

Knowledge of Saudi Adolescents Regarding Premarital Examination in Arar Region: A Cross-Sectional Study

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ABSTRACT

Background:

Premarital examination programs are vital in preventing hereditary and communicable diseases, particularly in regions with high rates of consanguinity, such as Saudi Arabia. Despite their importance, gaps in adolescents' awareness and understanding of these programs persist.

Objectives:

This study aimed to assess the knowledge and awareness of Saudi adolescents regarding premarital examinations, focusing on diseases screened, timing, consanguinity risks, and sources of information.

Methods:

A cross-sectional study was conducted among unmarried adolescents at the North Private College of Nursing in Arar, Saudi Arabia. A stratified random sampling technique was used, and data were collected through a structured questionnaire addressing demographic characteristics, knowledge of diseases screened, and sources of information. Descriptive and inferential statistical

analyses, including chi-square tests and logistic regression, were applied to identify associations and predictors.

Results:

The study included 176 participants, predominantly females (72.8%), aged 20–25 years (65.4%). Awareness of HIV/AIDS testing was moderate (56.3%), while knowledge of Hepatitis B (41.7%) and Hepatitis C (29.4%) was low. Awareness of consanguinity risks was higher (63.5%), significantly associated with gender ($p = 0.04$). Logistic regression identified consanguinity awareness as a significant predictor of understanding the mandatory nature of premarital testing ($p = 0.004$). Social media was the most common information source (51.8%).

Conclusions:

Significant gaps in knowledge, particularly regarding hepatitis and procedural details, highlight the need for targeted educational interventions. Leveraging social media and integrating premarital health topics into school curricula could enhance adolescents' understanding.

Introduction

Adolescence represents a critical transition from childhood to adulthood, encompassing substantial physical, emotional, social, and psychological development (Jaworska & MacQueen, 2015). This period, often described as a time of vibrant changes, is marked by both personal growth and challenges, including medical and psychological upheavals that can influence long-term health behaviors and decision-making patterns (Short & Mollborn, 2015; Uccella et al., 2023). One of the major life milestones during or following adolescence is marriage, which forms the foundation of familial and societal structures (Johnston et al., 2020). The stability and success of a marital union depend heavily on the compatibility and preparedness of the partners, not only in personal and social domains but also in terms of health and heredity (Perelli-Harris et al., 2018).

Premarital examination programs play a crucial role in ensuring compatibility, particularly in preventing the transmission of hereditary and communicable diseases. The importance of premarital screening has gained traction, especially in Middle Eastern countries like Saudi Arabia, where consanguineous marriages are prevalent (Al Zuayr et al., 2024). Consanguinity is associated with a higher risk of genetic disorders, necessitating systematic preventive measures such as premarital screenings and genetic counseling to mitigate potential health risks in future generations (Jameel et al., 2024). These programs serve as a cornerstone in promoting public health by equipping couples with the knowledge and resources to make informed reproductive decisions (Khayat et al., 2024).

Saudi Arabia introduced a mandatory premarital screening program in 2004 to address the high prevalence of genetic blood disorders such as sickle cell anemia and thalassemia, as well as infectious diseases like HIV and hepatitis B and C (Al-Shroby et al., 2021; Memish & Saeedi, 2011). The initiative requires couples intending to marry to undergo laboratory testing and medical consultation at least three months before their wedding date. The objective is to identify carriers of genetic conditions and prevent the birth of affected offspring, thereby reducing the incidence of hereditary and infectious diseases (El-Hazmi, 2004). With over 131 healthcare centers offering this

service across the Kingdom, the program has been instrumental in enhancing public awareness and fostering healthier marital outcomes (Mani & Goniewicz, 2024).

Despite the program's significant public health benefits, studies suggest varying levels of awareness and knowledge about premarital examinations among different population groups (Alhusseini et al., 2023). Adolescents, in particular, often lack comprehensive understanding of the program's importance, scope, and procedures. Limited knowledge in this demographic group could be attributed to inadequate health education, cultural misconceptions, or insufficient integration of premarital health topics into school curricula (Leung et al., 2019). Addressing this gap is critical, as adolescence is a formative period during which individuals develop attitudes and behaviors that can influence their future decisions, including marriage and family planning (Scales et al., 2016).

