

# Community Awareness and Knowledge Assessment Toward the Risk of the Genetic Diseases Resulting from Consanguineous Marriage

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## Abstract

Recent studies indicate a high incidence of consanguineous marriage (CM) in Saudi Arabia, which may lead to the transmission of genetic diseases like thalassemia, sickle cell anemia, apnea, and other diseases from parents to their offspring. So, increasing community awareness regarding the dangers of CM can minimize the occurrence of genetic diseases. Our study aims to measure the level of community awareness and knowledge about consanguinity and its huge effect on developing genetic diseases in Saudi Arabia in 2023. This study is a cross-sectional observational study. The data was collected using an online questionnaire designed to elicit the participant's knowledge of the risk of genetic diseases resulting from consanguineous marriage. The participants were from 18 to 60 years of age from various regions of Saudi Arabia in 2023.

The study included 380 participants; the data shows that 82.1% of the participants were females, and the majority of respondents fall within the 21-30 age range, comprising 53.4% of the total sample. The majority of individuals surveyed have a high knowledge level, with 42.6% of individuals falling into this category. The second largest group is the moderate knowledge level group, with 41.8%, and 15.5% having poor knowledge. The assessment of community awareness and knowledge of the risk of genetic diseases resulting from consanguineous marriage in Saudi Arabia is an important area of research with implications for public health, healthcare providers, and the community at large. Our study showed that knowledge levels were adequate, but awareness levels were surprisingly low.

**Keywords:** Consanguinity, Consanguineous marriage, Genetic disease, Awareness, Knowledge, Saudi Arabia

## INTRODUCTION

Consanguinity is used to describe a marriage between two spouses who are biologically related and occur within the same kinship group [1]. Sociocultural factors have a high impact on promoting consanguinity marriage in Arab and Middle Eastern populations, like similar culture, religion, ethnicity, and geography [2]. Due to the strong bonds between families, the ease of choosing spouses, the availability of suitable partners for both genders, the desire to strengthen family support, the low cost of marriage, the strong ties between the couple and their children within the family, and above all the better management of marital relations, millions of people frequently practice cousin marriages in the majority of developing countries, particularly in the Islamic region [3]. Genetic diseases are anomalies defects that occur at the time of birth or later in life, and these anomalies could be structural or functional defects and they are considered one of the most common problems that occur in childhood [4]. Consanguineous marriage (CM) is considered one of the risk factors that

contribute to the occurrence of genetic diseases in offspring [5]. Many significant findings show that the relevant marriage will increase the risk of inheriting any one of the 4968 genetic diseases that can affect any parts of the body like blood-associated disease (acute lymphocytic leukemia), breathing stop (apnea), and other genetic diseases [6]. According to a

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study published in 2019, 20% of the global population prefers consanguineous marriage (CM) [7]. It is popular in a variety of regions, including North Africa, South Asia, and the Middle East, where kinship is common [4]. In addition, consanguineous marriage is prevalent among Islamic regions and countries [8]. It has been estimated that the prevalence of Consanguineous marriage in different cities throughout the Kingdom of Saudi Arabia was reported to be as high as 42% to 67% [9]. Also, some studies have shown that children born to consanguineous parents are at a higher risk of inheriting genetic diseases than children born to non-consanguineous parents [10]. In 2017, a study revealed that out of 2024 Saudi citizens most participants (97%) had a good understanding of genetic diseases and consanguinity [11]. Another study conducted in Al Madinah city with 810 participants in the same year found that 39.6% agreed and 23.5% strongly agreed that consanguineous marriages increased the risk of health issues in offspring [12]. A study in Oman shared the same objective as this study and showed a high rate of consanguineous marriage and moderate knowledge about the health risks associated with consanguinity [13]. Due to the strong relationship between consanguineous marriage and its significant effect on genetic disease, despite society's awareness of its seriousness, current studies show an increase in the rate of consanguineous marriage and associated disease. In addition, some studies suffer from limited sample size, which affects the accuracy of the results. Thus, the main objective of this study was to measure the awareness and knowledge level among the adult population in all of Saudi Arabia region about consanguineous marriage and its effect on genetic diseases happening.

### Objectives

The main objective of this study is to measure the awareness and knowledge level among the adult population in all of the Saudi Arabian region about consanguineous marriage and its effect on genetic diseases.

