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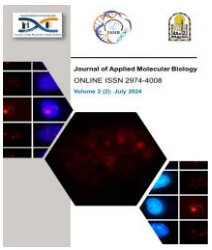

Factors Affecting Knowledge and Attitudes Toward Genetic Diseases and Consanguineous Marriage among Students at the University of Saba Region, Yemen

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ABSTRACT

Background: Genetic diseases pose a significant public health burden in Yemen, with a high prevalence of conditions like thalassemia and sickle cell anemia, linked in part to the practice of consanguineous marriage. Pre-marital screening offers a crucial preventative measure to identify couples carrying genetic diseases. Understanding the knowledge and attitudes of university students towards genetic diseases and their relationship to consanguineous marriage is crucial. This study aimed to evaluate the level of knowledge and attitudes towards genetic diseases and consanguineous marriage and determine the most important factors affecting that knowledge and attitudes among university youth. **Materials and Methods:** A cross-sectional analytical study was conducted at the University of Saba Region. The study sample was selected from the target group using a simple random selection procedure. A structured and self-managed questionnaire was used to collect data. Descriptive analysis and chi-square test were used to assess the level of knowledge and attitudes and to identify factors associated with that knowledge and attitudes of university students. **Results:** 64.2% of the students had a good level of knowledge, and 58.7% of them showed positive attitudes toward genetic diseases and surrogacy. The chi-square test showed that females, married students residing in urban areas, those whose parents have a high level of education, and those with a medium to a high level of living have a higher level of knowledge compared to others. In addition, females and students residing in urban areas have more positive attitudes towards consanguineous marriage and pre-marital screening. **Conclusion:** Most students have good knowledge, and more than half have positive attitudes. However, it is still insufficient and must be strengthened among students. Moreover, several factors affected this knowledge and attitudes.

1. INTRODUCTION

A genetic disease is a disorder that is caused by an error in the genetic material or DNA of an individual. These errors in DNA can be of different types either single base mutation, single gene, or multiple gene or they can involve the addition or subtraction of entire chromosomes causing the genetic disease. Most of these genetic diseases can be transferred from parents to offspring [17, 18]. Genetic illnesses affect a large section of the world's population [21]. And are the leading cause of death in children under the age of ten [11]. Genetic problems afflict around 5% of the global population with diseases [1]. Despite the conditions' rarity, there are a considerable number of people with genetic diseases overall- roughly 30 million people in the United States of America suffer from rare diseases [12].

Certain genetic disorders are common throughout the Arab world. Examples of these diseases include Sickle Cell Disease, Down Syndrome, Thalassemia, Glucose-6-Phosphate Dehydrogenase Deficiency, Breast Cancer, Familial Mediterranean Fever, Deafness, and Ankylosing Spondylitis. The yearly incidence of these diseases is greater than 100 cases per 100,000 live births in the Arab world [12, 26].

In Yemen, Genetic blood diseases (Haemoglobinopathies) are the most frequent hereditary diseases in the country, of which thalassemia and sickle cell disease are the most common [16]. The prevalence of thalassemia B in Yemen was 4.4%, and the highest rate was in the western coastal and mountainous regions of the country, where the incidence rate is estimated at 11.3 per 10,000 live births [9]. It was also found that the prevalence of thalassemia was 13% (8.6% for alpha thalassemia and 4.4% for beta thalassemia traits) in Sana'a [7]. Also, the prevalence of sickle cell disease in Yemen is 2.2%, with a larger occurrence in the country's western coastline and midwestern regions, where the incidence can approach 20/10,000. The Taiz region in the country's mid-west was found to have a high prevalence of thalassemia and sickle cell disease (19.4%) [3]. Consanguineous marriage is a prevalent practice in Muslim and tribal societies throughout the Middle East, however, it has been linked to detrimental effects on health, making it the most significant contributing cause to the high prevalence of hereditary illnesses [15].