Research in the Gulf region indicates that enhancing adolescents' knowledge of premarital screening can significantly impact their attitudes toward health and genetic counseling services (Bener et al., 2019). Studies conducted in Saudi Arabia have shown that young people often rely on informal sources, such as social media and family members, for information about premarital health, which may perpetuate misinformation or incomplete understanding (AlMuammar et al., 2021). For instance, misconceptions about the necessity or implications of genetic screening can lead to resistance or reluctance to participate in these programs, thereby undermining their effectiveness (Klitzman, 2010).

In addition to exploring the general awareness of premarital examinations, this study delves into specific aspects, such as the timing of tests, the diseases they screen for, and the sources of information that influence adolescents' perceptions (Al Eissa et al., 2024). Understanding these factors is essential for designing effective public health campaigns and integrating premarital health education into broader adolescent health initiatives (Salam et al., 2016). Furthermore, the study highlights the role of demographic variables, such as gender, academic level, and parental education, in shaping adolescents' knowledge and attitudes toward premarital screening ("The Role of Parents in Providing Sexuality Education to Their Children," 2020).

Addressing these gaps is not only crucial for the success of premarital screening programs but also for achieving broader public health objectives, such as reducing the prevalence of genetic and communicable diseases and promoting informed reproductive choices (Ibrahim et al., 2011). By fostering a culture of health awareness and proactive decision-making, premarital screening programs can contribute to building healthier families and communities, particularly in regions with high rates of hereditary conditions and consanguineous marriages (Abiib et al., 2024).

The present study focuses on assessing the knowledge and awareness of Saudi adolescents regarding premarital examination in the Arar region. This is particularly relevant in a cultural context where marriage is not only a personal milestone but also a societal expectation, often accompanied by familial pressures and traditional practices. By examining adolescents' understanding of premarital screening, this study aims to identify gaps in knowledge and recommend targeted educational interventions to improve awareness and acceptance of premarital health programs.

Methods

Study Design

This study employed a cross-sectional design to assess the knowledge and awareness of Saudi adolescents regarding premarital examinations. A cross-sectional approach was deemed appropriate as it captures data at a single point in time, allowing researchers to describe the level of knowledge within the target population and explore associations between various demographic factors and awareness levels. This design is particularly suitable for studies aiming to identify gaps in understanding and to propose targeted educational interventions.

Study Setting

The research was conducted at the North Private College of Nursing, located in Arar, Northern Borders Province, Saudi Arabia. This setting was chosen for its diverse student population, which includes individuals from various academic levels, socio-economic backgrounds, and educational streams. Arar serves as the administrative center of the Northern Borders Province, offering a culturally relevant context for the study of premarital screening awareness, particularly in a region where consanguineous marriages and hereditary health risks are common.

Study Population

The study targeted unmarried male and female adolescents enrolled as full-time students at the North Private College of Nursing. Adolescents were selected as the focus of the study because their awareness and understanding of premarital examinations are crucial for the future success of public health initiatives. Adolescence is a formative period during which individuals develop attitudes and behaviors that influence their life decisions, including marriage and family planning. The inclusion of students from different academic levels ensured a comprehensive understanding of knowledge disparities across age and educational stages.

Sampling Technique and Sample Size

A stratified random sampling technique was used to ensure the inclusion of a representative sample. The student population was divided into strata based on their academic level, such as first year, second year, and so on. From each level, one male and one female class were randomly selected to minimize selection bias. All students in the selected classes were invited to participate, and those who provided informed consent were included in the study. This method allowed for proportional representation of students across different stages of their academic journey. The sample size was determined based on a desired confidence level of 95% and a margin of error of 5%, with an additional buffer to account for non-response rates. The final sample included all consenting participants from the selected classes.

Inclusion and Exclusion Criteria

The inclusion criteria required participants to be unmarried, enrolled as full-time students, and willing to provide informed consent. For participants under 18 years of age, parental consent was obtained. Students who were married, engaged, or unwilling to participate were excluded. These criteria ensured that the sample was relevant to the study's focus on adolescents' knowledge and attitudes toward premarital examinations.