## MATERIALS AND METHODS

### Study Design

This is a cross-sectional questionnaire survey study conducted on the Saudi adult population on consanguinity and genetic disorders from various provinces and regions of Saudi Arabia in 2023.

### Study Setting: Participants, Recruitment, and Sampling Procedure

The study's population included individuals with age between 18–60 years old living in Saudi Arabia.

### Inclusion and Exclusion Criteria

All social classes of adult males and females over 18 years old in Saudi Arabia cities were included. The only exclusion criteria were being younger than 18 years old.

### Sample Size

The sample size was estimated by using the Qualtrics calculator with a confidence level of 95%; the minimum sample size was 385.

### Method for Data Collection and Instrument (Data Collection Technique and Tools)

Data collection was done using a form survey instrument from a questionnaire done by a previous similar study [12], which was administered anonymous questionnaire in English and Arabic version, containing questions regarding demographic features such as age, gender, etc. Also asked seven questions about their knowledge of marriage of consanguinity. Section three was about 13 questions about his or her views on consanguineous marriages and the likelihood of acquiring certain diseases.

### Scoring System

#### Knowledge Score

To determine the knowledge score marriage of consanguinity, the knowledge section's prompt responses were taken into account. Seven conventional questions were given to the participants, and the combined scores of the questions were used to determine the respondent's overall knowledge score. If the response was accurate, a score of 1 was given. 0 scores for incorrect responses were provided. The original Bloom's cut-off points, 80.0% -100.0-60%-79% and <59%, were adapted and modified from the KAP study into three levels, the score for knowledge varied from 1 to 7 points and were classified into three levels as follows: 1. high level: 7-5 scores; 2. moderate level: 3 scores; and 3. low level: 4-0 scores.

#### Awareness Score

Each respondent was given a 13-item question about his or her views on consanguineous marriages and the likelihood of acquiring certain diseases. The following responses were noted: agree, disagree, or I don't know. Scores ranging from 1 to 2 were assigned depending on whether there was adequate awareness or not. I don't know received a score of 0. The original Bloom's cut-off points, 80.0% -100.0-60%-79% and <59%, were adapted and modified from the KAP study into three levels, the score for knowledge varied from 1 to 13 points and were classified into three levels as follows: 1. high level: 13-10 scores; 2. moderate level: 9; and 3. low level: 8-0 scores. The maximum possible score thus was  $13 \times 2 = 26$ .

### Analyzes and Entry Method

Collected data was entered on the computer by Using the Windows version of Microsoft Excel 2019. Data then was transferred to the Statistical Package of Social-Science Software (SPSS) application version 20, to be statistically analyzed.

## RESULTS AND DISCUSSION

**Table 1** showed that the majority of respondents fall within the 21-30 age range, comprising 53.4% of the total sample. This is followed by the 41-50 and 51-60 age groups, which make up 15.8% and 14.2% of the participants, respectively. The youngest age group, 18-20, represents 6.6% of the respondents, and the 31-40 age group accounts for 10.0% of the total. In terms of gender distribution, the data shows that 82.1% of the participants are female, while 17.9% are male. Moving on to nationality, the overwhelming majority (92.9%) of respondents are Saudi, with the remaining 7.1% being non-Saudi. Regarding location, the data is segmented into five regions: East, Middle, North, South, and West. The West region has the highest representation at 45.3%, followed by North (17.6%), South (10.3%), East (15.5%), and Middle (11.3%). When it comes to education level, the majority of participants hold a Bachelor's degree, constituting 67.4% of the sample. This is followed by the postgraduate group at 13.7%, secondary education at 12.4%, diploma holders at 5.8%, and those with a middle-level education at 0.8%. The data also provides insights into the annual income distribution of the participants. The majority of respondents fall within the 1000-5000 Saudi Riyals income bracket, representing 48.4% of the sample. This is followed by the 5001-10000 bracket at 22.9%, the 10001-20000 bracket at 18.4%, and those earning more than 20000 Riyals at 10.3%. Finally, the table presents the marital status of the participants, with the highest percentage (52.9%) being single individuals, followed by married (41.1%), divorced (4.5%), and widowed (1.6%) individuals.

