**Republic of Yemen**
**Emirates International University**
**Faculty of Medicine and Health Science**

# Knowledge, Attitudes, and Practices of Medical Students Toward Premarital Screening at Emirates International University, Sana'a City - Yemen.

A Research Submitted in Partial Fulfillment of the Requirements for the Bachelor's Degree in Medicine ,Faculty of Medicine and Health Sciences, Emirates International University

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بسم الله الرحمن الرحيم


وقل اعملوا


فسيرى الله عملكم ورسوله والمؤمنون

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## Dedication

This work is dedicated to our families, whose unwavering support and belief in us have been the foundation of our journey; thank you for your patience, encouragement, and endless inspiration. To our mentors and teachers, whose guidance and insight have shaped our growth and ignited my passion for discovery. To our friends, for their companionship and understanding. And finally, to all who strive for knowledge and progress, may this work serve as a small contribution to our shared pursuit of truth and understanding.

The Researchers.

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**The Researchers**

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# List of Abbreviations

| | |
|---|---|
| AIDS | Acquired immunodeficiency syndrome |
| HBV | Hepatitis B virus |
| HCV | Hepatitis C virus |
| HIV | Human immunodeficiency virus |
| PMC | Premarital counseling |
| PMS | Premarital screening |
| PMSGC | Premarital screening and genetic counseling |
| PMSP | Premarital screening program |
| SCA | Sickle cell anemia |
| SD | Stander deviation |
| SPSS | Statistical Package for the Social Sciences |
| STDs | Sexually transmitted disease |
| WHO | World health organization |

**Knowledge, Attitudes, and Practices of Medical Students Toward Premarital Screening at Emirates International University in Sana'a City - Yemen .**


## Abstract

**Background:** A premarital screening (PMS) is an effective program to identify carriers of genetic diseases and sexually transmitted diseases and provide genetic counseling to couples for a healthy reproductive life.

**Objectives:** To evaluate the knowledge, attitudes, and practices of medical students toward premarital screening at Emirates International University in Sana'a - Yemen.

**Methodology:** A cross-sectional study was conducted among medical students at Emirates International University in 2024. A self-administered questionnaire was distributed to 265 students. The questionnaire was composed of four parts; the first part contains questions about the sociodemographic characteristics of students, the second part consists of eight items about the knowledge of PMS, the third part consists of fourteen items about the attitude of PMS and the fourth part the last section consists of five items about the practice of PMS. All data were entered and analyzed in the statistical package SPSS version 27.

**Results:** Most of the students (90.9%) knew the importance of PMS in reducing the occurrence of genetic and sexually- transmitted diseases, the unavailability of a PMS program - Yemen was perceived by (49.4%) of the students, (89.1%) of the students agreed to do PMS before marriage, (76.6%) agreed to make laws and regulations to stop marriage in PMS case of positive results was accepted. In this study, 184 (69.4%) students exhibited good knowledge, 205 (77.4%) had a positive attitude and 194 (73.2%) demonstrated good practices regarding PMS.

**Conclusions:** Although the majority of Emirates International University Medical students favored PMS and had a fair knowledge about most of its aspects, a small proportion of them refused its mandating or legally preventing at-risk marriages. These negative attitudes could be reversed by health education of medical students on PMS.


**Keywords:** Knowledge, Attitudes, Practice, medical student, Premarital screening, Sana’a- Yemen.

# Chapter 1
# (Introduction)

# 1 Introduction

## 1.1 Background

Genetic blood disorders are a major global community health concern, particularly prevalent in Arab countries, where they account for a significant proportion of physical and mental handicaps. One of the leading contributing factors to the high incidence of inherited blood disorders, such as Sickle Cell Anemia (SCA) and thalassemia, is consanguineous marriage (Al-Nood *et al.,* 2016). Consanguinity refers to marriage between relatives who are at least second-degree cousins (Ben *et al.,* 2013). Approximately 700 million people are in consanguineous marriages worldwide (Anwar *et al.,* 2014). Consanguinity impact the social, emotional, psychological, and financial well-being of families. Studies have shown that the highest rates of consanguineous marriages are associated with low socioeconomic levels, illiteracy, and rural residence (Bener & Mohammad, 2017).

According to the World Health Organization (WHO), approximately 240 million people are carriers of hemoglobinopathies, and at least 200,000 affected individuals are born annually, roughly divided between sickle cell anemia and thalassemia (Al-Fars *et al.,* 2014). Genetic disorders tend to be chronic, difficult, and expensive to manage, and sometimes life-threatening. The overall cost of almost all common genetic disorders in the Arab world has been estimated to be USD 13 billion per year (Al-Balushi & Al-Hinai, 2018).

Premarital screening (PMS) for hereditary diseases is recognized as a vital strategy for preventing genetic disorders, congenital abnormalities, and medical and psychosocial marital problems. Programs designed to determine whether individuals carry a genetic predisposition that may lead to diseases in their offspring are recommended in various studies. Several countries in the Middle East have adopted such programs, including Iran in 1997, Saudi Arabia in 2004, the United Arab Emirates in 2011, and Oman in 2018. Cyprus was among the first to implement compulsory PMS for β-thalassemia in 1973 (Al-Qahtani *et al.,* 2019).

PMS is a critical preventive measure for couples planning to develop family, promoting the health and well-being of women and their partners before pregnancy, which can be very beneficial in reducing the spread of diseases (Bener *et al.,* 2019).

## 1.2 Problem Statement

In Yemen, hereditary diseases are notably prevalent, exacerbated by high rates of consanguineous marriages. This practice, common in Yemen and other Arab regions, significantly increases the risk of genetic disorders in offspring (El-Hazmi, 2010; Tadmouri *et al.*, 2009). However, Yemen lacks comprehensive premarital screening (PMSP)—both elective and mandatory—which could identify carriers of genetic disorders and reduce disease rates in future generations. This gap poses a substantial challenge to the healthcare system, which must manage increasing rates of genetic disorders without preventive PMS measures (Hamamy, 2012; Natarajan and Joseph, 2021).

There is limited research on community awareness regarding genetic screening in Yemen, particularly concerning university students, who represent an essential demographic. Studies from similar contexts suggest that university students, especially those studying medicine and public health, may have some knowledge about PMS but often lack the depth of understanding and attitudes needed to advocate for or utilize these screenings effectively. This is concerning since medical students will soon serve as healthcare providers and could play a pivotal role in promoting PMS awareness if properly educated on its benefits.

## 1.3 Significance of the study

The primary objective of this study is to explore the knowledge, attitudes, and practices of medical students regarding PMS at Emirates International University in Sana'a City - Yemen . The findings of this study could be crucial for initiating awareness campaigns if a PMS program is ever considered in Yemen. Understanding the awareness levels and perceptions of these future healthcare providers can inform efforts to develop education and awareness initiatives. Ultimately, this research could help improve public health and prevent the spread of genetic disorders in the region.

## 1.4 Questions of the study

- What is the level of knowledge of medical students at Emirates International University regarding PMS?
- What are the attitudes of medical students at Emirates International University toward PMS?

- What are the practices of medical students at Emirates International University concerning PMS?

## 1.5 Objectives of the study

### 1.5.1 General objective

- To determine the level of knowledge, attitudes, and practices of medical students toward PMS at Emirates International University in Sana'a city - Yemen.

### 1.5.2 Specific objectives

1. To determine the level of knowledge of medical students toward PMS at Emirates International University.
2. To determine the attitudes of medical students toward PMS at Emirates International University
3. To determine the practice of medical students toward PMS at Emirates International University.

# Chapter 2
# (Literature Review)

# 2 Literature Reviewed

## 2.1 Premarital Screening (PMS)

### 2.1.1 History of Premarital Screening

Premarital Screening dates back to 1975, when thalassemia screening was first introduced in Italy as part of a school prevention initiative. However, even earlier, in 1970, Virginia implemented sickle cell anemia testing. Over the following decades, countries such as Cyprus, Canada, Italy, the United Kingdom, and Greece established nationwide screening programs with notable success (Tosun *et al.,* 2006). Subsequently, regions like Jordan, Saudi Arabia, Tunisia, China, Malaysia, and India adopted either mandatory or voluntary premarital testing programs to combat genetic and infectious diseases (Al-Hamdan *et al.,* 2007).

### 2.1.2 Concept of PMS

Premarital screening is a comprehensive medical procedure aimed at identifying risks of genetic disorders and infectious diseases that could be transmitted between partners or passed to their future offspring. It involves several essential tests, which contribute to ensuring the health of both the couple and their potential children (Almualm, 2022).

