08)	31 (16.40)	3.32 (1.49-7.63)	.004
		Have knowledge	51 (72.86)	107 (89.92)	158 (83.60)		
	SCA	Have no knowledge	19 (27.14)	6 (5.04)	25 (13.23)	7.02 (2.64-18.61)	<.001
		Have knowledge	51 (72.86)	113 (94.96)	164 (86.77)		
	Hepatitis B	Have no knowledge	13 (18.57)	6 (5.04)	19 (10.05)	4.29 (1.55-11.89)	.005
		Have knowledge	57 (81.43)	113 (94.96)	170 (89.95)		
	Hepatitis C	Have no knowledge	22 (31.43)	6 (5.04)	28 (14.81)	8.63 (3.29-22.63)	<.001
		Have knowledge	48 (68.57)	113 (94.96)	161 (85.19)		
	AIDs	Have no knowledge	5 (7.14)	6 (5.04)	11 (5.82)	1.45 (.43-4.93)	.539
		Have knowledge	65 (92.86)	113 (94.96)	178 (94.18)		
Attitude for screening	Thalassemia	Accept	58 (82.86)	73 (61.34)	131 (69.31)	3.05 (1.48-6.28)	.002 ^b
		Refuse	12 (17.14)	46 (38.66)	58 (30.69)		
	SCA	Accept	53 (75.71)	79 (66.39)	132 (69.84)	1.58 (.81-3.07)	.193
		Refuse	17 (24.29)	40 (33.61)	57 (30.16)		
	Hepatitis B	Accept	52 (74.29)	73 (61.34)	125 (66.14)	1.82 (.95-3.49)	.081
		Refuse	18 (25.71)	46 (38.66)	64 (33.86)		
	Hepatitis C	Accept	52 (74.29)	76 (63.87)	128 (67.72)	1.64 (.85-3.14)	.150
		Refuse	18 (25.71)	43 (36.13)	61 (32.28)		
	AIDs	Accept	21 (30.00)	37 (31.09)	58 (30.69)	.9 (.50-1.81)	1.000
		Refuse	49 (70.00)	82 (68.91)	131 (69.31)		

^aAccept (Strongly agree + Agree) vs Refuse (Strongly Disagree + Disagree + not respond + Uncertain).

^bFisher's exact test.