**Table 1.** Sociodemographic characteristics of participants (n=380)

	Parameter	No.	%
Age	18_20	25	6.6
	21_30	203	53.4
	31_40	38	10.0
	41_50	60	15.8
	51_60	54	14.2
Gender	Male	68	17.9
	Female	312	82.1
Nationality	Saudi	353	92.9
	Non-Saudi	27	7.1
	East	59	15.5
Location	Middle	43	11.3
	North	67	17.6
	South	39	10.3
	West	172	45.3
	middle	3	.8
Education Level	secondary	47	12.4
	Bachelor's degree	256	67.4
	diploma	22	5.8
	Postgraduate	52	13.7
	1000-5000	184	48.4
Monthly Income (in Saudi Riyals)	5001-10000	87	22.9
	10001-20000	70	18.4
	more than 20000	39	10.3
Marital Status	Married	156	41.1

Single	201	52.9
Divorced	17	4.5
Widowed	6	1.6

In **Table 2**, when asked about their stance on consanguineous marriage, only 11.8% of respondents were in favor, while the majority (73.7%) were against it. However, a significant portion (14.5%) did not know where they stood on the issue. When asked about the potential benefits of marrying a second or third-degree relative, 32.9% of respondents believed that it could reduce the risk of genetic diseases. However, almost half (48.7%) did not believe this to be the case, and 18.4% were unsure. The majority of respondents (87.1%) believed that genetic diseases are life-threatening, while only 4.7% did not believe this to be the case. However, a significant portion (8.2%) were unsure. When asked about the possibility of treating genetic diseases, only 18.2% of respondents believed that it was possible, while 60.5% were unsure and 21.3% did not believe it was possible. The overwhelming majority (99.2%) of respondents had heard of premarital examination, which is a positive sign. However, when asked whether premarital screening is limited to infectious diseases, only 23.7% of respondents believed this to be the case, while 63.2% did not, and 13.2% were unsure. When asked about the consequences of insisting on marriage after receiving positive test results, 78.9% of respondents were aware of the potential risks, while 10.5% were not, and 10.5% were unsure. Finally, the majority of respondents (95.0%) believed that deciding on consanguineous marriage and premarital screening is a serious matter that requires careful consideration. However, a small portion (4.2%) did not believe this to be the case.

**Table 2.** Knowledge of the risk of the genetic diseases resulting from consanguineous marriage (n=380).

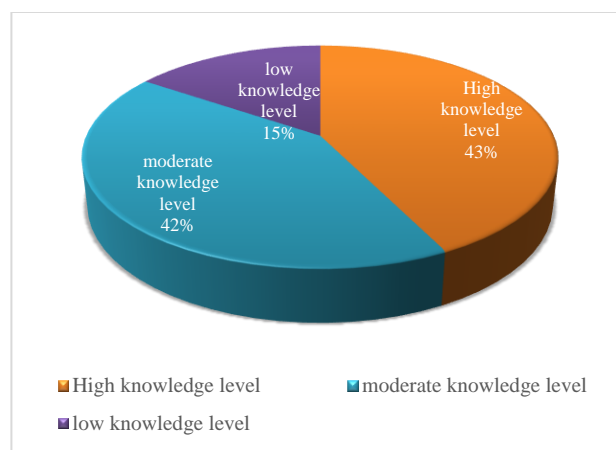
Parameter	Yes	No	Don't know
Against consanguineous marriage	45 11.8%	280 73.7%	55 14.5%
Marriage to a second or third-degree relative reduces the risk of genetic diseases	125 32.9%	185 48.7%	70 18.4%
Genetic diseases are life-threatening	331 87.1%	18 4.7%	31 8.2%
Genetic diseases can be treated	69 18.2%	230 60.5%	81 21.3%
Heard about the premarital examination	377 99.2%	2 .5%	1 .3%
Premarital screening is limited to infectious diseases (such as hepatitis, AIDS)	90 23.7%	240 63.2%	50 13.2%
Know the consequences of insisting on marriage after knowing the positive test results	300 78.9%	40 10.5%	40 10.5%
Think it is a reality check and you have to make a serious decision about it	361 95.0%	3 .8%	16 4.2%