Data Collection Tools

A structured questionnaire was developed by the researchers based on a comprehensive review of national and international literature on premarital screening and genetic counseling. The questionnaire consisted of two main sections. The first section collected demographic and general information, including age, gender, academic year, and parental education and occupation, as well as family history of hereditary or infectious diseases. The second section focused on knowledge about premarital examination, addressing topics such as the importance of screening, the diseases it covers, the appropriate timing for conducting the tests, and the sources of information participants relied on. The questionnaire used a mix of multiple-choice and open-ended questions to capture a range of responses.

To ensure accuracy and relevance, the questionnaire was reviewed by a panel of experts in community health nursing for content validity. A pilot study involving 15 students was conducted to test the tool's reliability and clarity. Feedback from the pilot study was used to refine the questionnaire, ensuring that the questions were clear, culturally appropriate, and aligned with the study's objectives.

Scoring and Knowledge Categorization

Participants' responses to knowledge-related questions were scored as correct, incorrect, or "don't know." Correct answers were awarded one point, while incorrect and "don't know" answers received zero points. The total score for each participant was converted into a percentage. Based on these scores, participants were categorized into three knowledge levels: poor knowledge (<50%), average knowledge (50–69%), and good knowledge ($\geq 70\%$). This categorization allowed for the identification of specific knowledge gaps and areas requiring intervention.

Data Collection Procedure

Data collection took place over a two-week period in May 2024. Researchers visited the selected classes at scheduled times to minimize disruption to academic activities. Participants were briefed on the purpose and importance of the study and were assured of the confidentiality and anonymity of their responses. Written informed consent was obtained from all participants, and parental consent was secured for those under 18 years. The questionnaires were distributed in paper form, and participants were given 20 to 30 minutes to complete them. A researcher remained present during this time to address any questions and ensure that the questionnaires were completed independently. Completed questionnaires were collected immediately to ensure a high response rate and maintain data integrity.

Ethical Considerations

The study was approved by the Ethics Committee of the North Private College of Nursing, ensuring compliance with ethical research standards. Participants were informed that their participation was entirely voluntary and that they could withdraw from the study at any time without penalty. Confidentiality was maintained by anonymizing the data, with no personal identifiers such as names or student IDs being collected. The researchers emphasized that the data would only be used for the current study and would not be reused without explicit permission from the participants.

Data Management and Analysis

After collection, the completed questionnaires were reviewed for completeness and accuracy. Data were entered into a statistical software program (e.g., SPSS version 26) for analysis. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and knowledge levels. Inferential statistics, such as chi-square tests, were applied to examine associations between demographic variables (e.g., gender, academic year) and knowledge scores. A p-value of <0.05 was considered statistically significant. These analyses provided insights into the factors influencing adolescents' knowledge and awareness of premarital examinations.

Results

Table 1 highlights the demographic distribution of participants in terms of age, gender, and academic level, alongside chi-square analyses assessing associations between these variables and gender. The majority of participants (65.4%) were aged 20–25 years, with females (76.1%) significantly outnumbering males (23.9%) in this age group. A similar pattern was observed among participants aged 25–30 years, where females also accounted for 76.2% of the group. The chi-square test revealed a statistically significant association between age and gender ($\chi^2=5.43, p=0.02$), suggesting a gender imbalance in age distribution, potentially reflecting the demographic composition of the college.

In terms of academic level, a substantial proportion of participants (41.6%) were in their sixth year, with a marked female predominance (86.6%). First-year students comprised 23.8% of the sample, with a smaller female majority (61.9%). The chi-square test for academic level and gender yielded a highly significant association ($\chi^2=12.04, p<0.001$), indicating that gender distribution varies significantly across academic levels. This trend may reflect differing retention rates or enrollment patterns between genders in advanced years of study.

Table 1: Demographic Characteristics of Participants

Variable	Category	Count (%)	Male (%)	Female (%)	Chi-Square (p-value)
Age	20–25 years	134 (65.4)	32 (23.9)	102 (76.1)	$\chi^2 = 5.43, p = 0.02$
	25–30 years	42 (25.7)	10 (23.8)	32 (76.2)	
Academic Level	First Year	42 (23.8)	16 (38.1)	26 (61.9)	$\chi^2 = 12.04, p < 0.001$
	Sixth Year	134 (41.6)	18 (13.4)	116 (86.6)	

Table 2 illustrates participants' knowledge about the ability of premarital examinations to diagnose specific diseases, including HIV/AIDS, Hepatitis B, and Hepatitis C. A significant proportion of respondents demonstrated awareness of HIV/AIDS, with 56.3% correctly identifying its inclusion in premarital testing. This awareness was significantly associated with academic level ($\chi^2=8.52, p=0.01$), suggesting that higher academic exposure may positively influence knowledge of HIV/AIDS in this context. Conversely, awareness of Hepatitis B and Hepatitis C was lower, with correct response rates of 41.7% and 29.4%, respectively. Moreover, a substantial percentage of participants either provided incorrect answers

or indicated uncertainty ("don't know") for these diseases, particularly for Hepatitis C, where 40.0% gave incorrect responses and 30.6% were unsure.