1. **Sexually Transmitted Diseases (STDs)**: This screening includes tests for infections such as human immunodeficiency virus (HIV), hepatitis B (HBV), hepatitis C (HCV), gonorrhea, syphilis, bacterial vaginosis, and genital warts. Early detection facilitates effective treatment, reducing health risks to the partner and preventing transmission to future children.
2. **Blood Group Testing**: Identifying each partner's blood type is critical, particularly for detecting Rhesus factor incompatibility, which can lead to Rhesus isoimmunization. This condition may impact pregnancy outcomes and fetal health, making early awareness crucial for preventive interventions.
3. **Sickle Cell Gene Testing**: Understanding whether both partners are carriers of the sickle cell gene is essential. If both partners are carriers, there is a 50% chance of having a child with the disease, necessitating informed reproductive choices and genetic counseling to mitigate risks.
4. **Fertility Testing**: Premarital fertility assessments can help detect any fertility issues, allowing couples to address them early. Early intervention is beneficial in reducing the

emotional and social stress associated with infertility and may improve the chances of successful treatment.

5. **Screening for Genetic and Chronic Medical Conditions**: Tests for conditions such as diabetes, hypertension, kidney disorders, and genetic disorders like thalassemia are conducted to identify and manage potential health concerns early. Proactive management ensures better health outcomes for the couple and their future family (Almualm, 2022).

### 2.1.3 Importance of PMS

Premarital screening plays a vital role in reducing the prevalence of genetic disorders such as thalassemia and sickle cell anemia, as well as infectious diseases like hepatitis and HIV. This reduction helps alleviate the financial burden on both families and healthcare systems. Furthermore, by fostering awareness of health risks that could affect marital harmony, premarital testing promotes informed decision-making. In some instances, screening results may lead couples to explore medical management options or assisted reproductive technologies to ensure healthy family planning (Alhosain, 2018 and Al-Shafai *et al.,* 2022).

### 2.1.4 Consequences of Skipping PMS

Not undergoing PMS can have serious and far-reaching effects on individuals, families, and society, particularly in regions where consanguineous marriages are common or genetic disorders are prevalent.

1. **Increased Risk of Genetic Disorders**: Without proper screening, couples may unknowingly pass on hereditary conditions such as thalassemia, sickle cell anemia, or cystic fibrosis to their children. These disorders can lead to lifelong medical challenges and require extensive and costly healthcare interventions. Research from Saudi Arabia has shown that PMS significantly reduces the incidence of these genetic conditions (Al-Aama *et al.,* 2008).
2. **Higher Prevalence of Infectious Diseases**: Skipping PMS increases the risk of undetected infectious diseases like HIV, hepatitis B, or syphilis being transmitted between partners and their children. This not only compromises the health of the family but also contributes to a greater public health burden (Almualm, 2022).
3. **Emotional and Psychological Impact**: The birth of a child with a severe genetic or congenital disorder can cause immense emotional distress for parents, strain their

relationship, and lead to psychological issues such as anxiety and depression. These emotional struggles often disrupt family dynamics and lower the overall quality of life (Alhosain, 2018).

4. **Financial Burden**: Having child with a genetic disorder or chronic illness involves significant medical expenses, placing a heavy financial strain on families. This economic pressure can threaten a family's financial stability and escalate healthcare costs for society. Health systems may become overwhelmed by the need for long-term care (Al-Shafai *et al.,* 2022).
5. **Social impact**: On a social impact, a higher prevalence of genetic disorders due to the lack of PMS can lead to increased healthcare expenditures and reduced workforce productivity. Preventing these conditions through public health initiatives becomes more difficult and costly (Jameel *et al.,* 2024).

## 2.2 Knowledge, Attitude, and Practice of PMS

**Melaibari *et al.,* (2017)** this study aimed to investigate the knowledge, attitudes, and practices of Taif University students towards the national PMS program, a cross-sectional study was conducted during April-May 2016 on a random sample of university students in Taif City. The results revealed that most participants (97.4%) were aware that genes may transmit hereditary diseases and had heard about the PMS program. Most participants who partook in the PMS justified it based on preventing disease transmission to their offspring and ensuring their partner's health. A fair number (82.9%) were willing to change their decision to marry in the case of receiving incompatible results. Moreover, the majority of the participants (91.8%) demanded the implementation of a law that prohibits incompatible marriages.

**Al-Enezi *et al.,* (2017)** conducted a cross-sectional study at Kuwait University to assess students' knowledge, attitudes, and satisfaction regarding the premarital screening program (PMSP) and factors influencing these views. Surveying 809 students, the study found generally low knowledge scores about hereditary diseases and PMS, with significant associations to factors like gender, marital status, parental education, and family history of hereditary disease. Medical faculty students and those with a family history of hereditary diseases scored higher in knowledge. The findings suggest that targeted educational efforts could improve awareness and attitudes, particularly among non-medical students, to support public health initiatives.

**Alhowiti & Shaqran, (2019)** to assess the level of knowledge and the attitude among Saudi Tabuk University students regarding the premarital screening program. A cross-sectional study was conducted from April 2019 to August 2019 among Saudi students of the University of Tabuk, both male and female. A self-administered questionnaire about the knowledge and attitude of the Saudi community towards the premarital screening program was used for data collection. The results of the study included 437 students. The age ranged between 18 and 29 years with a mean ± SD of 21.5 ± 2.2 years. More than half of them (56.8%) were females. Overall, slightly less than half of the students (48.3%) had sufficient knowledge regarding premarital screening. Females (p=0.003), married (p=0.044), and medical students (p=0.024) were more knowledgeable than their counterparts. Overall, almost two-thirds of the students (69.8%) had a positive attitude towards premarital screening.

**Albadrani *et al.*, (2020)** to investigate the impact of PMS in Saudi Arabia. A cross-sectional study was conducted at Jazan University from January to June 2014. A self-administered questionnaire was distributed to 1000 Jazan University Students, both males and females. The results revealed the vast majority of the participants (922; 94%) believed that a PMS program was a preventive measure. More than two-thirds of the participants (613; 72.5%) favored having regulations and laws for premarital screening and most of the students (891; 90.8%) believed PMS programs limited the spread of hereditary (HD) and infectious diseases (ID). Most of the participants (756; 77.1%) reported that PMS tests should be done before engagement.

**Aga *et al.*, (2021)** to evaluate the medical students' knowledge, awareness, and attitude of genetics and genetic testing in general and premarital screening (PMS) in particular. An online predesigned, validated, and self-administered questionnaire was dispensed to all medical students of King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS) in KSA. Results of the study showed a total of 302 students responded to the survey with a mean age of 21.68 ± 2.32 (standard deviation) of which 38.7% were males and 61.3% were females. 51 (16.9%) students were from Phase I, 124 (41.1%) from Phase II, 127 (42.1%) from Phase III of College of Medicine KSAU-HS, Jeddah Campus. 224 (74.2%) of the participants had no direct relationship with their parents and 23 (7.6%) had a personal history of hereditary disease. About 86.1% of students knew that genetic counseling is available in the Kingdom and 83.4% were familiar with PMS. The majority of students (female = 83.2%; male = 84.6%) did perceive that consanguinity can increase the chance of hereditary diseases. The overwhelming majority (female = 94.1%; male = 85.4%) agreed to make PMS obligatory before marriage, 87.4% of

which were Phase III students. However, only a minority of students disagreed with marriage being allowed even if the result of PMS became incompatible, and most agreed to carry out PMS.

**Al-Shroby *et al.*, (2021)** to assess knowledge levels, attitudes, and behaviors associated with premarital screening and genetic counseling (PMSGC) in the general Saudi Arabian population and their associations with sociodemographic characteristics. A cross-sectional, population-based study of 6263 participants randomly selected from all 20 health regions in Saudi Arabia, stratified according to age and fulfilling predefined selection criteria. Trained data collectors used a comprehensive pretested questionnaire to collect data. Data were collected in March and April 2019. Results of the study showed all 6263 participants had heard about PMSGC, only 575 (9.2%) participants had satisfactory knowledge, while 3283 (52.4%) participants had fair knowledge. Predictors of high knowledge scores were university or higher education level (aOR=2.06; 95% CI: 1.80–2.36), positive medical history of PMSGC-screened disease (aOR=2.02; 95% CI: 1.51–2.69), family income ≥3000 SR/month (aOR=1.70; 95% CI: 1.50–1.93), being married/previously married (aOR=1.46; 95% CI: 1.25–1.70), female gender (aOR=1.25; 95% CI: 1.12–1.40), and age >18 years (aOR=1.25; 95% CI: 1.06–1.48). The majority of participants (5246, 83.8%) had positive attitudes towards the importance of PMSGC, the burden of screened genetic and infectious diseases on the family, and that marrying was inadvisable with incompatible results. Of the 3986 engaged or married participants, 2911 (73.0%) had undertaken premarital screening, of whom 360 (12.4%) had incompatible results; 98 (37.1%) were married despite this information.