Communities and populations have differing rates of consanguineous marriages depending on a number of variables, including religion, culture, and geographic dispersion. First-cousin marriages are the most common kind of consanguineous marriages [10]. According to an Egyptian survey, 31.4% of first cousins and 6% of second cousins get married through consanguineous unions [25]. A study conducted in Yemen also revealed that the rate of consanguineous marriage is high, reaching more than 44.7%, and traditional. Understanding of the epidemiology of consanguinity remains poor in Yemen [14].

Therefore, Reproductive health programs are based on an integrated strategy for the prevention of genetic diseases through community education, population screening, genetic consultation, early diagnosis, and premarital screening (PMS) [6]. Premarital screening helps determine whether prospective spouses are carriers of some diseases without symptoms or if they have any genetic flaws [22].

University years mark a time of exploration, independence, and often, marriage planning. For some, that plan may involve marrying a close relative, a practice known as consanguineous marriage. While culturally common in many regions, young adults must

understand the potential link between consanguineous marriage and a higher risk of genetic diseases in their future offspring. This knowledge, coupled with the importance of pre-marital examinations, can empower them to make informed choices about their family's health [12]. From this standpoint, the current study aimed to evaluate the level of knowledge and attitudes towards genetic diseases and consanguineous marriage, and to determine the most important factors affecting this knowledge and attitudes among university youth.

2. MATERIALS AND METHODS

Study design:

In this study, an analytical cross-sectional study was used.

Study setting:

This study was carried out at the University of Saba Region in Yemen across all faculties. Which includes students from various Yemeni governorates who were displaced due to the war.

Study Population:

All Yemeni students, both male and female, enrolled at the University of Saba Region who are present on campus during the study.

Study procedures:

- Because the study sample is drawn from the University young category, the population is homogeneous, hence a simple random sample was utilized.

Sample size determination:

The following formula was utilized to determine the sample size:

$n = (z\ a/2\ )^2 * p\ q\ /\ d^2$.

Where:

n is the sample size.

Z= is the standard normal variable, and it represents the 95% significant level (1.96).

P= is the prevalence rate of knowledge, and attitudes of university youth towards genetic diseases and consanguineous marriage in the region, and since P is not available. So, 50% was assumed.

q = 1-p, and d= The marginal error is equal to 0.05.

$n= (1.96)^2\ (0.5)\ (0.5)\ /\ (0.05)^2 = 384$ students

Therefore, the sample size was modified by 1.5 times to become (576), so that it is a better representative of the population. A sample of (576) was selected from students at the University of Saba Region.

Study Variables:

The independent variables in this study were the sociodemographic factors, while the dependent variables were the knowledge and attitude of youth toward genetic diseases and consanguineous marriage.

Data collection tools:

The data were collected using a questionnaire designed by the researcher after reviewing previous literature and distributed to university youth who agreed to participate in the research after explaining the purpose of the study [5, 19 and 20]. It comprised the four parts listed below:

Part I:

Social, demographic, and economic characteristics:

The purpose of this section was to gather sociodemographic information about university students, including their age, gender, residence, marital status, Faculty, academic year, level of education of their parents, and level of living.

Part II:

University students' knowledge of genetic diseases and consanguineous marriage:

In this part, eleven questions were given to the students to gather essential assessment information regarding genetic diseases and their relationship to consanguineous marriage, their types, causes, dangers, methods of transmission, and prevention.

Total knowledge score scoring system:

Every question had one point for the right response and zero for the incorrect response. Below is a classification of the overall score: -

- Good level $\rightarrow$ > 50% of the overall knowledge score.
- Poor level $\rightarrow$ $\leq$ 50% of the overall knowledge score.

Part III:

Determining the participants' informational sources about genetic diseases and consanguineous marriage such as schools, universities, health institutions, the media, social media, the Internet, family, friends, and others.

Part IV:

Attitude of university youth towards genetic diseases and consanguineous marriage.

It consists of three items to assess students' attitudes towards genetic diseases and consanguineous marriage. The three-point Likert scale was used to score attitude statements: agree (3), neutral (2), and disagree (1). After computation, the attitudes total score was divided into two groups: -

- Positive attitude $\rightarrow$ > 50% of the overall attitude score.
- Negative attitude $\rightarrow$ $\leq$ 50% of the overall attitude score.