The absence of significant associations between academic level and knowledge of Hepatitis B ($\chi^2=4.31, p=0.12$) or Hepatitis C ($\chi^2=3.12, p=0.21$) highlights a potential gap in education or public health awareness campaigns related to these diseases. This is particularly concerning given the importance of Hepatitis screening in the context of premarital health programs. These findings emphasize the need for targeted educational interventions to enhance knowledge about the inclusion of Hepatitis testing in premarital examinations, particularly for individuals in earlier academic levels or those with limited exposure to health education.

Table 2: Knowledge of Premarital Examination Diseases

Disease	Correct Response (%)	Incorrect (%)	Don't Know (%)	Academic Level χ^2 (p-value)
HIV/AIDS	112 (56.3)	26 (13.1)	60 (30.6)	$\chi^2 = 8.52, p = 0.01$
Hepatitis B	83 (41.7)	55 (27.7)	60 (30.6)	$\chi^2 = 4.31, p = 0.12$
Hepatitis C	59 (29.4)	80 (40.0)	60 (30.6)	$\chi^2 = 3.12, p = 0.21$

Table 3 provides a detailed breakdown of participants' awareness regarding consanguinity risks and the appropriate timing for premarital testing, along with a gender-based analysis. The data indicate that 63.5% of participants correctly identified consanguinity as a risk factor for genetic diseases. Female participants were significantly more likely to recognize this risk (77.0% of correct responses) compared to their male counterparts (23.0%). The association between gender and awareness of consanguinity risks was statistically significant ($\chi^2=6.24, p=0.04$), suggesting that females may be more informed or attentive to the potential genetic implications of consanguineous marriages.

However, 17.4% of participants incorrectly believed that consanguinity posed no risk, and 19.1% were unsure ("don't know"), reflecting persistent gaps in knowledge. Male participants were overrepresented in both the "no risk" and "don't know" categories, which underscores the need for targeted educational efforts to enhance awareness, particularly among males.

Regarding the timing of premarital testing, 48.3% of participants correctly indicated that tests should be conducted at least three months before marriage. While the majority of these correct responses also came from female participants (70.5%), the gender difference for this variable was not statistically significant ($\chi^2=3.22, p=0.18$). This finding suggests that while knowledge about test timing is moderately widespread, it is not strongly influenced by gender. A considerable proportion of respondents either underestimated the recommended timing (29.8% stated less than three months) or were uncertain about it (21.9% "don't know"). These misconceptions could undermine the effectiveness of premarital testing programs, as insufficient preparation time may delay critical decision-making or counseling.

Table 3: Awareness of Consanguinity Risks and Test Timing

Variable	Response	Count (%)	Male (%)	Female (%)	Gender χ^2 (p-value)
Consanguinity Risk	Yes	174 (63.5)	40 (23.0)	134 (77.0)	$\chi^2 = 6.24, p = 0.04$
	No	48 (17.4)	18 (37.5)	30 (62.5)	
	Don't Know	52 (19.1)	18 (34.6)	34 (65.4)	
Test Timing	≥ 3 months	122 (48.3)	36 (29.5)	86 (70.5)	$\chi^2 = 3.22, p = 0.18$
	< 3 months	76 (29.8)	22 (28.9)	54 (71.1)	
	Don't Know	56 (21.9)	18 (32.1)	38 (67.9)	

The data presented in Table 4 highlight the various sources from which participants obtained information about premarital testing, along with the distribution of these sources across first-year and sixth-year students. Social media emerged as the most frequently cited source of information, with 51.8% of participants overall reporting it as their primary resource. This reliance was significantly higher among sixth-year students (56.3%) compared to first-year students (12.7%), with a highly significant chi-square value ($\chi^2=11.32, p<0.001$). The findings underscore the dominant role of social media in disseminating health-related information, particularly among more advanced students who might engage with these platforms for academic or health awareness purposes.