**Al-Shafai *et al.*, (2022)** conducted a cross-sectional study at Qatar University to assess students' knowledge, perception, and attitudes regarding the PMSP and to identify predictors of knowledge and attitude. A total of 476 students participated in an online survey, with 424 (89.1%) being female and approximately two-thirds between the ages of 18-21. Only 100 students reported prior knowledge of PMS. Key factors associated with increased PMS knowledge included being female, studying in a health-related college, and having parents without a consanguineous marriage. Most participants recognized genetic diseases as psychological and economic burdens. However, only 178 students indicated they would consider canceling a marriage if PMS results were incompatible. Positive associations with a supportive attitude included PMS knowledge, health-related college enrollment, and the belief that PMS does not interfere with destiny. Despite the mandatory nature of PMS in Qatar, the study

revealed low awareness among future couples, suggesting a need for enhanced education on the program's importance.

**Dewi *et al.*, (2022)** to assess the level of knowledge and attitudes towards premarital screening among teenagers in a university setting in Indonesia. A cross-sectional including 310 adolescents aged 18–21 years at obtained through a non-random consecutive sampling at Universitas Padjadjaran. The data was collected from October 2020 until January 2021 using a close-ended questionnaire, assessing knowledge and attitude toward the PMS. Results of the study showed most of the respondents (90.3%) had good knowledge of PMS. Respondents who had positive attitudes (79%) strongly agreed that carrying out PMS was important, and 51% perceived that PMS needed to be a mandatory procedure before marriage. However, 59.6% had no idea how to deal if the result of the PMS was positive.

**Hamed *et al.*, (2022)** to assess the knowledge, perception, and attitude of future couples towards premarital screening. A descriptive cross-sectional design was utilized in the Qebly Maternal and Child Health (MCH) center in Shebin El-Kom city in Menoufia Governorate in Egypt. The results of the study revealed that approximately three-quarters of the studied future couples (73.3%) had heard about PMS, but approximately two-thirds of the studied future couples (69.40%) had inadequate knowledge about premarital screening. More than one-half of the studied future couples (50.80%) had a positive perception of premarital screening. Approximately two-thirds of the studied future couples (68.30%) had a positive attitude about premarital screening. There was a positive correlation and a high statistical difference among the total knowledge score, the total attitude score, and the total perception score of studied future couples regarding premarital screening.

**Saleh *et al.*, (2022)** to assess the university students' knowledge of the premarital screening program. A cross-sectional design using a systematic random sample technique for selecting 265 students from the four constituent colleges of Ras Al Khaimah University, UAE. The study findings revealed that more than half of the students had a positive family history of hereditary diseases. Most of them were aware that premarital screening program reduces genetic and sexually transmitted diseases. Around half of them had an average knowledge level about hereditary diseases and premarital screening programs. The majority of the participants have an average knowledge level about the premarital screening program.

**Shebani *et al.*, (2024)** to investigate knowledge and attitudes toward genetic PMS programs among university students in Libya. A cross-sectional study was conducted using a self-administered questionnaire distributed to 421 Libyan students aged 18-25 years at the University of Tripoli. Results of the study showed most of the participants (79%, n=316) agreed that a PMS program is important and expressed willingness to have PMS programs if they were advised to do so. Two-thirds of participants (67%, n=268) had heard of PMS programs, of whom (27.2%, n=73) heard of them from social media.

**Mahmood *et al.*, (2024)** examined university students' knowledge, perceptions, and attitudes toward the PMSP in the Kurdistan Region of Iraq. Surveying 960 students, they found that knowledge levels varied, with 39.4% having poor knowledge and only 24.7% having good knowledge. However, support for PMSP was high: 83.1% valued the program, and 78.8% advocated for premarital awareness. A majority believed PMSP could reduce genetic diseases (65.8%) and sexually transmitted infections (65.6%). Cultural acceptance of consanguineous marriage was evident, with 59.7% supporting marriage between relatives. Married participants had higher knowledge and attitude scores, and males scored higher in knowledge, though gender and residential area didn't significantly affect perceptions or attitudes.

## 2.3 Knowledge, Attitude, and Practice of PMS in Yemen

In Yemen, hereditary conditions and infectious diseases are prevalent, emphasizing the need for effective premarital health programs to prevent the spread of genetic disorders and sexually transmitted infections. Given the cultural context, where consanguineous marriages are common, it is crucial to assess how well medical students understand the importance of PMS and premarital counseling (PMC) and their willingness to support these measures. Few studies have explored these issues within Yemeni medical student populations, providing valuable insights into their perspectives and potential impact on public health initiatives.

**Al-Nood *et al.*, (2016)** this study assessed the knowledge and attitudes of medical students at Sana'a University towards PMS. The results showed that 92% of participants were aware that PMS reduces the risk of hereditary and sexually transmitted diseases. A significant portion of students believed in the importance of PMS, with 82% supporting mandatory screening and 62% agreeing to legal measures preventing marriage if the results were unfavorable.

**Almualm, (2022)** this study evaluated the knowledge and attitudes towards PMC among Hadhramout University students. Findings indicated that most participants recognized the

importance of PMC before marriage and had a generally positive attitude towards it. The study also revealed that male students exhibited more favorable attitudes towards PMC compared to female students. Additionally, participants believed that counseling programs could effectively raise awareness and promote PMC in the community.

**Almoliky *et al*., (2022)** investigated the knowledge and attitudes of engaged and recently married couples in Taiz, Yemen, toward PMS. The study found that most participants (83.60%-94.18%) were aware of inherited and infectious diseases, with educational institutions as the primary source of knowledge. Females generally had higher knowledge than males, except regarding acquired immunodeficiency syndrome (AIDS), where no gender difference was observed. Most participants had positive attitudes toward PMS, though many held negative views on AIDS testing (70% of males, 68.91% of females). While a majority believed screening could reduce disease incidence, about half (50.79%-56.61%) would still proceed with marriage despite positive screening results. Only 47.62% supported making PMS mandatory before engagement.

# Chapter 3
# (Methodology)

# 3 Methodology

## 3.1 Study Design

A cross-sectional study.

## 3.2 Study Location

The study was conducted at Emirates International University, located in Sana'a City - Yemen.

## 3.3 Sampling

### 3.3.1 Study Population

The study population comprised medical students enrolled in Levels 1 to 4 at Emirates International University.

### 3.3.2 Inclusion Criteria

All medical students enrolled in Levels 1 to 4 at Emirates International University in Sana'a City - Yemen who were available during the 2024-2025 academic level and within the study period.

### 3.3.3 Exclusion Criteria

Students who were not available during the 2024-2025 academic level and those who did not provide consent were excluded from the study.

### 3.3.4 Sample Size

The sample size was estimated based on a study conducted at Hadhramaut University by Almualm (2022), which reported that the knowledge about PMS among the study population was 82.8%. The sample size was calculated using the formula provided by Charan & Biswas (2013): $E = \frac{\left\{Z_{1-\alpha/2^2}(-P)\right\}}{d_2}$

- n: is the sample size needed.
- $Z_{1-\alpha}$ = Critical value and a standard value for the corresponding level of confidence. In this study, it is 95% Cl is 1.96

- P = Expected prevalence which based on previous research
- d is the desired margin of error = 5% = 0.05
- Using these parameters, the calculated sample size is 265

### 3.3.5 Sampling Technique

The sampling technique used in this study was survey sampling, as all eligible medical students enrolled in Levels 1 to 4 at Emirates International University were included.

## 3.4 Data Collection

Data were collected through a self-administered questionnaire consisting of four parts: socio-demographic data, knowledge about PMS, attitude toward PMS, and practice toward PMS. The questions regarding knowledge and attitude toward PMS were adapted from a previous study conducted at Sana'a University (Al-Nood *et al*., 2016), while the questions regarding practice toward PMS were adapted from a study conducted at Taif University (Melaibari *et al*., 2017).

The first part of the questionnaire contained questions about the socio-demographic characteristics of students, such as age, gender, marital status, education level, residence, consanguinity between parents, and family history of hereditary diseases. The second part consisted of eight items about knowledge of PMS. The third part comprised fourteen items about attitudes toward PMS, six of which were adopted from a study conducted at King Abdullah University (Aga *et al*., 2021). The final section assessed students degree of commitment to PMS results in various scenarios. In this study, the knowledge, attitude (postive, negative) and practice average score of $< 50\%$ was considered as poor and $\geq 50\%$ considered as good.

## 3.5 Validity and Reliability of Questionnaire

Face validity of questionnaire items was assessed by giving the questionnaire to experts and sample students and asking them what they think the purpose of the questionnaire is and what construct they believe is being measured.

## 3.6 Data Analysis

Data was entered and analyzed using IBM SPSS (Statistical Package for the Social Sciences) Statistics for windows, Version 27. The socio-demographic characteristics of the students were described using descriptive statistics. The students knowledge and attitudes were

quantified and presented as numbers and percentages. The chi-square test was used to assess the significance between different categorical variables.

## 3.7 Ethical Considerations

Ethical considerations were paramount in this study. First, ethical approval and written permission were obtained from Emirates International University to distribute the questionnaire. Second, before commencing the study, students provided informed consent and were given clear explanations about the research. Third, the dignity of all researchs students was prioritized and respected. Finally, confidentiality of the research data was ensured, and anonymity was guaranteed for all collected information.