The Procedures:

It consists of the preparatory phase and the implementation phase.

2.1. Preparatory Phase:

During this phase, theoretical knowledge about the research variables was acquired through reviewing recent national and international related literature, papers, and periodicals, through which the researcher developed the study tools. They were revised and corrected by supervisors.

Validity:

All tools were validated by three experts from the faculty members in the field of public health and biostatistics at the University of Saba Region Yemen. Who were from different academic categories, i.e. professor and assistant professor, to ensure the accuracy and appropriateness of the information and tools.

Reliability:

Cronbach's α values for the knowledge and attitude questions toward genetic illnesses and consanguineous marriage were 0.74 and 0.77, respectively.

Pilot study:

A pilot study was conducted before starting data collection for 10% of the sample size to test and evaluate the clarity, consistency, and applicability of the study tool and estimate the time required to fill out the questionnaire. And the approximate time to complete each questionnaire was 15 minutes. There was no change in tools. The tools were clear and understood by the participants. Therefore, the experimental ratio was included in the study.

2.2. Implementation Phase:

Study data was collected during the period from January to April 2022. The researcher took four days each week, in the morning period only according to the researcher's working conditions and the students' study schedules. The researcher interviewed the students and explained the purpose and nature of the study in a simple way. Verbal consents were obtained from each study participant.

Ethical consideration:

1. The Ethical Committee, Molecular Biology Research & Studies Institute, Assiut University was approved to conduct this study.
2. Privacy and confidentiality were considered concerning the participant data gathered.
3. The nature of the study does not pose any risk to the study subjects during the implementation of the research.
4. After explaining the purpose and benefits of the research, informed consent was obtained from the selected students to participate in the study.
5. No conflict of interest.

Data management and analysis:

Data was collected, coded, and tabulated using SPSS V. 25. The graphs were constructed using Microsoft Excel Software. The average and standard deviation were computed for the quantitative data, while percentages and numbers were computed for the categorical variables. Inferential statistics were performed by using chi-square (χ^2) to investigate factors affecting the knowledge and attitude of the studied sample and test differences between the subcategories. A P-value of 0.05 or less was regarded as significant.

3. RESULTS

3.1. Characteristics of the University students participating in the study:

The sociodemographic and economic characteristics of the University youth participating in the study, at the University of Saba Region in 2022, Yemen are shown in **Table 1**. The total sample size of the study was 576 students, of which 54.9% (316) were males and 45.1% (260) were females.

Regarding the age group of the students participating in the study, the highest percentage (36.8%) was in the age group from 22 to 24 years, while the lowest percentage (30.9%) was aged 18 to 20, with an average of 21.7±1.7 years.

Evidently, more than half of the sample (58.3%) were single. It was also found that the majority of students participating in the study (69.8%) were urban residents.

Table 1. Characteristics of the University students participating in the study. University of Saba Region, Yemen.

Characteristics	No	%	Characteristics	No	%
Gender			**The academic year**		
• Male	316	54.9	• First	218	37.8
• Female	260	45.1	• Second	133	23.1
Age (group)			• Third	88	15.3
• 18-20	178	30.9	• Fourth or above	137	23.8
• 20-22	186	32.3	**Fathers' education**		
• 22-24	212	36.8	• Illiterate	68	11.8
Mean ± SD	**21.7 ± 1.7**		• Primary, preparatory	121	21
Marital status			• Secondary	90	15.6
• Single	336	58.3	• Diploma	75	13
• Married	214	37.2	• University or above	222	38.5
• Widower	16	2.8	**Mothers' education**		
• Divorced	10	1.7	• Illiterate	243	42.2
Residence			• Primary, preparatory	162	28.1
• Urban	402	69.8	• Secondary	97	16.8
• Rural	174	30.2	• Diploma	26	4.5
Faculty			• University or above	48	8.3
• Scientific faculties	140	24.3	**The living level of the family**		
• literary faculties	436	75.7	• High	22	3.8
			• Average	504	87.5
			• Low	50	8.7

Regarding their faculties, most students (75.7%) were enrolled in literary faculties, while 24.3% were enrolled in practical faculties. Meantime, the highest percentage of the students (37.8%) was in the first academic year, while the lowest percentage (15.3%) was in the third year.