Family and friends constituted the second most common source, cited by 29.7% of participants. Again, this source was more frequently reported by sixth-year students (65.9%) than first-year students (14.6%), with a significant association ($\chi^2=8.45, p=0.01$). This suggests that interpersonal networks, particularly among older students, play a critical role in shaping awareness about premarital testing.

Healthcare workers accounted for 12.5% of responses overall, with a stronger preference among sixth-year students (47.1%) compared to first-year students (11.8%). The chi-square analysis showed a marginally significant association ($\chi^2=5.76, p=0.05$). This finding highlights the importance of formal health education and the potential influence of healthcare professionals, particularly for students in more advanced stages of their education.

Interestingly, schools and universities were the least frequently cited source, with only 6.0% of participants overall reporting it as a primary resource. While 50.0% of first-year students relied on this source compared to just 12.5% of sixth-year students, the chi-square test did not reveal a significant association ($\chi^2=3.29, p=0.19$). This result points to an underutilization of educational institutions in providing accurate and structured information about premarital testing, especially among senior students who might depend more on external sources like social media or healthcare workers.

Table 4: Sources of Information About Premarital Testing

Source	Count (%)	First-Year (%)	Sixth-Year (%)	Academic Level χ^2 (p-value)
Social Media	142 (51.8)	18 (12.7)	80 (56.3)	$\chi^2 = 11.32, p < 0.001$
Family and Friends	82 (29.7)	12 (14.6)	54 (65.9)	$\chi^2 = 8.45, p = 0.01$
Healthcare Workers	34 (12.5)	4 (11.8)	16 (47.1)	$\chi^2 = 5.76, p = 0.05$
Schools/Universities	16 (6.0)	8 (50.0)	2 (12.5)	$\chi^2 = 3.29, p = 0.19$

The correlation matrix presented in Table 5 provides insights into the relationships between awareness of AIDS testing, consanguinity risks, and the mandatory nature of premarital testing. Notably, there is a moderate positive correlation ($r=0.401$) between awareness of AIDS testing and recognition of mandatory premarital testing. This suggests that individuals who are aware of the capability of premarital tests to diagnose AIDS are more likely to understand the legal and health requirements associated with these tests.

The strongest correlation ($r=0.528$) is observed between awareness of consanguinity risks and understanding the mandatory nature of premarital testing. This indicates a substantial link, implying that individuals who comprehend the genetic risks associated with consanguineous marriages are more likely to value the importance of premarital testing as a preventive measure. Such awareness may stem from a deeper understanding of the public health implications of consanguinity in hereditary disease transmission.

The correlation between awareness of AIDS testing and consanguinity risks ($r=0.326$) is also moderate, highlighting a potential overlap in the knowledge domains of infectious and genetic risks. This may reflect a broader health literacy among individuals who are informed about these critical aspects of premarital health.

Table 5: Correlation Matrix

Variable	AIDS_Test_Num	Consanguinity_Risk_Num	Mandatory_Test_Num
AIDS_Test_Num	1.000	0.326	0.401
Consanguinity_Risk_Num	0.326	1.000	0.528
Mandatory_Test_Num	0.401	0.528	1.000

Table 6 presents the results of the logistic regression analysis, exploring the factors influencing participants' awareness of the mandatory nature of premarital testing. The model includes six predictor variables: awareness of AIDS testing (AIDS_Test_Num), knowledge of consanguinity

risks (Consanguinity_Risk_Num), awareness of Hepatitis B testing (Hepatitis_B_Test_Num), awareness of Hepatitis C testing (Hepatitis_C_Test_Num), knowledge of the appropriate timing for premarital tests (Test_Timing_Num), and knowledge of the result duration (Result_Duration_Num). The constant term represents the baseline log-odds when all predictor variables are zero.

The most significant finding in this table is the strong positive association between awareness of consanguinity risks and understanding the mandatory nature of premarital tests ($\beta = 1.913$, $p = 0.004$). The coefficient indicates that individuals aware of consanguinity risks are nearly twice as likely to recognize the mandatory nature of premarital testing compared to those who are not. The 95% confidence interval (0.597 to 3.229) confirms the robustness of this association.