# Chapter 4

## (Results)

# 4 Results

## 4.1 Socio-demographic characteristics of respondent students

Table (1) shows that out of 265 students enrolled in the study, 123 (46.4%) were female and 142 (53.6%) were male. The majority (74.7%) were aged 20 to 25 years (range 18-33 years), 97.4% were Yemeni, 89.4% lived in urban areas, and 91.7% were single. Students were evenly distributed across academic levels: first level (25.3%), second level (25.3%), third level (24.9%), and fourth level (24.5%). The rate of consanguineous marriages among their parents was 46.8%, and 16.2% reported a family history of hereditary diseases.

Table 1: Socio-demographic characteristics of respondent Emirates International University medical students

| Characteristic | Frequency (%) |
|---|---|
| **Gender** | |
| Female | 123 (46.4%) |
| Male | 142 (53.6%) |
| **Age** | |
| Less than 20 years | 54 (20.4%) |
| 20 to 25 years | 198 (74.7%) |
| More than 25 years | 13 (4.9%) |
| **Education level** | |
| First Level | 67 (25.3%) |
| Second Level | 67 (25.3%) |
| Third Level | 66 (24.9%) |
| Fourth Level | 65 (24.5%) |
| **Nationally** | |
| Yemeni | 258 (97.4%) |
| No Yemeni | 7 (2.6%) |
| **Resident** | |
| Rural | 28 (10.6%) |
| Urban | 237 (89.4%) |
| **Marital status** | |
| Single | 243 (91.7%) |
| Married | 22 (8.3%) |
| **Consanguinity between parent** | |
| Yes | 124 (46.8%) |
| No | 141 (53.2%) |
| **Family history of hereditary disease** | |
| Yes | 43 (16.2%) |
| No | 158 (59.6%) |
| Do not Know | 64 (24.2%) |
| **Total** | **265 (100%)** |

## 4.2 Knowledge Levels among Students

Of the 265 students, 184 (69.4%) demonstrated good knowledge about PMS, while the remaining 81 students (30.6%) had poor knowledge (Table 2).

Table 2: Distribution of knowledge levels among students regarding PMS

| Level of knowledge | Frequency (%) |
|---|---|
| Poor | 81 (30.6%) |
| Good | 184 (69.4%) |

When asked about the availability of PMSP in Yemen, nearly half of the students (50.6%) responded "Yes," while the remaining 49.4% responded "No." A large majority (93.2%) were aware that premarital screening is conducted for both males and females. Approximately half of the students (46.4%) correctly identified premarital screening as a blood test (Table 3).

Regarding the target diseases in premarital screening, 71.7% of the students recognized sexually transmitted and infectious diseases, including viral hepatitis B and C, and HIV, as relevant. Hereditary diseases were identified by 78.1% of students, and 90.9% acknowledged that PMS helps reduce the incidence of genetic and sexually transmitted diseases (Table 3).

When asked about their primary sources of information on PMS, 31.7% of students cited university, followed by 23.8% who mentioned media, 17.7% who mentioned family and friends, 15.1% who mentioned healthcare services, and 11.7% who mentioned school (Table 3).

Table 3: Knowledge level of students about PMS

| Knowledge item | F(%) |
|---|---|
| **Availability of PMSP in Yemen** | |
| Yes | 134 (50.6%) |
| No | 131 (49.4%) |
| **PMS tests include** | |
| Blood tests only | 123 (46.4%) |
| Blood tests and physical examination | 142 (53.6%) |
| **Who should be tested in of PMS** | |
| Man | 5 (1.9%) |
| Women | 13 (4.9%) |
| Both | 247 (93.2%) |
| **Diseases targeted by PMS include** | |
| Hereditary diseases only | 41 (15.5%) |
| Sexually-transmitted diseases only | 16 (6.0%) |
| Both hereditary and sexually-transmitted diseases | 190 (71.7%) |
| Do not know | 18 (6.8%) |
| **PMS reduces the occurrence of genetic and sexually** | |
| Yes | 241 (90.9%) |
| No | 9 (3.4%) |
| Do not Know | 15 (5.7%) |
| **Genetic blood disease targeted by PMS include** | |
| Sickle cell disease | 15 (5.7%) |
| Thalassemia | 14 (5.3%) |
| Both sickle cell disease and thalassemia | 207 (78.1%) |
| Do not Know | 29 (10.9%) |
| **Sexually-transmitted diseases targeted by PMS include** | |
| Viral hepatitis B and | 23 (8.7%) |
| HIV infection | 29 (10.9%) |
| Viral hepatitis B and C and HIV | 163 (61.5%) |
| Do not know | 50 (18.9%) |
| **The main sources of information on PMS include** | |
| School | 31 (11.7%) |
| University | 84 (31.7%) |
| Media | 63 (23.8%) |
| Family and friends | 47 (17.7%) |
| Healthcare services | 40 (15.1%) |

## 4.3 Attitudes among Students

Among the 265 students, 205 (77.4%) exhibited a positive attitude toward PMS, while the remaining 60 students (22.6%) displayed a less favorable attitude (Table 4).

Table 4: Distribution of attitudes levels among students regarding PMS

| Level of Attitudes | F (%) |
|---|---|
| Postive | 60 (22.6%) |
| Negative | 205 (77.4%) |

A significant portion of the students (86.8%) recognized the importance of conducting PMS, and an even larger percentage (94.0%) supported the establishment of a PMS program (PMSP) in Yemen. Additionally, 73.2% of the students supported making PMS a mandatory requirement before marriage, with 85.7% believing it could play a crucial role in reducing the prevalence of genetic and sexually transmitted diseases in Yemen. Counseling sessions before and after PMS were endorsed by 72.8% of the students (Table 5).

Only a minority (20.8%) believed that marriage should proceed if PMS results were incompatible, whereas the majority (76.6%) supported enacting laws to prohibit marriage in the case of a positive PMS test. Furthermore, 78.9% of the students felt that PMS posed no harm or disadvantage, and 61.5% did not view it as a violation of personal privacy. A significant proportion (83.8%) acknowledged that consanguinity could increase the likelihood of hereditary diseases, and 81.9% felt that PMS should ideally be conducted during engagement, while 14.0% preferred it just before marriage and 4.2% after marriage (Table 5).

Overall, 89.1% of students agreed to undergo PMS. The primary reasons for agreement included preventing disease transmission to offspring (60.4%), ensuring marital fitness (21.9%), confirming the partner's health status (9.4%), and protecting their own health (8.3%). Among those who disagreed with PMS, family pressure was the most cited reason (26.0%), followed closely by religious beliefs (24.5%), concerns that a positive result could prevent marriage (23.4%), the perception that PMS results could be insulting (8.7%), and worries that the results might be unfavorable (17.4%) (Table 5).

Table 5: Attitude among students about PMS

| Attitude item | F (%) |
|---|---|
| **Carrying out PMS is important** | |
| Disagree | 9 (3.4%) |
| Neutral | 26 (9.8%) |
| Agree | 230 (86.8%) |
| **PMSP should be established in Yemen** | |
| Disagree | 7 (2.6%) |
| Neutral | 9 (3.4%) |
| Agree | 249 (94.0%) |
| **Agreement to carry out PMS** | |
| Disagree | 9 (3.4%) |
| Neutral | 20 (7.5%) |
| Agree | 236 (89.1%) |
| **What do you think about the appropriate time of doing PMS** | |
| On engagement | 217 (81.9%) |
| Just before marriage | 37 (14.0%) |
| After marriage | 11 (4.2%) |
| **Agreement on making PMS as a mandatory procedure before marriage** | |
| Disagree | 13 (4.9%) |
| Neutral | 58 (21.9%) |
| Agree | 194 (73.2%) |
| **Agreement on making laws and regulations to stop marriage in case of PMS test positivity** | |
| Disagree | 17 (6.4%) |
| Neutral | 45 (17.0%) |
| Agree | 203 (76.6%) |
| **Do you think that we should have counseling sessions before and after PMS** | |
| Yes | 193 (72.8%) |
| No | 25 (9.4%) |
| Do not Know | 47 (17.7%) |
| **Do you think that PMSP is important to reduce genetic and sexually transmitted disease prevalence in Yemen** | |
| Yes | 227 (85.7%) |
| No | 20 (7.5%) |
| Do not Know | 18 (6.8%) |
| **Do you think that there is harm or disadvantage of PMS** | |
| Yes | 40 (15.1%) |
| No | 209 (78.9%) |
| Do not Know | 16 (6.0%) |
| **Do you think that consanguinity can increase the chance of hereditary diseases** | |
| Yes | 222 (83.8%) |
| No | 33 (12.5%) |
| Do not Know | 10 (3.8%) |
| **Do you think that marriage should be allowed even if the result of PMS came incompatible** | |
| Yes | 55 (20.8%) |
| No | 165 (62.3%) |
| Do not Know | 45 (17.0%) |
| **PMS does not break personal privacy** | |
| Disagree | 28 (10.6%) |
| Neutral | 74 (27.9%) |
| Agree | 163 (61.5%) |
| **Reasons for agreement to carry out PMS** | |
| To prevent transmission of diseases to my offspring | 160 (60.4%) |
| To ensure that my partner is healthy | 25 (9.4%) |
| To prevent transmission of disease to me | 22 (8.3%) |
| To ensure fitness for marriage | 58 (21.9%) |
| **Reasons for disagreement to carry out PMS** | |
| Do not want to interfere with God's will | 65 (24.5%) |
| The results may not be in the favor of my choice | 46 (17.4%) |
| Positive results may prevent marriage | 62 (23.4%) |
| Family may refuse continuation of marriage | 69 (26.0%) |
| Feeling that such test results is an insult to me | 23 (8.7%) |

## 4.4 Practice among Students

Out of 265 students, 194 (73.2%) demonstrated good practices regarding PMS, while the remaining 71 students (26.8%) showed poor practices (Table 6).