Regarding parents' education, the highest percentage of students' fathers (38.5%) had University qualifications or above, while the highest percentage of students' mothers (42.2%) were illiterate. Regarding the level of living, the majority of students (87.5%) whose families enjoy an average level of living.

3.2. Knowledge and sources of information related to genetic diseases and consanguineous marriage among the University students:

The distribution of the University students participating in the study according to their knowledge about genetic diseases and consanguineous marriage is found in **Table 2.**

The majority of students (96.2%) know that genetic diseases are transmitted from parents to children. And 86.1% believe that consanguineous marriages rise the risk of having children with genetic illnesses, and 72.7% of them know that genetic diseases are transmitted in some cases of consanguine marriage only and not all, and more than two-thirds (79.3%) know that these diseases are not transmitted through infection.

Table 2. Distribution of the participating in the study according to their knowledge about genetic diseases and consanguineous marriage, University of Saba Region, Yemen.

Items	Category	No	%
• Genetic diseases are transmitted from parents to children.	Yes	554	96.2
	No	22	3.8
• Consanguineous marriages increase the risk of having children with genetic diseases.	Yes	496	86.1
	No	80	13.9
• Genetic diseases are transmitted in some cases of inbreeding.	Yes	419	72.7
	No	157	27.3
• There is no complete recovery from genetic blood diseases.	Yes	266	46.2
	No	310	53.8
• Genetic diseases are transmitted by infection.	Yes	119	20.7
	No	457	79.3
• Genetic counseling provides important information to couples about genetic diseases.	Yes	325	56.4
	No	251	43.6
• A premarital medical examination is one of the most important tools to prevent the spread of genetic diseases.	Yes	530	92
	No	46	8
Knowledge of types of genetic diseases Which of the following is a hereditary disease?			
• Thalassemia	Yes	205	35.6
	No	371	64.4
Sickle cell anemia	Yes	135	23.4
	No	441	76.6
Hemophilia and G6PD	Yes	108	18.7
	No	468	81.3
Down syndrome	Yes	14	2.4
	No	562	97.6

In addition, the majority of students (92.0%) consider premarital screening to be the most significant means to prevent the spread of genetic diseases, and 56.4% believe that genetic counseling provides important information to couples about genetic diseases.

Whereas more than half of the students (53.8%) believe there is complete recovery from genetic diseases. It was found that the knowledge of the students about the types of genetic diseases was very weak, as only 35.6% of them knew thalassemia and 23.4% knew sickle cell anemia, while their knowledge about (hemophilia and G6PD), and Down syndrome (18.7% and 2.4%, respectively).

The total levels of knowledge among university students, indicating that 64.2% of

the youth have good knowledge, while 35.8% of them have poor knowledge are presented in **Figure 1**. The sources of information about genetic diseases among the students participating in the study are illustrated in **Figure 2.** It was found that the chief source of information was the school as reported by 50.9% of the students, social media and the internet were the second most common sources of information (36.3%), while the media was reported by 35.7% of the participants as source of information, whereas "the University and "seminars & clubs" were the least reported sources (13.0% and 6.6% respectively).