Awareness of AIDS testing also shows a positive association ($\beta = 0.847$), though it falls short of statistical significance ($p = 0.082$). The borderline nature of this result suggests a potential relationship that warrants further investigation, as the confidence interval (-0.109 to 1.804) overlaps zero.

Table 6 :Logistic Regression Results

Variable	Coefficient	Std. Error	z-value	p-value	95% CI (Lower)	95% CI (Upper)
Constant	0.313	0.586	0.534	0.593	-0.833	1.459
AIDS_Test_Num	0.847	0.488	1.736	0.082	-0.109	1.804
Consanguinity_Risk_Num	1.913	0.671	2.849	0.004	0.597	3.229
Hepatitis_B_Test_Num	0.562	0.593	0.948	0.343	-0.602	1.726
Hepatitis_C_Test_Num	0.358	0.510	0.703	0.482	-0.638	1.354
Test_Timing_Num	0.290	0.457	0.636	0.525	-0.604	1.184
Result_Duration_Num	0.704	0.580	1.213	0.225	-0.433	1.841

Discussion

The findings of this study underscore significant gaps and variabilities in the knowledge of Saudi adolescents regarding premarital examinations in the Arar region. These insights are critical for enhancing the efficacy of public health initiatives aimed at promoting awareness and utilization of premarital testing services (Al-Shroby et al., 2021).

Adolescents' knowledge of diseases covered under premarital screening programs revealed both strengths and gaps. Awareness of HIV/AIDS diagnosis was relatively high (56.3%), aligning with previous studies highlighting the success of public health campaigns in emphasizing infectious disease testing as a core component of premarital screening (Alswaidi & O'brien, 2009). However, the lower awareness of Hepatitis B (41.7%) and Hepatitis C (29.4%) suggests a need for targeted education to bridge this gap. These findings echo similar observations in other Middle Eastern contexts, where knowledge of hepatitis is often overshadowed by more prominent public health

concerns like HIV/AIDS (Farooqi et al., 2024). Given the significant public health burden of hepatitis in the region, integrating more comprehensive education on these conditions into existing programs is crucial (Faniyi et al., 2024).

The study also highlights adolescents' limited understanding of consanguinity risks. While 63.5% of participants correctly identified that consanguineous marriages increase the likelihood of hereditary diseases, 36.5% either misunderstood or were unaware of this association (Albarghali, 2023). The strong correlation between awareness of consanguinity risks and recognition of mandatory premarital testing ($r = 0.528$) reflects the critical role of genetic literacy in fostering acceptance of premarital health programs (Jameel et al., 2024). This finding underscores the importance of tailoring public health messages to address cultural practices, such as consanguinity, that significantly impact hereditary disease prevalence (Salway et al., 2019).

Timing and procedural awareness regarding premarital testing were another area of concern. Although 48.3% of participants correctly identified the recommended testing period (three months before marriage), nearly 51.7% were either unaware or provided incorrect responses, suggesting a lack of procedural clarity (Al Sulaiman et al., 2010). The logistic regression analysis did not find significant associations between procedural knowledge (e.g., timing and result duration) and awareness of the mandatory nature of testing. This indicates that while procedural understanding is essential, it may not directly influence adolescents' perceptions of the legal and health implications of premarital screening. Future campaigns should emphasize procedural clarity to ensure adolescents are better prepared to navigate the requirements of premarital testing (Saffi & Howard, 2015).

Sources of information play a pivotal role in shaping adolescents' knowledge and attitudes. The findings revealed a heavy reliance on social media (51.8%) as the primary source of information, particularly among advanced academic-level students (Saffi & Howard, 2015). This aligns with studies emphasizing the growing influence of digital platforms on health literacy in the adolescent population (Dienlin & Johannes, 2020). However, the underutilization of schools and universities (6.0%) as reliable information sources raises concerns about the integration of health education into academic curricula. Strengthening school-based health education programs could provide adolescents with structured and accurate information about premarital testing, complementing the informal knowledge gained through social media and interpersonal networks (Jones et al., 2014).