**Figure 1.** Knowledge sources about inherited disease (Thalassemia and SCA) by gender.

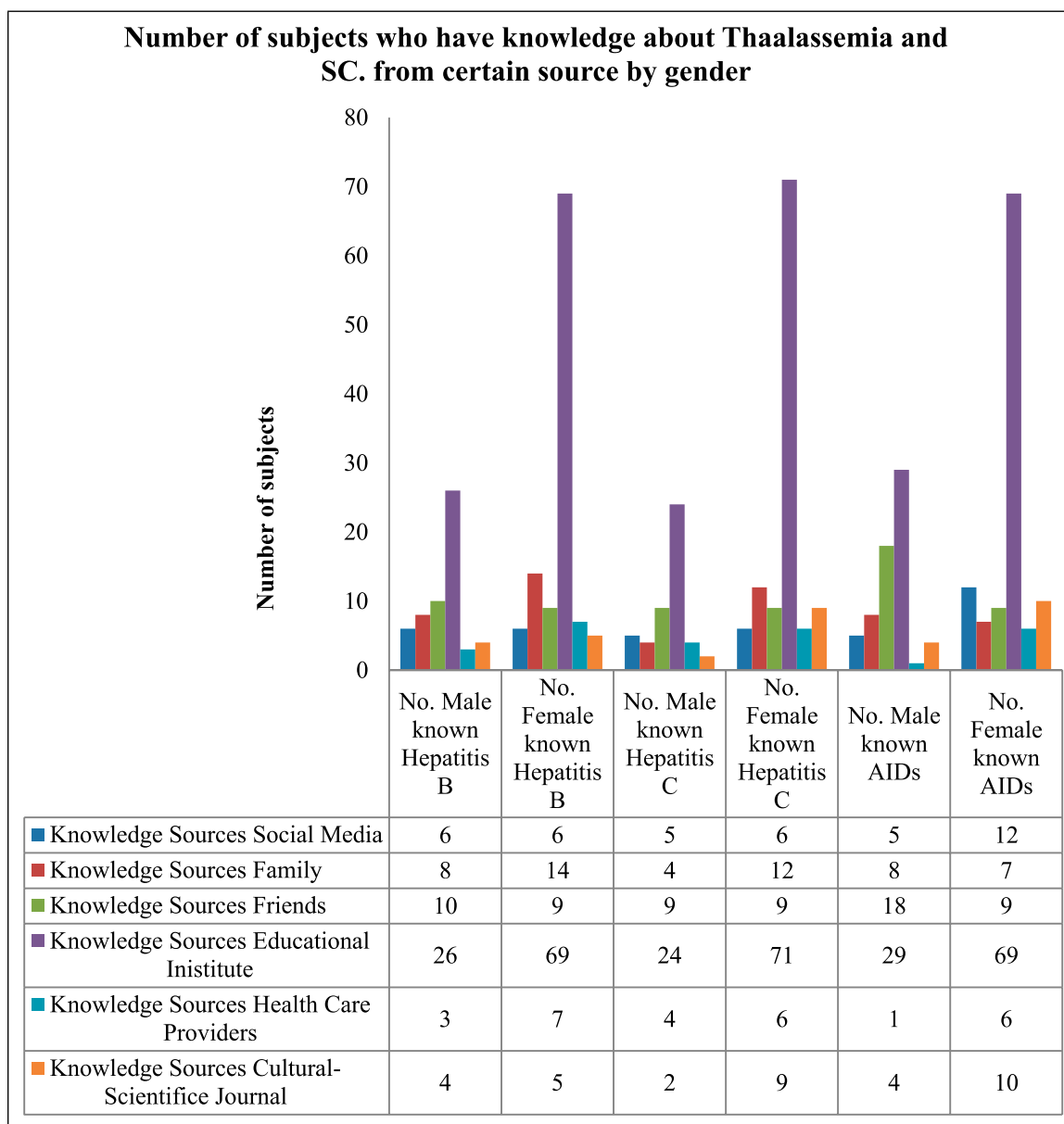


Figure 2. Knowledge sources about infectious disease (Hept. B, Hept. C and AIDs) by gender.

(~51.6%) out of 51 males and 69, 71 and 69 (~65.1%) out of 107 females. Friend was the second source for males (~24.2%) while the family was the second source for females (~10.3%). The social media was the third source for males (~10.4%) while the friends was the third source for females (~8.4%). The family was fourth source for males (6.2%) while the social media was the fourth source for females (~7.5%) The health care providers and cultural-scientific journals were the last sources.

According to the results presented in the [Table 3](#), the majority of both males (77.14%) and females (81.51%) appeared to have a positive response regarding the importance of

screening for the inherited diseases that lead to decrease the incidence of these diseases, while the majority of only females (72.27%) appeared to have a positive response regarding notifying their partners in case of the result of the testing for the inherited diseases was positive but with no significant difference ($P = .056$) to males who only 58.57% of males were positively responded. In other hand, no significant difference between males and females regarding notifying their families in case of positive results as well no big difference among their attitudes regarding that; since the positive responses were 51.43% and 57.14% vs 48.57% and 42.86% as negative responses in males and females respectively. On the

Table 3. Attitude of the Respondents Regarding Consequences of Premarital Screening by Gender.

Diseases	Item	Attitude	Male (N = 70); n (%)	Female (N = 119); n (%)	Total (N= 189); n (%)	OR	P Value
Inherited diseases	Will the PMS decrease the incidence of inherited diseases?	Accept	54 (77.14)	97 (81.51)	151 (79.89)	.765 (.37-1.58)	.573
		Refuse	16 (22.86)	22 (18.49)	38 (20.11)		
	In case of positive results, will you notify your partner?	Accept	41 (58.57)	86 (72.27)	127 (67.20)	.543 (.29-1.01)	.056
		Refuse	29 (41.43)	33 (27.73)	62 (32.80)		
	In case of your partner's positive results, will you notify your family?	Accept	36 (51.43)	68 (57.14)	104 (55.03)	.79 (.44-1.44)	.454
		Refuse	34 (48.57)	51 (42.86)	85 (44.97)		
	In case of positive results, will you go ahead to get married?	Accept	42 (60.00)	54 (45.38)	96 (50.79)	1.806 (.99-3.29)	.07
Refuse		28 (40.00)	65 (54.62)	93 (49.21)			
In case of positive results, will you get an anxious or depression?	Accept	22 (31.43)	67 (56.30)	89 (47.09)	.356 (.19-.66)	.001	
	Refuse	48 (68.57)	52 (43.70)	100 (25.91)			
Do you agree to make PMS as an obligatory step before marriage?	Accept	32 (45.71)	58 (48.74)	90 (47.62)	.886 (.49-1.60)	.763	
	Refuse	38 (54.29)	61 (51.26)	99 (52.38)			
Infectious diseases	Will the screening decrease the incidence of infectious diseases?	Accept	46 (65.71)	87 (73.11)	133 (70.37)	.705 (.37-1.33)	.323
		Refuse	24 (34.29)	32 (26.89)	56 (29.63)		
	In case of positive results, will you inform your partner?	Accept	35 (50.00)	69 (57.98)	104 (55.03)	.725 (.40-1.31)	.294
		Refuse	35 (50.00)	50 (42.01)	85 (44.97)		
	In case of your partner's positive results, will you inform your family?	Accept	31 (44.29)	73 (61.34)	104 (55.03)	.501 (.28-.91)	.024
		Refuse	39 (55.71)	46 (38.66)	85 (44.97)		
	In case of positive results, will you get an anxious or depression?	Accept	22 (31.43)	64 (53.78)	86 (45.50)	.394 (.21-.73)	.004
Refuse		48 (68.57)	55 (46.22)	103 (54.50)			
In case of positive results, will you disconnect with your family and others?	Accept	31 (44.29)	76 (63.87)	107 (56.61)	.450 (.25-.82)	.010	
	Refuse	39 (55.71)	43 (36.13)	82 (43.39)			