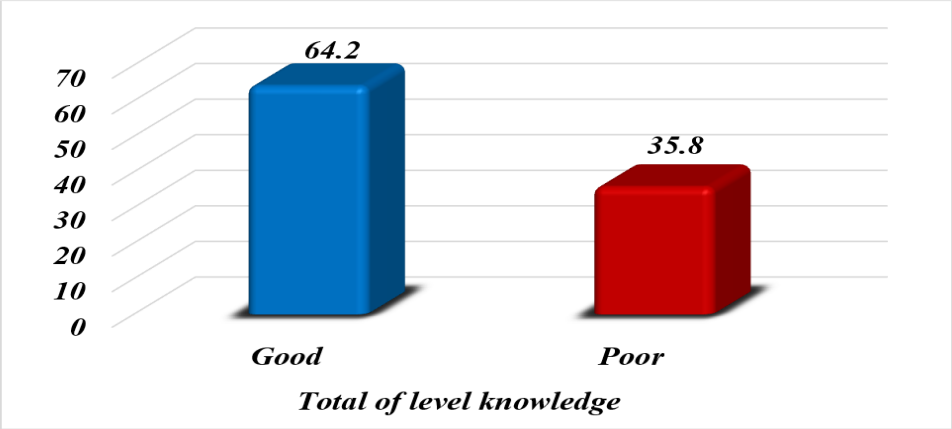

Figure 1. Distribution of total levels of knowledge among the University students about genetic diseases and consanguineous marriage. University of Saba Region, Yemen.

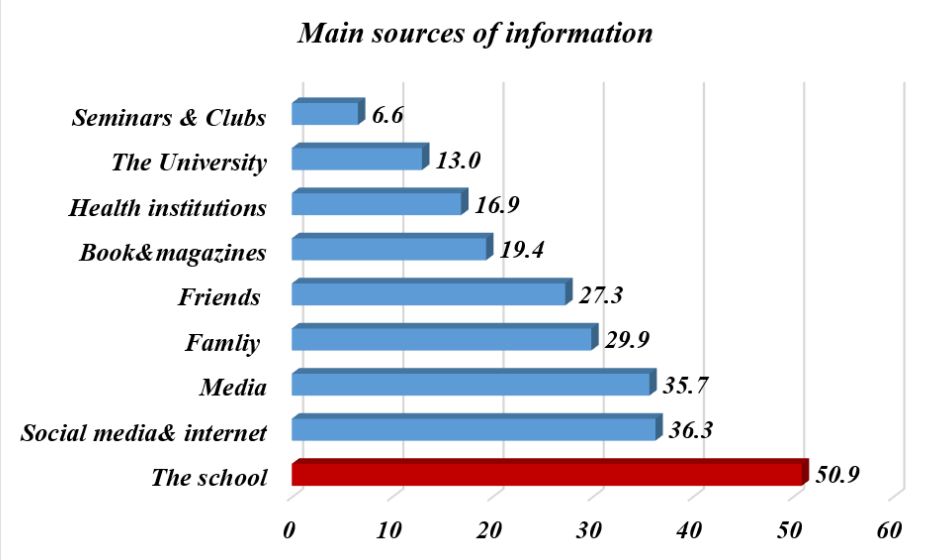

Figure 2. Main Sources of information related to genetic diseases, as reported by the University students participating in the study, University of Saba Region, Yemen.

3.3. Attitudes towards genetic diseases and consanguineous marriage among the University students:

The distribution of the participants according to their attitude toward genetic diseases and consanguineous marriage is illustrated in **Figure 3.** Most participants (81.9%) agreed that a premarital examination is very important. While the attitudes of students were neutral regarding the marriage of relatives, and the risk of genetic diseases (42.2%, and 38.9%, respectively). In addition, the total students' attitude level regarding genetic diseases and consanguineous marriage. where it found that 58.7% of students had a positive attitude, and 41.3% of them had a negative attitude.