The results of **Table 3** indicated that the majority of participants were aware of the risks associated with consanguineous marriage. For example, 78.4% of participants agreed that health problems could result in offspring, while only 8.4% disagreed. Similarly, 79.7% of participants agreed that congenital defects and deformities could result, while only 10.3% disagreed. In terms of specific diseases, the results show that participants were most knowledgeable about hereditary blood disorders, with 81.6% agreeing that they could result from consanguineous marriage. Participants were also quite knowledgeable about diabetes, with 76.3% agreeing that it could result from consanguineous marriage. On the other hand, participants were less knowledgeable about some diseases, such as flu and pneumonia. Only 13.7% of participants agreed that flu could result from consanguineous marriage, while 65.3% disagreed. Similarly, only 31.3% of participants agreed that pneumonia could result from consanguineous marriage, while 43.4% disagreed.

**Table 3.** Awareness about the risks of the genetic diseases resulting from consanguineous marriage (n=380).

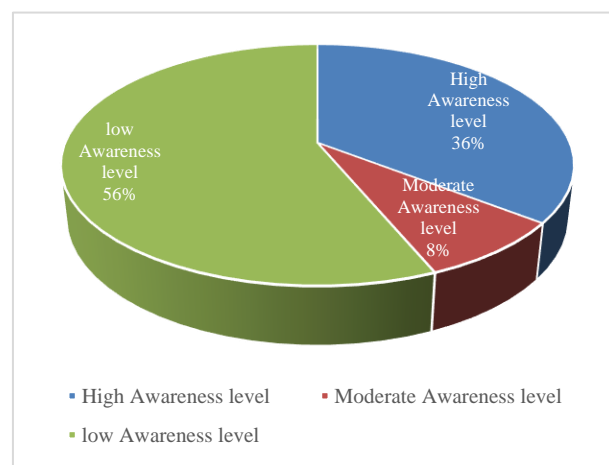
Parameter	Agree	disagree	Don't know
<b>Health problems in offspring</b>	298 78.4%	32 8.4%	50 13.2%
<b>Congenital defect and deformity</b>	303 79.7%	39 10.3%	38 10.0%
<b>Hereditary blood disorder</b>	310 81.6%	24 6.3%	46 12.1%
<b>Deafness</b>	212 55.8%	58 15.3%	110 28.9%
<b>Congenital heart disease</b>	258 67.9%	50 13.2%	72 18.9%
<b>Down's syndrome</b>	217 57.1%	92 24.2%	71 18.7%
<b>Mental retardation</b>	240 63.2%	62 16.3%	78 20.5%
<b>Epilepsy</b>	209 55.0%	69 18.2%	102 26.8%
<b>Asthma</b>	208 54.7%	88 23.2%	84 22.1%
<b>Diabetic</b>	290 76.3%	50 13.2%	40 10.5%
<b>blood cancer</b>	184 48.4%	90 23.7%	106 27.9%
<b>Flu</b>	52 13.7%	248 65.3%	80 21.1%
<b>Pneumonia</b>	119 31.3%	165 43.4%	96 25.3%

According to the data in **Figure 1**, the majority of individuals surveyed have a high knowledge level, with 42.6% of individuals falling into this category. The second largest group is the moderate knowledge level group, with 41.8% of the individuals representing this category. Finally, the smallest group is the low knowledge level group, which includes 15.5% of the individuals falling into this category.



**Figure 1.** Knowledge score of the risk of genetic diseases resulting from consanguineous marriage

Based on the data provided in **Figure 2**, it appears that the majority of individuals have a low level of awareness, with 56.3% falling into this category. On the other hand, 35.5% of individuals have a high level of awareness, and only 8.2% have a moderate level of awareness.



**Figure 2.** Awareness score of the risk of genetic diseases resulting from consanguineous marriage.

**Table 4** shows that the knowledge score is categorized into high, moderate, and low knowledge, and the distribution is analyzed across different age groups. For the age group 18-20, the percentages of high, moderate, and low knowledge are 3.2%, 2.1%, and 1.3% respectively. Moving on to the age group 21-30, the percentages of high, moderate, and low knowledge are 22.1%, 23.2%, and 8.2% respectively, with a p-value of 0.645. Next, the distribution of knowledge scores is examined based on marital status. For singles, the percentages of high, moderate, and low knowledge are 22.1%, 21.6%, and 9.2% respectively, with a p-value of 0.674. Moving on to gender, the table shows that among the total sample, 68 individuals identified as male and 312 as female. The breakdown of high, moderate, and low knowledge scores within each gender category is also