Table 6: Distribution of practice levels among students regarding PMS

| Level of Practice | Frequency (%) |
|---|---|
| Poor | 71 (26.8%) |
| Good | 194 (73.2%) |

Table 7 presents key indicators of students practices related to PMS. Overall, only 20.4% of students expressed a willingness to proceed with marriage despite the risk of a genetic disease, and 15.1% would do so despite the risk of a contagious disease. In contrast, 72.8% of students indicated they would reconsider marriage if there were incompatibility, and 67.5% supported the implementation of laws to prohibit incompatible marriages. Furthermore, 88.7% of students were willing to actively raise awareness about the importance of PMS.

Table 7: Practice among students about PMS

| Practice item | Frequency (%) |
|---|---|
| **Will / would decide to marry even if there is a hereditary disease risk.** | |
| Yes | 54 (20.4%) |
| No | 211 (79.6%) |
| **Will / would decide to marry even if there is communicable disease risk** | |
| Yes | 40 (15.1%) |
| No | 225 (84.9%) |
| **Willing to change decide to marry in the case of incompatibility** | |
| Yes | 193 (72.8%) |
| No | 72 (27.2%) |
| **Will demand implementation of a law that prohibits incompatible marriage** | |
| Yes | 179 (67.5%) |
| No | 86 (32.5%) |
| **Will contribute to raising awareness about the importance of PMS** | |
| Yes | 235 (88.7%) |
| No | 30 (11.3%) |

## 4.5 Association between Knowledge, Practice and Attitudes

The correlation analysis in Table 8 provides valuable insights into the relationships between knowledge, attitudes, and practice regarding premarital screening (PMS) among students.

The positive correlation between knowledge and attitudes ($r = 0.209$, $p < 0.05$) indicates that as knowledge about PMS increases, attitudes toward it become more favorable. This suggests that educational initiatives could effectively improve attitudes toward PMS. Similarly, the positive correlation between knowledge and practice ($r = 0.172$, $p < 0.05$) implies that higher levels of knowledge lead to better practical engagement with PMS, reinforcing the role of awareness programs in promoting preventive behaviors.

The strongest relationship is observed between attitudes and practice ($r = 0.365$, $p < 0.01$), indicating that positive attitudes significantly influence students engagement in PMS practices. This suggests that interventions focused on cultivating positive attitudes may be particularly impactful in encouraging practical adoption of PMS.

In summary, these findings underscore the interdependent nature of knowledge, attitudes, and practice in shaping health behaviors, with attitudes being a key driver in translating knowledge into action.

Table 8: Correlate between Knowledge, Attitudes and Practice of Students Regarding PMS

| | | **Attitudes** | **Practice** |
|---|---|---|---|
| **Knowledge** | Pearson Correlation | .209** | .172** |
| | P value | .001 | .005 |
| | N | 265 | 265 |
| **Attitudes** | Pearson Correlation | | .365** |
| | P value | | .000 |
| | N | | 265 |

** Positive correlation

## 4.6 Association between Socio-demographic characteristics and level of knowledge

Table 9 shows a statistically significant relationship between students' educational levels and their understanding of premarital screening (PMS). Students with higher levels of education demonstrated greater knowledge of PMS than those with lower educational attainment. Other socio-demographic factors, including gender, age, nationality, place of residence, marital status, and family health history, did not show statistically significant relationships with PMS knowledge. While there were slight differences in the percentages of students with low and high knowledge across these groups, these variations were not statistically significant.

Level of education associated with knowledge higher levels of education demonstrated greater knowledge of PMS than those with lower educational attainment.

Table 9: Association between Socio-demographic characteristics and level of knowledge of PMS

| | | Poor | | Good | | $X^2$ | P value |
|---|---|---|---|---|---|---|---|
| | | F | % | F | % | | |
| **Gender** | Female | 32 | 39.5% | 91 | 49.5% | 2.239 | .135 |
| | Male | 49 | 60.5% | 93 | 50.5% | | |
| **Age** | less than 20 years | 21 | 25.9% | 33 | 17.9% | 3.237 | .072 |
| | 20 to 25 years | 58 | 71.6% | 140 | 76.1% | | |
| | More than 25 years | 2 | 2.5% | 11 | 6.0% | | |
| **Education level** | Frist Level | 28 | 34.6% | 39 | 21.2% | 13.383 | .004 |
| | Second Level | 22 | 27.2% | 45 | 24.5% | | |
| | Third Level | 9 | 11.1% | 57 | 31.0% | | |
| | Fourth Level | 22 | 27.2% | 43 | 23.4% | | |
| **Nationally** | Yemeni | 79 | 97.5% | 179 | 97.3% | .014 | .635 |
| | No Yemeni | 2 | 2.5% | 5 | 2.7% | | |
| **Resident** | Rural | 10 | 12.3% | 18 | 9.8% | .391 | .532 |
| | Urban | 71 | 87.7% | 166 | 90.2% | | |
| **Marital status** | Single | 75 | 92.6% | 168 | 91.3% | .123 | .726 |
| | Married | 6 | 7.4% | 16 | 8.7% | | |
| **Family history of hereditary disease(s)** | Yes | 15 | 18.5% | 28 | 15.2% | 2.084 | .353 |
| | No | 43 | 53.1% | 115 | 62.5% | | |
| | Do not Know | 23 | 28.4% | 41 | 22.3% | | |

## 4.7 Association between Socio-demographic characteristics and Attitude

Table (10) provides an analysis of attitudes towards PMS among students, revealing significant associations with specific socio-demographic variables. Gender was not significantly associated with attitudes (p-value > 0.05), indicating that gender does not strongly influence attitudes toward PMS. Similarly, age and education level also showed no significant associations (p-values > 0.05), suggesting these factors do not play a major role in shaping attitudes. Conversely, nationality was a significant factor (p-value = 0.048), with Yemeni students more likely to exhibit negative attitudes. Marital status, like gender, did not show a significant association (p-value > 0.05), suggesting it may have little impact on attitudes. However, a family history of hereditary disease was significantly associated with attitudes (p-value = 0.006).

Positive attitude associated with nationality Yemeni students show a positive attitude and associated with a family history of hereditary diseases Who have a family history show a positive attitude compared with students without a family history of PMS.

Table 10: Association between Socio-demographic characteristics and Attitudes towards PMS

| | | -ve | | +ve | | $X^2$ | P value |
|---|---|---|---|---|---|---|---|
| | | F | % | F | % | | |
| **Gender** | Female | 23 | 38.3% | 100 | 48.8% | 2.037 | .154 |
| | Male | 37 | 61.7% | 105 | 51.2% | | |
| **Age** | Less than 20 years | 16 | 26.7% | 38 | 18.5% | 1.846 | .397 |
| | 20 to 25 years | 41 | 68.3% | 157 | 76.6% | | |
| | More than 25 years | 3 | 5.0% | 10 | 4.9% | | |
| **Education level** | First Level | 23 | 38.3% | 44 | 21.5% | 7.785 | .051 |
| | Second Level | 13 | 21.7% | 54 | 26.3% | | |
| | Third Level | 10 | 16.7% | 56 | 27.3% | | |
| | Fourth Level | 14 | 23.3% | 51 | 24.9% | | |
| **Nationally** | Yemeni | 56 | 93.3% | 202 | 98.5% | 3.993 | .048 |
| | No Yemeni | 4 | 6.7% | 3 | 1.5% | | |
| **Resident** | Rural | 10 | 16.7% | 18 | 8.8% | 3.055 | .081 |
| | Urban | 50 | 83.3% | 187 | 91.2% | | |
| **Marital status** | Single | 54 | 90.0% | 189 | 92.2% | .282 | .377 |
| | Married | 6 | 10.0% | 16 | 7.8% | | |
| **Family history of hereditary disease(s)** | Yes | 10 | 16.7% | 33 | 16.1% | 5.447 | .006 |
| | No | 29 | 48.3% | 129 | 62.9% | | |
| | Do not Know | 21 | 35.0% | 43 | 21.0% | | |

## 4.8 Association between Socio-demographic characteristics and Practice

Table (11) demonstrated a statistically significant relationship between the gender and practice towards PMS in favor of females compared to males. Other socio-demographic characteristics, such as age, education level, nationality, residency, marital status, and family health history, had no statistically significant relationships with PMS practice.