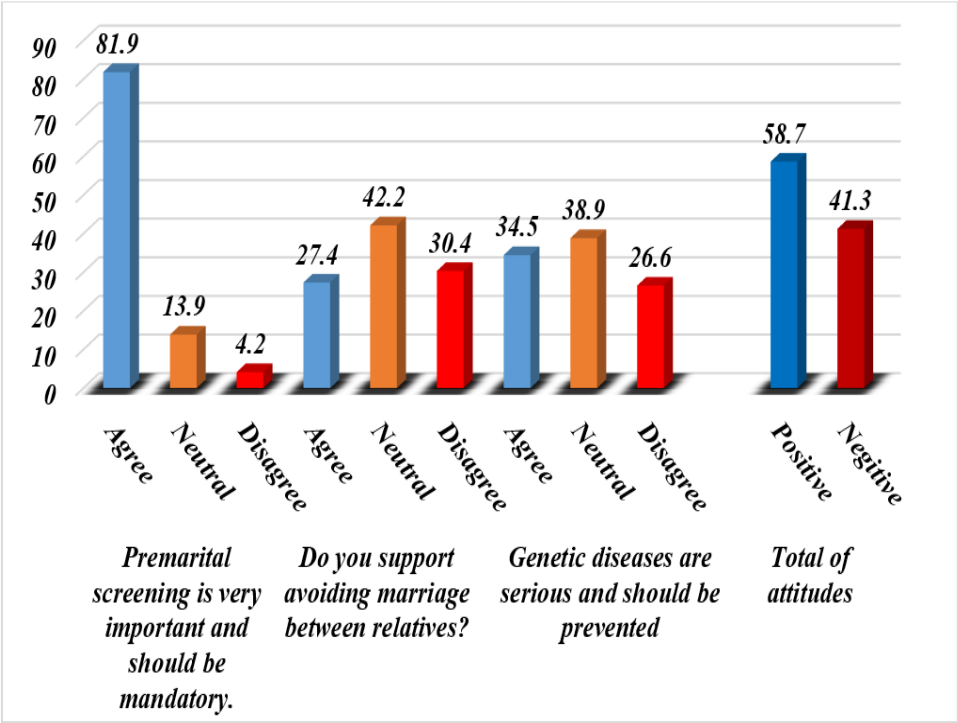

Figure 3. Distribution of the University students Participating in the study according to their attitude toward genetic diseases and consanguineous marriage, University of Sheba Region, Yemen.

3.4. Factors affecting levels of knowledge and attitudes towards genetic diseases and consanguineous marriage:

The factors associated with levels of knowledge and attitudes toward genetic diseases and consanguineous marriage among university youth are presented in **Table 3**. It was found that gender, marital status, residence, fathers' education, and living level of studied students are factors that had a statistically significant association with students' knowledge ($P < 0.05$). It was found that females, married students, those residing in urban areas, those whose parents have a high level of education, and those who have a medium to high level of living have a higher level of knowledge compared to others. However, it was found that age, college, academic year, and mother's education are factors that did not have a significant association with students' knowledge ($P > 0.05$).

Table 3. Factors associated with levels of knowledge and attitudes toward genetic diseases and consanguineous marriage among students at the University of Saba Region, Yemen.

Socio-demographic characteristics	Knowledge level					Attitudes level				
	Poor		Good		Chi-square P value	Negative		Positive		Chi-square P value
	No	%	No	%		No	%	No	%	
Gender										
• Male	127	40.2	189	59.8	$\chi2 = 5.969$	150	47.5	166	52.5	$\chi2 = 10.917$
• Female	79	30.4	181	69.6	P = 0.015*	88	33.8	172	66.2	P = 0.001*
Age (group)										
• 18-20	64	36.0	114	64.0	$\chi2 = 0.122$	68	38.2	110	61.8	$\chi2 = 4.748$
• 21-22	68	36.6	118	63.4	P = 0.941	70	37.6	116	62.4	P = 0.093
• 23-24	74	34.9	138	65.1		100	47.2	112	52.8	
Marital status										
• Single	133	39.6	203	60.4	$\chi2 = 16.777$	133	39.6	203	60.4	$\chi2 = 3.592$
• Married	58	27.1	156	72.9	P = 0.001*	96	44.9	118	55.1	P = 0.309
• Widower	11	68.8	5	31.3		4	25.0	12	75.0	
• Divorced	4	40.0	6	60.0		5	50.0	5	50.0	
Residence										
• Urban	129	32.1	273	67.9	$\chi2 = 7.820$	145	36.1	257	63.9	$\chi2 = 15.126$
• Ruler	77	44.3	97	55.7	P = 0.005*	93	53.4	81	46.6	P = 0.000*
Faculty										
• Scientific faculties	51	36.4	89	63.6	$\chi2 = 0.036$	62	44.3	78	55.7	$\chi2 = 0.671$
• Literary faculties	155	35.6	281	64.4	P = 0.85	176	40.4	260	59.6	P = 0.413

* Significant differences at $P \leq 0.05$.