provided, along with the corresponding percentages. For instance, among males, (8.7%) had high knowledge, and (6.3%) had moderate knowledge. Among females, (33.9%) had high knowledge, and (35.5%) had moderate knowledge. The p-value for gender is reported as 0.461. Moving on to nationality, the table indicates that 353 individuals were Saudi and 27 were non-Saudi. The distribution of knowledge scores within each nationality category is outlined, along with the respective percentages. For example, among Saudis, 148 had high knowledge (38.9%), and 152 had moderate knowledge (40.0%). The p-value for nationality is reported as 0.204. The table also provides data on location, with individuals categorized by their geographical region. The breakdown of knowledge scores and corresponding

percentages for each region is presented. For instance, in the East region, (5.8%) had high knowledge and (6.8%) had moderate knowledge. The p-value for location is reported as 0.277. With education levels, it is evident that the distribution of knowledge scores varies significantly across different categories, as participants with bachelor's degrees showed higher knowledge scores. For instance, among individuals with a Bachelor's degree, a substantial majority (67.4%) demonstrated high knowledge, while only a small percentage (10.5%) exhibited low knowledge. In contrast, those with a secondary education showed a more evenly distributed knowledge score, with 12.4% displaying low knowledge and 6.1% exhibiting high knowledge. The p-value for educational level is 0.012.

**Table 4.** Association between sociodemographic characteristics and knowledge score of the risk of the genetic diseases resulting from consanguineous marriage (n=380).

Parameter		Knowledge score			Total (N=380)	P value
		High knowledge	Moderate knowledge	Low knowledge		
Age	18_20	12 3.2%	8 2.1%	5 1.3%	25 6.6%	<b>0.645</b>
	21_30	84 22.1%	88 23.2%	31 8.2%	203 53.4%	
	31_40	16 4.2%	16 4.2%	6 1.6%	38 10.0%	
	41_50	23 6.1%	24 6.3%	13 3.4%	60 15.8%	
	51_60	27 7.1%	23 6.1%	4 1.1%	54 14.2%	
	Single	84 22.1%	82 21.6%	35 9.2%	201 52.9%	
marital status	Married	66 17.4%	67 17.6%	23 6.1%	156 41.1%	<b>0.674</b>
	Divorced	9 2.4%	8 2.1%	0 0.0%	17 4.5%	
	widow	3 0.8%	2 0.5%	1 0.3%	6 1.6%	
Gender	Male	33 8.7%	24 6.3%	11 2.9%	68 17.9%	0.461
	Female	129 33.9%	135 35.5%	48 12.6%	312 82.1%	
Nationality	Saudi	148 38.9%	152 40.0%	53 13.9%	353 92.9%	<b>0.204</b>
	Non-Saudi	14 3.7%	7 1.8%	6 1.6%	27 7.1%	
Location	East	22 5.8%	26 6.8%	11 2.9%	59 15.5%	<b>0.277</b>
	Middle	20 5.3%	14 3.7%	9 2.4%	43 11.3%	
	North	33 8.7%	25 6.6%	9 2.4%	67 17.6%	
	South	14 3.7%	23 6.1%	2 0.5%	39 10.3%	
	West	73 19.2%	71 18.7%	28 7.4%	172 45.3%	
Education Level	middle	1 0.3%	1 0.3%	1 0.3%	3 0.8%	<b>0.012</b>

Monthly Income (in Saudi Riyals)	secondary	23 6.1%	15 3.9%	9 2.4%	47 12.4%	<b>0.059</b>
	Bachelor's degree	111 29.2%	105 27.6%	40 10.5%	256 67.4%	
	diploma	5 1.3%	9 2.4%	8 2.1%	22 5.8%	
	Postgraduate	22 5.8%	29 7.6%	1 0.3%	52 13.7%	
	1000-5000	80 21.1%	69 18.2%	35 9.2%	184 48.4%	
	5001-10000	32 8.4%	39 10.3%	16 4.2%	87 22.9%	
	10001-20000	36 9.5%	31 8.2%	3 0.8%	70 18.4%	
	more than 20000	14 3.7%	20 5.3%	5 1.3%	39 10.3%	