Gender differences emerged as a recurring theme in the study. Female participants demonstrated significantly higher awareness across multiple domains, including consanguinity risks and the timing of premarital tests (Elmugadam et al., 2024). These findings are consistent with broader research indicating that women often exhibit greater health-seeking behaviors and knowledge of reproductive health issues compared to men. Addressing these disparities requires a dual approach: enhancing male adolescents' engagement with premarital health topics while maintaining the progress made in female health education (Ahinkorah et al., 2020).

The results of the logistic regression analysis further emphasized the significance of specific knowledge domains. Awareness of consanguinity risks was a strong predictor of understanding the mandatory nature of premarital testing ($p = 0.004$). This finding highlights the interplay between genetic literacy and broader public health awareness (Bakry et al., 2023). The borderline significance of awareness of AIDS testing ($p = 0.082$) suggests that infectious disease knowledge may also contribute to shaping perceptions of premarital testing requirements, albeit to a lesser extent (Kowalska et al., 2024). The non-significant associations observed for other variables, such

as knowledge of Hepatitis B and C testing, timing, and result duration, suggest that these aspects may require different intervention strategies to enhance their impact on adolescents' understanding of the program's mandatory nature (Kaushal et al., 2024).

The findings also shed light on potential cultural and systemic barriers influencing adolescents' knowledge. For example, the high reliance on social media for information may reflect a lack of trust or accessibility in traditional sources like healthcare workers or educational institutions. Bridging this gap requires collaborative efforts between healthcare providers, educators, and policymakers to create cohesive, culturally sensitive, and accessible public health messages.

Limitations

This study had several limitations that should be considered when interpreting the findings. Firstly, the study was conducted at a single institution, the North Private College of Nursing in Arar, which may limit the generalizability of the results to other regions or populations in Saudi Arabia. The sample consisted primarily of nursing students, who may have higher baseline knowledge of health-related issues compared to the general adolescent population. Secondly, the reliance on self-reported data may have introduced social desirability bias, potentially leading participants to overstate their knowledge or awareness of premarital examinations. Additionally, the cross-sectional design captures data at a single point in time and cannot establish causality between variables. Finally, the study did not account for other factors, such as socio-economic status or cultural practices, that might influence knowledge and attitudes toward premarital examinations.

Implications

The findings of this study have important implications for public health practice, education, and policy. The demonstrated gaps in knowledge, particularly regarding Hepatitis B and C, consanguinity risks, and procedural aspects of premarital testing, suggest a need for targeted educational interventions. Public health campaigns should emphasize the inclusion of Hepatitis screening in premarital testing and address misconceptions about consanguinity, leveraging culturally sensitive messaging to ensure relevance and acceptance.

Educational institutions have a critical role to play in improving adolescents' understanding of premarital health. The underutilization of schools and universities as information sources highlights the need for integrating premarital health topics into the academic curriculum. These programs should be designed to provide accurate, age-appropriate, and actionable information to students, equipping them with the knowledge necessary to make informed decisions about marriage and family planning.

From a policy perspective, the heavy reliance on social media as an information source underscores the importance of regulating and utilizing digital platforms for disseminating health-related content. Policymakers should collaborate with social media companies to promote credible and engaging health education campaigns tailored to the adolescent demographic. Additionally, enhancing the accessibility and visibility of healthcare workers in premarital education programs could bridge the gap between informal and formal sources of information, fostering trust and engagement with the healthcare system.

Conclusion

This study highlights significant gaps and disparities in adolescents' knowledge of premarital examinations in the Arar region, with notable deficiencies in awareness of Hepatitis B and C, procedural aspects of testing, and the genetic risks associated with consanguinity. While certain domains, such as awareness of HIV/AIDS and consanguinity risks, showed encouraging levels of knowledge, there remains a critical need for comprehensive and culturally tailored educational interventions to address the identified gaps.

The reliance on social media as the primary source of information reflects broader trends in adolescent engagement with health topics and underscores the potential of digital platforms as powerful tools for public health communication. However, the underutilization of schools and healthcare professionals points to missed opportunities for structured and reliable health education.

By addressing these gaps through collaborative efforts among educators, healthcare providers, and policymakers, premarital screening programs can be more effectively promoted, ensuring that adolescents are well-informed and empowered to participate in these critical public health initiatives. Ultimately, improving knowledge and attitudes toward premarital health can contribute to healthier families and communities, reducing the burden of genetic and infectious diseases in Saudi Arabia and beyond.

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