Table 3. Continued.

Socio-demographic characteristics	Knowledge level					Attitudes level				
	Poor		Good		Chi-square P value	Negative		Positive		Chi-square P value
	No	%	No	%		No	%	No	%	
The academic year										
• First	70	32.1	148	67.9	$\chi2 = 2.813$	92	42.2	126	57.8	$\chi2 = 10.082$
• Second	52	39.1	81	60.9	P = 0.421	44	33.1	89	66.9	P = 0.018*
• Third	30	34.1	58	65.9		32	36.4	56	63.6	
• Fourth or above	54	39.4	83	60.6		70	51.1	67	48.9	
Fathers' education										
• Illiterate	31	45.6	37	54.4	$\chi2 = 9.796$	22	32.4	46	67.6	$\chi2 = 6.714$
• Primary, preparatory	47	38.8	74	61.2	P = 0.044*	60	49.6	61	50.4	P = 0.152
• Secondary	37	41.1	53	58.9		39	43.3	51	56.7	
• Diploma	18	24.0	57	76.0		32	42.7	43	57.3	
• University or above	73	32.9	149	67.1		85	38.3	137	61.7	
Mothers' education										
• Illiterate	88	36.2	155	63.8	$\chi2 = 3.090$	110	45.3	133	54.7	$\chi2 = 6.951$
• Primary, preparatory	56	34.6	106	65.4	P = 0.543	68	42.0	94	58.0	P = 0.139
• Secondary	31	32.0	66	68.0		35	36.1	62	63.9	
• Diploma	13	50.0	13	50.0		12	46.2	14	53.8	
• University or above	18	37.5	30	62.5		13	27.1	35	72.9	
Living level										
• High	8	36.4	14	63.6	$\chi2 = 6.329$	9	40.9	32	59.1	$\chi2 = 0.647$
• Medium	172	34.1	332	65.9	P = 0.042*	211	41.9	293	58.1	P = 0.724
• Low	26	52.0	24	48.0		18	36.0	13	64.0	

* Significant differences at $P \leq 0.05$.

Regarding attitudes, gender, residence, and year of study are factors that have a statistically significant relationship ($P < 0.05$). It has been shown that females, students residing in urban areas, and students in the second and third years of study have more positive attitudes towards consanguineous marriage and pre-marital examination. However, it was noted that age, marital status, college, father's education, mother's education, and living level are factors that did not have a significant association with students' attitudes ($P > 0.05$).

4. DISCUSSION

There is a relationship between genetic diseases and consanguineous marriage, as consanguineous marriage is one of the most significant factors for the spread of genetic diseases, especially in Yemen, where social and cultural norms still encourage consanguineous marriage despite the high incidence of various genetic diseases [27]. University youth are in early adulthood, which is the time to make effective decisions regarding marriage, childbearing, offspring, and even lifestyle, all of which are affected by their health conditions. The purpose of this study was to evaluate knowledge and attitudes towards genetic diseases and consanguineous marriage and associated factors among university youth in Yemen.