Starting with age groups, in **Table 5** we observed that the 21-30 age group has the highest awareness scores, with 73 individuals (19.2%) falling into the high awareness category and 115 (30.3%) in the low awareness category. The p-value for this age group is 0.668. Moving on to marital status, we can see that singles constitute the largest group, with 72 individuals (18.9%) exhibiting high awareness and 112 (29.5%) with low awareness. The p-value for this category is 0.894. Next, when considering gender, females show higher awareness scores compared to males. Specifically, 114 females (30.0%) have high awareness and 172 (45.3%) have low awareness, with a p-value of 0.605. Nationality also appears to have an impact on awareness, with a higher

percentage of Saudi nationals exhibiting high awareness (33.7%) compared to non-Saudi individuals (1.8%), as indicated by a p-value of 0.515. Moving on to location, individuals from the West region seem to have the highest awareness scores, with 62 (16.3%) in the high awareness category, 16 (4.2%) in the moderate awareness category, and 94 (24.7%) in the low awareness category, with a p-value of 0.6781. Education level also plays a role, with individuals holding bachelor's degrees showing the highest awareness scores, with 89 (23.4%) in the high awareness category and 149 (39.2%) in the low awareness category, with a p-value of 0.021 indicating a statistically significant association.

**Table 5.** Association between sociodemographic characteristics and awareness score of the risk of genetic diseases resulting from consanguineous marriage (n=380).

Parameter		Awareness score			Total (N=380)	P value
		High awareness	Moderate awareness	Low awareness		
Age	18_20	6 1.6%	4 1.1%	15 3.9%	25 6.6%	<b>0.668</b>
	21_30	73 19.2%	15 3.9%	115 30.3%	203 53.4%	
	31_40	14 3.7%	1 0.3%	23 6.1%	38 10.0%	
	41_50	20 5.3%	6 1.6%	34 8.9%	60 15.8%	
	51_60	22 5.8%	5 1.3%	27 7.1%	54 14.2%	
	Single	72 18.9%	17 4.5%	112 29.5%	201 52.9%	
marital status	Married	52 13.7%	13 3.4%	91 23.9%	156 41.1%	<b>0.894</b>
	Divorced	8 2.1%	1 0.3%	8 2.1%	17 4.5%	
	widow	3 0.8%	0 0.0%	3 0.8%	6 1.6%	
Gender	Male	21 5.5%	5 1.3%	42 11.1%	68 17.9%	0.605
	Female	114 30.0%	26 6.8%	172 45.3%	312 82.1%	
Nationality	Saudi	128	29	196	353	<b>0.515</b>

		33.7%	7.6%	51.6%	92.9%	
	Non-Saudi	7	2	18	27	
		1.8%	0.5%	4.7%	7.1%	
	East	20	2	37	59	
		5.3%	0.5%	9.7%	15.5%	
	Middle	19	3	21	43	
		5.0%	0.8%	5.5%	11.3%	
Location	North	19	7	41	67	<b>0.6781</b>
		5.0%	1.8%	10.8%	17.6%	
	South	15	3	21	39	
		3.9%	0.8%	5.5%	10.3%	
	West	62	16	94	172	
		16.3%	4.2%	24.7%	45.3%	
	Middle	0	0	3	3	
		0.0%	0.0%	0.8%	0.8%	
	Secondary	17	4	26	47	
		4.5%	1.1%	6.8%	12.4%	
Education Level	Bachelor's	89	18	149	256	<b>0.021</b>
		23.4%	4.7%	39.2%	67.4%	
	Diploma	2	4	16	22	
		0.5%	1.1%	4.2%	5.8%	
	Postgraduate	27	5	20	52	
		7.1%	1.3%	5.3%	13.7%	
	1000-5000	62	17	105	184	
		16.3%	4.5%	27.6%	48.4%	
Monthly Income (in Saudi Riyals)	5001-10000	28	7	52	87	<b>0.336</b>
		7.4%	1.8%	13.7%	22.9%	
	10001-20000	24	5	41	70	
		6.3%	1.3%	10.8%	18.4%	
	more than 20000	21	2	16	39	
		5.5%	0.5%	4.2%	10.3%	

Consanguineous marriage, or marriage between close relatives, is a common practice in many cultures around the world, including in Saudi Arabia. However, research has shown that consanguineous marriages are associated with an increased risk of genetic diseases and birth defects in offspring. Despite this, many communities may not be fully aware of the risks associated with consanguineous marriage, and there may be a lack of knowledge about genetic diseases and how they are inherited [3].