Note. PMS = Premarital Screening

contrary, males (60%) could be more likely to go ahead for marriage in case of positive results more than females (45.38%) by 1.8 times but with no significant difference ($P = .07$). The results also revealed that the two-third of males (68.57%) will not feel with anxious or depression in case of positive results, oppositely with a significant difference ($P = .001$), the large proportion of females (56.3%) will feel with that. Both males and females showed similar attitudes and trends regarding making these screening as an obligatory step before marriage; since 45.71% of males and 48.74% of females accepted that condition while 54.29% of males and 51.26% of females rejected that.

The attitudes of the study subjects regarding the consequences of screening for infectious diseases are presented in a [Table 3](#); the majority of bot males (65.71%) and females (73.11%) appeared to have a positive response regarding the importance of screening for the infectious diseases that lead to decrease the incidence of these diseases. The result showed that attitudes of males are equally oriented and to a less extent females as well regarding notify of their partners in case of the result of the testing for the infectious diseases is positive. The large proportion of females (61.34%) will notify their families if the result of the testing for the infectious diseases is positive, oppositely with a significant difference ($P = .024$), the large proportion of males (55.71%) will not notify. The results also revealed that the two-third of males (68.57%) will

not feel with anxious or depression in case of positive results, oppositely with a significant difference ($P = .004$), the 53.78% of females will feel with that. Interestingly, less than half of males (44.29%) will disconnect with their families and others in case of positive results, while the large proportion of males (63.87%) will disconnect, with a significant difference ($P = .010$).

Discussion

This study investigated the knowledge and attitudes of engaged and recently get married couples towards the premarital screening for specific inherited and infectious diseases as well consequences of this screening. The awareness about reported inherited and infectious diseases were very high (83.60-94.18%) among study respondents. Females had significantly higher knowledge about the inherited (thalassemia and SCA) and infectious (hepatitis B and hepatitis C) diseases, only about AIDs there was no significantly difference among gender, at the same trend, a study was conducted at 2011 on Omani adults reported that the awareness towards SCA was high (83.8%) and was towards thalassemia (55.3%).¹⁸ Our results were in a good agreement regarding awareness about thalassemia, where female's awareness was higher than males, but oppositely to our result regarding awareness about SCA where Omani study indicated

that male's awareness was higher than females.¹⁸ In 2017, a cross-sectional study on male Saudi (Jazan) was reported that 41.3% had an average knowledge about SCA, 41.3% had good knowledge and 17.4% of them had poor knowledge,¹⁹ a reasonable level of knowledge about genetic diseases was reported among university students in Jeddah.²⁰ A survey among university students in Jordan showed that students had a lack of knowledge about PMS-related diseases, although they had an adequate knowledge about PMS itself.²¹

The results revealed that the majority of the respondents either males (74.29%-82.86%) or females (61.34%-68.91%) appeared to have positive attitudes (accept) towards testing for inherited diseases (Thalassemia and SCA) and infectious diseases (Hepatitis B and Hepatitis C), in contrast, the majority of respondents (70% of males, 68.91% of females) appeared to have negative attitudes (refuse) for AIDs testing, this may due to cultural and ethics aspects and highly cost-effectiveness.²² Our study results also revealed that males had positive attitudes for thalassemia testing more than females with a significantly difference, while no difference between males and females regarding testing for the other inherited and infectious diseases. A Saudi studies reported that approximately 80% of the respondents would like to have PMS²³ and almost all unmarried female students (99.0%) agreed on the importance of PMS.²⁴ A more recent study among male Saudi (Jazan) showed that 95.2% of them favored of doing screening for SCA.¹⁹ Syrian students had an overall positive attitude toward PMS, but in certain aspects they don't.²⁵ According to the recent study, 87.8% of young Jordanian adults had a positive attitude toward premarital genetic screening.