The practice associated the gender towards PMS in favor of females having more than males.

Table 11: Association between Socio-demographic characteristics and Practice towards PMS

| | | Poor | | Good | | $X^2$ | P value |
|---|---|---|---|---|---|---|---|
| | | F | % | F | % | | |
| **Gender** | Female | 18 | 25.4% | 105 | 54.1% | 17.300 | .000 |
| | Male | 53 | 74.6% | 89 | 45.9% | | |
| **Age** | Less than 20 years | 15 | 21.1% | 39 | 20.1% | 4.690 | 096 |
| | 20 to 25 years | 49 | 69.0% | 149 | 76.8% | | |
| | More than 25 years | 7 | 9.9% | 6 | 3.1% | | |
| **Education level** | First Level | 18 | 25.4% | 49 | 25.3% | 1.707 | .635 |
| | Second Level | 15 | 21.1% | 52 | 26.8% | | |
| | Third Level | 17 | 23.9% | 49 | 25.3% | | |
| | Fourth Level | 21 | 29.6% | 44 | 22.7% | | |
| **Nationally** | Yemeni | 67 | 94.4% | 191 | 98.5% | 2.937 | 087 |
| | No Yemeni | 4 | 5.6% | 3 | 1.5% | | |
| **Resident** | Rural | 11 | 15.5% | 17 | 8.8% | 2.491 | .114 |
| | Urban | 60 | 84.5% | 177 | 91.2% | | |
| **Marital status** | Single | 65 | 91.5% | 178 | 91.8% | .003 | .958 |
| | Married | 6 | 8.5% | 16 | 8.2% | | |
| **Family history of hereditary disease(s)** | Yes | 14 | 19.7% | 29 | 14.9% | .906 | .636 |
| | No | 40 | 56.3% | 118 | 60.8% | | |
| | Do not Know | 17 | 23.9% | 47 | 24.2% | | |

# Chapter 5
# (Discussion)

# 5 Discussion

Premarital screening (PMS) is one of the most effective preventive methods for reducing the transmission of genetic disorders by identifying carriers of blood genetic disorders before marriage. PMS is widely accepted ethically and religiously and is economically feasible (Al-Shafai *et al.,* 2022). Although the practice is widely recognized for its public health benefits (Saleh *et al.,* 2022), Yemen has yet to establish a formal PMS program. Before implementing PMS on a national level, it is crucial to assess the attitudes and knowledge of medical students, as they will be responsible for educating the public and administering these services in the future. To our knowledge, this study is among the first to examine the knowledge, attitudes, and practices of Yemeni medical students toward PMS.

## 5.1 Socio-demographic characteristics of students

In this study, 265 students participated, with a majority being male (53.6%), aged 20–25 (74.7%), Yemeni nationals (97.4%), mostly single (91.7%), and from urban areas (89.4%). These demographics align with similar studies conducted in Yemen, Qatar, the UAE, and Saudi Arabia (Almualm, 2022; Al-Shafai *et al.,* 2022; Saleh *et al.,* 2022; Aga *et al.*, 2021), which indicate a predominant age range of 20–25 and a high proportion of single students. This demographic alignment may reflect the typical age of marriage and reproductive health awareness in the Arab world, where PMS holds particular relevance for preventing genetic disorders.

Approximately 46.8% of participants in this study reported parental consanguinity, and 16.2% had a positive family history of hereditary diseases. These findings are lower than those reported in Saudi Arabia and the UAE (Saleh *et al.,* 2022; Aga *et al.,* 2021), where consanguinity rates range from 25.8% to 44%, and family history of hereditary disease is more prevalent. The high rates of consanguineous marriages across the Middle East can lead to an increased risk of hereditary disorders, underscoring the importance of PMS. The limited awareness of genetic risks associated with consanguinity suggests a critical need for comprehensive PMS programs and genetic counseling services.

## 5.2 Knowledge level among student

In this study, 69.4% of students demonstrated a good level of knowledge about PMS. This percentage it is higher than the results reported in Saudi studies, with knowledge levels at 48.3% (Alhowiti & Shaqran, 2019) and 52.4% (Al-Shroby *et al.,* 2021). However, this percentage is lower than findings from other studies, such as those in Saudi Arabia (96.16%) (Albadrani *et al.,* 2020) and Indonesia (90.3%) (Dewi *et al.,* 2022). The variation in PMS knowledge rates could be partly attributed to differences in the tools and metrics used to assess knowledge across these studies. Additionally, cultural or regional emphasis on PMS awareness and variations in medical curricula may also play a role.

## 5.3 Attitudes among students

In this study, the level of positive attitudes towards PMS was 77.4%, which aligns closely with findings from similar studies in Saudi Arabia (83.8%) (Al-Shroby *et al.,* 2021), Indonesia (79%) (Dewi *et al.,* 2022), and Egypt (68.3%) (Hamed *et al.,* 2022). Such a positive attitude among students could be beneficial for healthcare providers, as it may support more constructive consultations with prospective couples who test positive during PMS.

Participant agreement on key attitudes towards PMS was high in several areas: 86.8% acknowledged the importance of PMS, 73.2% agreed it should be mandatory before marriage, and 76.6% felt that legal measures should prevent marriage in cases of positive PMS results. Additionally, 72.8% supported counseling sessions both before and after PMS, while 78.9% disagreed with the notion that PMS has any defects or disadvantages. A strong majority (83.8%) recognized that consanguineous marriages can increase the risk of hereditary diseases, and 62.3% opposed marriage if PMS results were incompatible. Only 10.6% felt PMS compromised personal privacy. 24.5% of participants expressed a religious misinterpretation, viewing PMS as interference with God's will. These results were similar to the results of study done in KSA (Alhowiti & Shaqran, 2019).

A substantial 94% of participants supported establishing a formal PMS program in Yemen (PMSP), with 85.7% agreeing that such a program is essential to reduce the prevalence of genetic and sexually transmitted diseases in the country. These findings are consistent with previous studies from Saudi Arabia (Al-Shroby *et al.,* 2021; Alhowiti & Shaqran, 2019), Yemen (Almualm, 2022), Indonesia (Dewi *et al.,* 2022), and Egypt (Hamed *et al*., 2022), where

participants similarly expressed positive attitudes towards PMS. The alignment of this study's results with prior research indicates that students have a strong appreciation for the importance of PMS in preventing genetic and communicable diseases.

## 5.4 Practice amomg students

In this study, 73.2% of students demonstrated good practices related to premarital screening (PMS). Raising public awareness of PMS is essential to reduce the incidence of marriages with a high risk of producing affected children.

Notably, 20.4% of participants indicated they would proceed with marriage despite the presence of a hereditary disease risk, and 15.1% would do so even with a communicable disease risk. Additionally, 27.2% reported that they would not alter their marriage decision if compatibility issues were identified. Furthermore, 32.5% of students opposed legislation banning incompatible marriages, and 11.3% did not support efforts to raise awareness about PMS. These results align with findings from previous studies in Indonesia (Dewi *et al.*, 2022) and Libya (Shebani *et al.*, 2024), suggesting that a lack of early health education in schools and universities may contribute to these attitudes.

# Chapter 6

## CONCLUSION, LIMITATION & RECOMMENDATION

# 6 Conclusion, Limitation & Recommendation

## 6.1 Conclusion

This study explored the "Knowledge, Attitudes, and Practices of Medical Students Toward Premarital Screening (PMS) at Emirates International University, Sana'a City - Yemen." recognizing that these factors are critical in reducing the incidence of genetic and infectious diseases. The study included 265 medical students (46.4% female, 53.6% male), with a majority aged 20 to 25 years, predominantly Yemeni (97.4%), urban residents (89.4%), and single (91.7%). Students were evenly distributed across academic levels.

The results showed a high level of knowledge among students about PMS and its role in preventing inherited and infectious diseases. This knowledge was reflected in the positive attitudes and practices of both genders, with most students expressing a willingness to undergo PMS and acknowledging its importance in reducing disease prevalence.

These findings emphasize the vital role of health education in enhancing knowledge, attitudes, and practices toward PMS, suggesting that educational initiatives could strengthen students' commitment to preventive health measures.

## 6.2 Limitation

The limitations of this study could include the following:

1. **Sample Representativeness**: Since the study was conducted among medical students at a single university (Emirates International University, Sana'a), the findings may not be generalizable to all university students in Yemen or to the general population. Medical students may have a higher baseline knowledge about health-related topics than students in other fields.
2. **Self-Reported Data**: The study relied on self-reported data through a questionnaire, which could introduce biases such as social desirability bias, where students may have responded in a way they believe is expected or more acceptable, rather than reflecting their true opinions or practices.
3. **Cross-Sectional Design**: The study's cross-sectional design captures responses at a single point in time, limiting the ability to determine causality or assess changes in knowledge, attitudes, or practices over time. Longitudinal studies could provide insights into how educational interventions or social changes impact PMS knowledge and attitudes.