The rates of consanguineous marriages in the Middle East, South Asia, Central Asia, and West Asia are notable. Saudi Arabia ranked second in terms of the highest frequency of consanguineous marriage, with a prevalence ranging from 22% to 55% [14, 15].

The majority of participants in the current survey, 67.4%, possessed a bachelor's degree. However, there was little disparity in viewpoints between those who opposed consanguineous marriages (73.7%) and those who were uncertain (14.5%). Half of the participants in a prior Saudi study had a disposition towards consanguineous marriage [16]. Research conducted in Iran found a consanguinity rate of 32.5% [17]. The Saudi study revealed that individuals who received medical knowledge exhibited a less favorable attitude toward supporting consanguinity. The authors attributed this to the notable correlation between educational sessions and changes in attitude [16]. A study conducted in

Turkey among high school students observed a significant alteration in their understanding and perspective on consanguineous marriage following the implementation of a training program [18].

Our findings showed that regarding knowledge scores, 84.4% of participants exhibited high to moderate knowledge scores, indicating adequate knowledge scores. Whereas awareness score levels showed different variables, more than half of the respondents (56.3%) showed low awareness levels. On the other hand, an Iranian study revealed that 44.6% of the participants exhibited insufficient understanding of the genetic ramifications of inbreeding [17]. In contrast, another study recorded a higher percentage of 75% [19].

Our study showed that 87.1% of the participants believe that genetic diseases are life-threatening, while 60.5% think that genetic diseases can't be treated. Similarly, a study in Al-Madinah showed that 62.8% of the participants were aware that inherited disorders pose a significant risk to life, whereas 50.6% were aware that certain diseases are not curable [12].

Our study showed that educational level was the only parameter to exhibit a significant association with knowledge and awareness scores, as participants holding bachelor's degrees seemed to have higher knowledge ( $p=0.012$ ) and awareness score levels ( $p=0.021$ ). On the contrary, another study showed that there was a significant difference observed

among various education levels in their attitudes towards consanguineous marriage (P-value = 0.03). A higher percentage of individuals with postgraduate education (48%) expressed opposition to consanguineous marriage. However, when it came to the increased risk of various diseases associated with consanguineous marriage, no significant variation was found across different education levels [12].

The findings of the study are important for several reasons. Firstly, they provide insight into the level of awareness and knowledge about genetic diseases and consanguineous marriage within the Saudi Arabian community. This information can help to identify areas where education and awareness campaigns may be needed to improve understanding of the risks associated with consanguineous marriage.

Additionally, the study can also inform public health initiatives and policies aimed at reducing the prevalence of consanguineous marriage and mitigating the risks of genetic diseases. By understanding the level of awareness and knowledge within the community, public health officials can tailor their efforts to effectively reach and educate the population about the potential consequences of consanguineous marriage [5].

Furthermore, the study may also have implications for healthcare providers and genetic counselors working in Saudi Arabia. By understanding the community's knowledge and attitudes toward genetic diseases and consanguineous marriage, healthcare professionals can better address the needs of their patients and provide appropriate support and guidance [7].

It is important to note that the findings of this study may not be generalizable to other populations or cultures, as attitudes and awareness of genetic diseases and consanguineous marriage can vary widely. However, the study serves as a valuable contribution to the existing literature on this topic and highlights the importance of assessing community awareness and knowledge in addressing the risks associated with consanguineous marriage [10].

## CONCLUSION

In conclusion, the assessment of community awareness and knowledge of the risk of genetic diseases resulting from consanguineous marriage in Saudi Arabia is an important area of research with implications for public health, healthcare providers, and the community at large. Our study showed that knowledge levels were adequate, but awareness levels were surprisingly low. By understanding the level of awareness and knowledge within the population, efforts can be made to improve education and awareness about the risks associated with consanguineous marriage and genetic diseases, ultimately leading to better health outcomes for future generations.

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Written consent was obtained from all individual participants included in the study.

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