Regarding the importance of PMS; the majority of the respondents agreed that screening reduces the incidence of the inherited and infectious diseases; this result is consistent with many previous studies conducted in Arab countries; in a cross-sectional study conducted on medical students of Sana'a university found that vast majority of the respondents (92%) believed that PMS is important and it reduces the inherited and sexually transmitted diseases,²⁶ A similar view has obtained from a Saudi study where 94.3% of the study subjects accept that PMS is an effective tool to prevent genetic diseases,²⁷ another Saudi study conducted on students of King Abdulaziz University (KAU) in Jeddah reported that 95% of them believed that PMS limit the spread of inherited disease,²⁸ another more recent Saudi study indicated that majority of participants (94% agreed that PMS reduces the incidence of some inherited diseases and sexually transmitted diseases²⁹ a similar result obtained from Oman studies that 90.3% of respondents aware the potential of PMS to limit the spread of inherited diseases,¹⁸ and 94.3% of participants believed PMS to be important³⁰ as well 80% of subjects residing in UAE believed in the importance of genetic testing.³¹ In fact, the effectiveness of PMS in term of reduction the diseases incidence have been reported in many countries including Turkey, Iran and Iraqi Kurdistan where

decreasing in B-thalassemia birth was of approximately 90, 80, and 65% respectively.³²

Approximately half of the respondents tend to go ahead for marriage in case of positive results, this is in a good agreement to a study conducted among or unmarried female students in King Abdul-Aziz University, Jeddah, where 67.1% of students agreed that the marriage decision should be changed in case of positive results for genetic diseases²⁴ while approximately 15% of Jordanian respondents feel that the marriage should not be go ahead in case of the screening result for couple is positive.²¹ According to the Jordanian studies; 23% of the students from multiple Jordanian universities³³ and 14.1% of young Jordanian adults³⁴ were willing to go ahead with marriage in case of positive results. The results our study also revealed that the two-third of males (68.57%) will not feel with anxious or depression in case of positive results, oppositely, more than half of females (56.3%-53.78) will feel with that. 55.71% of males prefer to persist to connect with their families and others if the result of infectious diseases screening is positive, on the contrary, 63.87% of females will not prefer. According to the study conducted on Omani adults, majority of them (83.8%) aware of psychological burden of inherited diseases on families.¹⁸

Eight Middle Eastern countries legalized PMS as mandatory step for prospective couples.^{1,14,15} Making the PMS as an obligatory step prior engagement was accepted by 47.62% of our study respondents while this step was accepted 82% of medical students,²⁶ this difference may refer to the information acquired from their medical study. A Nigeria study reported that 81.9% of the respondents support the legalizing of premarital genetic counseling.³⁵ 53% of Omani students.¹⁸ 90% of the participants³⁰ and majority (female 94.1%; male 85.4%) of medical students³⁶ agreed PMS should be obligatory. its noteworthy to mention to the importance of this study, further investigation including large sample size is recommended.

Conclusion

This study is addressing knowledge and attitude of engaged and recently married couples in Taiz toward premarital screening and its consequences, since knowledge and attitudes are the primary determinants that could help in reduction diseases incidence. In this study has been reported a high level of knowledge toward PMS and its related inherited and infectious diseases among respondents, in particular females, thereby indicating to the importance of education as it was a major source of knowledge. This knowledge reflected on majority of both gender who had positive attitudes toward PMS in term of willingness to do testing and on their well-belief about the importance of PMS in term of reduction of diseases incidence, as well reflected on half of the respondents mainly males who preferred to go ahead for marriage in case of

positive results and accepted to make the PMS as an obligatory procedure prior engagement.

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Ethical Approval

Verbal and/or written consent were obtained from each participant after providing perfect explanation and promising to keep the information and answers confidentiality. Ethical approval (JustMed02/2021) was obtained from the Institutional Review Board (IRB), Faculty of Medical Sciences, Aljanad University of Science and Technology, Taiz, Yemen.

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