4. **Potential for Sampling Bias**: The study's sample was selected from students who were present and willing to participate, which might exclude those with differing views or backgrounds, potentially skewing the results.

These limitations suggest areas for improvement in future research, including broader sampling across different universities, more in-depth qualitative exploration of cultural and religious factors, and longitudinal approaches to understand changes in attitudes over time.

## 6.3 Recommendation

In light of the findings, several strategic recommendations emerge to enhance the understanding and implementation of preventive measures in hereditary disease prevention in Yemen:

1. **Enhance Education**: Implement comprehensive education on premarital screening (PMS) within university curricula, specifically targeting medical students. These should include dedicated lectures and courses, supplemented by social media and government-led campaigns to raise broader public awareness of the risks associated with hereditary diseases and consanguinity.
2. **Implement Genetic Counseling Programs**: Establish accessible genetic counseling programs in universities to educate both students and the public on the importance of PMS and hereditary disease prevention. These programs can serve as a bridge to inform and encourage responsible family planning practices.
3. **Develop Legislation**: Advocate for policies that make PMS a standard practice and consider enacting legislation that limits incompatible marriages based on PMS results. Such policies would mitigate the risk of genetic and communicable diseases, fostering a healthier population.
4. **Broaden Future Research**: Encourage future research across various Yemeni universities with diverse student demographics. Additional studies could provide a more comprehensive understanding of gender-related perspectives on PMS and the general receptiveness to genetic counseling, ensuring a holistic approach to policy development and educational initiatives.

By adopting these recommendations, Yemen can lay the groundwork for a sustainable, culturally appropriate approach to PMS. This will benefit future generations by reducing the prevalence of genetic diseases and enhancing public health outcomes.

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# Appendix

# Appendix

## Questionnaire

**Republic of Yemen**
**Emirates International University**
**Faculty of Medicine and Health Science**

### Knowledge, Attitudes, and Practices of Medical Students Toward Premarital Screening at Emirates International University, Sana'a City in Yemen.

We are a group of five-year students Faculty of Medicine and Health Sciences, Emirates International University We are doing this research to study knowledge, attitudes and practice of Emirates International university medical students towards premarital screening.

Your participation in this survey will provide us with valuable and useful knowledge of this topic.

We would like to assure the confidentiality of the information you provide to us, and no one other than the study team will be able to view any of the data contained in this form.

Filling out the survey will only take a few minutes, Thanking you in advance for your kind cooperation….

**First: Socio demographical data:**

| | | | |
|---|---|---|---|
| **Name** | | | |
| **Gender** | □ Female | □ Male | |
| **Age** | □ Less than 20 years | □ 20 to 25 years | □ More than 25 years |
| **Education level** | □1 Level | □ 2 Level | |
| | □ 3 Level | □ 4 Level | |
| **Nationally** | □ Yemeni | □ No- Yemeni | |
| **Resident** | □ Rural | □ Urban | |
| **Marital status** | □ Single | □ Married | |
| **Consanguinity between parent** | □ Yes | □No | |
| **Family history of hereditary disease(s)** | □ Yes | □ No | □ Do not know |

**Second: Knowledge about premarital screening:**

| | | | |
|---|---|---|---|
| **1. The main sources of information on premarital screening include:** | □ School | □ University | □ Media |
| | □ Family and friends | □ Healthcare services | |
| **2. Availability of premarital screening program in Yemen:** | □ Yes | □ No | |
| **3. Premarital screening tests include:** | □ Blood tests only | □ Blood tests and physical examination | |
| **4. Who should be tested in of premarital screening?** | □ Man | □ Women | □ Both |
| **5. Diseases targeted by Premarital screening include:** | □ Hereditary diseases only | □ Sexually-transmitted diseases only | |
| | □ Both hereditary and sexually-transmitted diseases | □ Do not know | |
| **6. Premarital screening reduces the occurrence of genetic and sexually:** | □ Yes | □ No | □ Do not know |
| **7. Genetic blood disease targeted by premarital screening include:** | □ Sickle cell disease | □ Thalassemia | |
| | □ Both sickle cell disease and thalassemia | □ Do not know | |
| **8. Sexually-transmitted diseases targeted by premarital screening include:** | □Viral hepatitis B and C | □ HIV infection | |
| | □ Viral hepatitis B and C and HIV | □ Do not know | |

**Third: Attitude:**

| | | | |
|---|---|---|---|
| **1. Carrying out Premarital screening is important:** | □ Agree | □ Neutral | □ Disagree |
| **2. Premarital screening program should be established in Yemen:** | □ Agree | □ Neutral | □ Disagree |
| **3. Agreement to carry out Premarital screening:** | □ Agree | □ Neutral | □ Disagree |
| **4. Reasons for agreement to carry out Premarital screening:** | □ To prevent transmission of diseases to my offspring | □ To ensure that my partner is healthy | |
| | □ To prevent transmission of disease to me | □ To ensure fitness for marriage | |
| **5. Reasons for disagreement to carry out Premarital screening:** | □ Do not want to interfere with God's will | □ The results may not be in the favor of my choice | |
| | □ Positive results may prevent marriage | □ Family may refuse continuation of marriage | |
| | □ Feeling that such test results is an insult to me | | |
| **6. What do you think about the appropriate time of doing Premarital screening:** | □ On engagement | □ Just before marriage | □ After marriage |
| **7. Agreement on making Premarital screening as a mandatory procedure before marriage:** | □ Agree | □ Neutral | □ Disagree |
| **8. Agreement on making laws and regulations to stop marriage in case of Premarital screening test positivity:** | □ Agree | □ Neutral | □ Disagree |
| **9. Do you think that we should have counseling sessions before and after Premarital screening?** | □ Yes | □ No | □ Do not know |
| **10. Do you think that Premarital screening program is important to reduce genetic and sexually transmitted disease prevalence in Yemen?** | □ Yes | □ No | □ Do not know |
| **11. Do you think that there is harm or disadvantage of Premarital screening?** | □ Yes | □ No | □ Do not know |
| **12. Do you think that consanguinity can increase the chance of hereditary diseases?** | □ Yes | □ No | □ Do not know |
| **13. Do you think that marriage should be allowed even if the result of Premarital screening came incompatible?** | □ Yes | □ No | □ Do not know |
| **14. Premarital screening does not break personal privacy?** | □ Agree | □ Neutral | □ Disagree |

**Four: Practice:**

| | | | |
|---|---|---|---|
| **1. Will / would decide to marry even if there is a hereditary disease risk?** | □ Yes | □ No | □ Do not know |
| **2. Will / would decide to marry even if there is communicable disease risk?** | □ Yes | □ No | □ Do not know |
| **3. Willing to change decide to marry in the case of incompatibility?** | □ Yes | □ No | □ Do not know |
| **4. Will demand implementation of a law that prohibits incompatible marriage?** | □ Yes | □ No | □ Do not know |
| **5. Will contribute to raising awareness about the importance of premarital screening?** | □ Yes | □ No | □ Do not know |

الجمهورية اليمنية
الجامعة الإماراتية الدولية
كلية الطب والعلوم الصحية

# المعارف والمواقف والممارسات لدى طلبة الطب بالجامعة الإماراتية الدولية تجاه فحوصات ما قبل الزواج مدينة صنعاء- اليمن

نحن مجموعة من طلاب السنة الخامسة كلية الطب والعلوم الصحية بالجامعة الإماراتية الدولية نقوم بهذا البحث لتقييم المعارف والمواقف والممارسات لدى طلبة الطب بالجامعة الإماراتية الدولية تجاه فحص قبل الزواج.

إن مشاركتكم في هذا الاستبيان ستزودنا بمعرفة وأهمية هذا الموضوع. ونود أن نؤكد على سرية المعلومات التي تقدمها لنا، ولن يتمكن أي شخص آخر غير فريق الدراسة من الاطلاع على أي من البيانات الواردة في هذا النموذج.

إن تعبئة الاستبيان لن تستغرق سوى دقائق معدودة، ونشكركم مقدماً على حسن تعاونكم...