This study discovered that the majority of students (96.2%) were aware that genetic diseases are transmission from parents to children. In addition, 86.1% believe that consanguine marriages raise the risk of having children with genetic diseases. Furthermore, 72.7% of them know that it is transmitted in some cases of consanguineous marriage and not in all cases. It is also worth noting that 79.3% of the participants know that genetic diseases are not transmitted through infection, this knowledge is particularly important in communities where consanguineous marriage is common. However, the results indicated some gaps in knowledge, particularly regarding the types of genetic diseases. Only 35.6% of participants knew about thalassemia, and 23.4% knew about sickle cell anemia. This suggests that there is a need to improve awareness about specific genetic diseases, especially those that are common in Yemen. Furthermore, knowledge about complete recovery from hereditary diseases is lacking, as over half of the youths (53.8%) believe in complete recovery, which is not always the case. These results are consistent with a study conducted by Alahdal [5], which indicated that there was a high level (91.51%) of awareness of the consequences of consanguineous marriage, and its association with genetic diseases. However, there is a lack of knowledge about the different types of genetic diseases. While the results of this study differed from the results of studies conducted by Mahboub [20] and Sedehi [24]**,** which found that most of the participants had poor knowledge about hereditary diseases associated with consanguineous marriage.

In terms of prevention, the vast majority of students (92.0%) considered premarital screening as the most important method to prevent the spread of genetic diseases, and 56.4% believe that genetic counseling provides important information to couples about genetic diseases. This finding is consistent with the findings of related studies conducted by Al-Aama [4], Al-Nood [8], Al Kindi [2] and Gharaibeh, and Mater [13], where they found that university students have a good knowledge of the importance of premarital screening to prevent the spread of genetic diseases in societies.

In general, the total level of knowledge among university students indicates that 64.2% of students have good knowledge of genetic diseases and their relationship

consanguineous marriage. This study is consistent with a study conducted in Saudi Arabia [5] which found that female students' knowledge about genetic diseases and their relationship to consanguineous marriage was good. However, there is still a need to improve knowledge among students, especially regarding specific genetic diseases and misconceptions about their nature and recovery.

The present study stated that the chief source of information among students about genetic diseases was school, as reported by 50.9% of the students surveyed, and social media and the internet ranked as the second most common source, followed by the media (36.3%, 35.7%, respectively). These results are similar to a study conducted in Egypt [12] that found that the Internet, schools, and the media were the main sources of information about genetic diseases. The study emphasizes the crucial role of schools in disseminating accurate information while acknowledging the growing influence of social media and the internet.

Regarding attitudes, the study showed that the majority of students (81.9%) agreed that a premarital examination is very important, where a premarital examination helps to identify potential health problems and ensure that both partners are healthy before they start a family. This finding is similar to findings reported in other Arab countries by Al Kindi [2] and Saleh [23] who found that most students appreciated the importance of PMS and favored testing, while The attitudes of students were neutral regarding the marriage of relatives, and the risk of genetic diseases. In general, university students had a positive attitude towards genetic diseases and their relationship to consanguineous marriage.

Concerning the factors influencing the knowledge and attitudes of university youth, the study revealed a number of indicators that affected the knowledge and attitudes of students towards genetic diseases and consanguineous marriage. It has been shown that gender, marital status, place of residence, parents' education, and standard of living of the students studied are factors that have an impact on the students' knowledge and attitudes. It was noted females, married students, those residing in urban areas, those whose parents have a high level of education, and those who have a medium to high level of living have a higher level of knowledge compared to others. And noted also females, students residing in urban areas, and students in the second and third years of study have more positive attitudes than other students. These findings are supported by El-Hosany [12] and [20], as they found that some of these factors have an important relationship with participants' knowledge and attitudes toward genetic diseases and consanguineous marriage.

CONCLUSION

The study concluded that university students' knowledge about genetic diseases and their relationship to consanguineous marriage was good and their attitudes were positive. Still, it is insufficient and must be strengthened among students. There was a noticeable lack of official sources of information, such as universities, health institutions, and the media, which constitutes a lack of knowledge. Several factors influencing student's knowledge and attitudes towards genetic diseases and consanguineous marriages were revealed. Gender, marital status, place of residence, parental education, and level of living of the students studied were factors that had a significant impact on students' knowledge and attitudes. The study recommended enhancing educational programs on the risk of genetic diseases and their relationship to consanguineous marriage among

university students, particularly focusing on underrepresented groups such as those with lower parental education levels or living in rural areas. Collaboration with official sources like universities, health institutions, and the media is crucial to disseminate accurate information and improve overall knowledge and attitudes towards these topics.

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