## أولاً: البيانات الديموغرافية

| | | | | |
|---|---|---|---|---|
| **الاسم** | | | | |
| **النوع** | ○ أنثى | | ○ ذكر | |
| **العمر** | ○ أقل من 20 سنة | ○ 20 إلى 25 سنة | | ○ أكثر من 25 سنة |
| **المستوى التعليمي** | ○ المستوى الأول | | ○ المستوى الثاني | |
| | ○ المستوى الثالث | | ○ المستوى الرابع | |
| **الجنسية** | ○ يمني | | ○ غير يمني | |
| **الإقامة** | ○ في الريف | | ○ في المدينة | |
| **الحالة الاجتماعية** | ○ عازب | | ○ مزوج | |
| **القرابة بين الوالدين** | ○ نعم | | ○ لا | |
| **تاريخ عائلي للإصابة بالأمراض الوراثية** | ○ نعم | ○ لا | | ○ لا اعرف |

## ثانياً: المعرفة حول فحص ما قبل الزواج

| | | | | |
|---|---|---|---|---|
| 1. **المصادر الرئيسية للمعلومات حول الفحص قبل الزواج تشمل:** | ○ المدرسة | ○ الجامعة | | ○ وسائل التواصل |
| | ○ العائلة والأصدقاء | | ○ خدمات الرعاية الصحية | |
| 2. **توافر برنامج الفحص قبل الزواج في اليمن:** | ○ نعم | | ○ لا | |
| 3. **تشمل اختبارات الفحص قبل الزواج:** | ○ فحوصات الدم فقط | | ○ فحوصات الدم والفحص البدني | |
| 4. **من الذي يجب أن يخضع للفحص قبل الزواج؟** | ○ الرجل | ○ المرأة | | ○ كلاهما |
| 5. **تشمل الأمراض المستهدفة بالفحص قبل الزواج:** | ○ الأمراض الوراثية فقط | | ○ الأمراض المنقولة جنسياً فقط | |
| | ○ الأمراض الوراثية والأمراض المنقولة جنسياً | | ○ لا اعرف | |
| 6. **يقلل الفحص قبل الزواج من حدوث الأمراض الوراثية والجنسية:** | ○ نعم | ○ لا | | ○ لا اعرف |
| 7. **تشمل أمراض الدم الوراثية المستهدفة بالفحص قبل الزواج:** | ○ مرض فقر الدم المنجلي | | ○ الثلاسيميا | |
| | ○ مرض فقر الدم المنجلي والثلاسيميا | | ○ لا اعرف | |
| 8. **تشمل الأمراض المنقولة جنسياً المستهدفة بالفحص قبل الزواج:** | ○ التهاب الكبد الفيروسي بي وسي | | ○ عدوى فيروس نقص المناعة البشرية | |
| | ○ التهاب الكبد الفيروسي بي وسي وفيروس نقص المناعة البشرية | | ○ لا اعرف | |

**ثالثا: الموقف**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | إجراء الفحص قبل الزواج مهم: | ○ | موافق | ○ | محايد | ○ | غير موافق |
| 2. | يجب إنشاء برنامج فحص ما قبل الزواج في اليمن: | ○ | موافق | ○ | محايد | ○ | غير موافق |
| 3. | الاتفاق على إجراء الفحص قبل الزواج: | ○ | موافق | ○ | محايد | ○ | غير موافق |
| 4. | أسباب الاتفاق على إجراء الفحص قبل الزواج: | ○ | لمنع انتقال الأمراض إلى نسلي | ○ | للتأكد من صحة شريكي | | |
| | | ○ | لمنع انتقال المرض لي | ○ | للتأكد من توافق الزواج | | |
| 5. | أسباب الخلاف على إجراء الفحص قبل الزواج: | ○ | لا أريد أن أتدخل في إرادة الله | ○ | قد لا تكون النتائج لصالح اختياري | | |
| | | ○ | النتائج الإيجابية قد تمنع الزواج | ○ | قد ترفض الأسرة استمرار الزواج | | |
| | | ○ | الشعور بأن نتائج الفحص اهانة لي | | | | |
| 6. | ما رأيك في الوقت المناسب لإجراء الفحص قبل الزواج: | ○ | في وقت الخطوبة | ○ | قبل الزواج مباشرة | ○ | بعد الزواج |
| 7. | الاتفاق على جعل الفحص قبل الزواج إجراءً إلزاميًا قبل الزواج: | ○ | موافق | ○ | محايد | ○ | غير موافق |
| 8. | الاتفاق على وضع قوانين وأنظمة لمنع الزواج في حالة إيجابية اختبار الفحص قبل الزواج: | ○ | موافق | ○ | محايد | ○ | غير موافق |
| 9. | هل تعتقد أنه يجب أن يكون لدينا جلسات إرشادية قبل وبعد الفحص قبل الزواج؟ | ○ | نعم | ○ | □ لا | ○ | لا اعرف |
| 10. | هل تعتقد أن برنامج الفحص قبل الزواج مهم للحد من انتشار الأمراض الوراثية والمنقولة جنسياً في اليمن؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 11. | هل تعتقد أن هناك ضرر أو عيب في الفحص قبل الزواج؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 12. | هل تعتقد أن زواج الأقارب يمكن أن يزيد من فرصة الإصابة بالأمراض الوراثية؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 13. | هل تعتقد أن الزواج يجب أن يكون مسموحا به حتى لو جاءت نتيجة الفحص قبل الزواج غير متوافقة؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 14. | هل الفحص قبل الزواج لا يخرق الخصوصية الشخصية؟ | ○ | موافق | ○ | محايد | ○ | غير موافق |

**رابعاً: التطبيق**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | هل ستقرر الزواج حتى لو كان هناك خطر الإصابة بمرض وراثي؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 2. | هل ستقرر الزواج حتى لو كان هناك خطر الإصابة بالأمراض المعدية؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 3. | هل ترغب في تغيير قرار الزواج في حالة عدم توافق الفحص؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 4. | هل ستطالب بتطبيق قانون يمنع الزواج الغير المتناسب؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |
| 5. | هل ستساهم في رفع مستوى الوعي حول أهمية فحص ما قبل الزواج؟ | ○ | نعم | ○ | لا | ○ | لا اعرف |

# المعارف والمواقف والممارسات لدى طلبة الطب بالجامعة الإماراتية الدولية تجاه فحوصات ما قبل الزواج مدينة صنعاء – اليمن


## الملخص

**المقدمة:** يُعد الفحص قبل الزواج برنامجًا فعالًا يهدف إلى تحديد حاملي الأمراض الوراثية والأمراض المنقولة جنسيًا، بالإضافة إلى تقديم الاستشارات الوراثية للأزواج لضمان حياة إنجابية صحية.

**الأهداف:** تقييم المعارف والمواقف والممارسات لدى طلبة الطب بالجامعة الإماراتية الدولية تجاه فحوصات ما قبل الزواج، بمدينة صنعا، اليمن.

**المنهجية**: أجريت دراسة مقطعية بين طلبة الطب الجامعة الإمارتية الدولية 2024. تم توزيع استبيان على 265 طالبًا. يتكون الاستبيان من أربعة أجزاء؛ يحتوي الجزء الأول على أسئلة حول الخصائص الاجتماعية والديموغرافية للطلبة، ويتكون الجزء الثاني من ثمانية بنود حول معرفة متلازمة ما قبل الزواج، ويتكون الجزء الثالث من أربعة عشر بندًا حول موقف متلازمة ما قبل الزواج والجزء الرابع، يقيم القسم الأخير درجة التزام المشارك بنتيجة متلازمة ما قبل الزواج في سيناريوهات مختلفة. تم إدخال كافة البيانات وتحليلها من خلال الإصدار 27 من الحزمة الإحصائية SPSS.

**النتائج**: أظهرت النتائج أن معظم الطلبة (90.9%) كانوا على دراية بأهمية الفحص قبل الزواج في تقليل حدوث الأمراض الوراثية والأمراض المنقولة جنسيًا. كما أشار (49.4%) من الطلبة إلى عدم توفر برنامج فحص قبل الزواج في اليمن، ووافق (89.1%) من الطلبة على إجراء الفحص قبل الزواج، بينما وافق (76.6%) منهم على سن قوانين تمنع الزواج في حالة وجود نتائج إيجابية للفحص. أظهرت الدراسة أن 184 مشاركًا (69.4%) أظهروا معرفة جيدة، و205 مشاركين (77.4%) كانت لديهم مواقف إيجابية، بينما 194 مشاركًا (73.2%) أظهروا ممارسات جيدة تجاه الفحص قبل الزواج.

**الاستنتاجات**: على الرغم من أن أغلبية طلبة كلية الطب بالجامعة الإماراتية الدولية يفضلون الفحص ما قبل الزواج ولديهم معرفة جيدة بمعظم جوانبه، إلا أن نسبة صغيرة منهم رفضت إلزامه أو منعه قانونياً للزواج المعرض للخطر. ويمكن تغيير هذه المواقف السلبية من خلال التثقيف الصحي لطلبة الطب حول الفحص ما قبل الزواج.


**الكلمات المفتاحية:** المعرفة، المواقف، الممارسة، طلبة الطب، فحوصات ما قبل الزواج، صنعاء، اليمن.

الجمهورية اليمنية
الجامعة الإماراتية الدولية
كلية الطب والعلوم الصحية

# المعارف والمواقف والممارسات لدى طلبة الطب بالجامعة الإماراتية الدولية تجاه فحوصات ما قبل الزواج مدينة صنعاء – اليمن

بحث مقدم كجزء من متطلبات الحصول على درجة البكالوريوس في الطب في كلية الطب والعلوم الصحية بالجامعة الإماراتية الدولية

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**كلية الطب**

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