MEDICAL SCIENCE

To Cite:
Makhdoom AK, Hanif I, Hussain S, Alanazi NAH, Almesned MA, Alenazi SA. Awareness of testicular torsion among the residents in Arar City, Kingdom of Saudi Arabia. *Medical Science* 2023; 27: e375ms3238 doi: https://doi.org/10.54905/disssi.v27i141.e375ms3238

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Peer-Review History
Received: 20 August 2023
Reviewed & Revised: 24/August/2023 to 02/November/2023
Accepted: 06 November 2023
Published: 10 November 2023

Peer-review Method
External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367

Awareness of testicular torsion among the residents in Arar City, Kingdom of Saudi Arabia

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ABSTRACT

Background: Testicular torsion is a urological emergency that demands swift recognition and intervention to prevent testicular loss. This study aimed to assess the awareness and knowledge of testicular torsion among residents of Arar City, Saudi Arabia, and explore the influence of sociodemographic factors on this awareness. *Methods:* A descriptive cross-sectional study design was employed. A structured questionnaire, prepared in Arabic, was distributed to 411 participants via online platforms after obtaining ethical approval. The survey collected data on sociodemographic characteristics and assessed awareness and knowledge of testicular torsion, including its status as a medical emergency. Statistical analysis involved chi-squared tests and T-tests, with a significance level of 5%. *Results:* Of the participants, 37.2% had heard of testicular torsion, while 35.3% recognized it as a medical emergency. Several sociodemographic factors were significantly associated with awareness and knowledge, including sex, age, marital status, educational level, and occupation. Male participants, those aged 18 to 29, single individuals, and those with secondary education or below exhibited higher awareness levels. Participants who were not currently employed displayed the most increased awareness. *Conclusion:* The study highlights the need for targeted educational interventions to improve awareness and knowledge of testicular torsion among the residents of Arar City. Increasing public understanding of the emergency nature of testicular torsion is crucial to reduce delays in seeking medical care and prevent testicular loss. Healthcare providers, educational institutions, and media outlets can collaborate to develop informative campaigns tailored to specific demographic groups, ultimately enhancing patient outcomes.

Keywords: Testicular torsion, Emergency, Awareness, Testicular loss, Saudi Arabia.

1. INTRODUCTION

Testicular torsion is a medical emergency characterized by the rotation of the spermatic cord, resulting in compromised blood flow to the testicle (Yap et

al., 2018). If testicular torsion is left untreated, it can lead to testicular ischemia and, ultimately, testicular loss. Testicular torsion predominantly affects young males, often during adolescence, and requires prompt diagnosis and surgical intervention to salvage testicular function (Ubee et al., 2014; Boettcher et al., 2012; Zhao et al., 2011). Despite its critical nature, testicular torsion remains relatively uncommon, with an estimated incidence of 1 in 4,000 males annually. This rarity, coupled with the non-specific and fluctuating symptoms of testicular torsion, presents challenges in early recognition and timely medical intervention (Ubee et al., 2014).

Awareness and knowledge of testicular torsion among the general population are crucial for several reasons. First, early symptom recognition is vital to ensure timely presentation to healthcare providers, reducing the risk of testicular loss. Second, improved public awareness can lead to quicker diagnosis and management, potentially preserving fertility and testicular function. Third, enhancing the understanding of testicular torsion as a medical emergency can decrease the morbidity of delayed treatment (Alyami et al., 2019; Friedman et al., 2016). Research into the awareness and knowledge of testicular torsion among the general population has shown varying levels of awareness globally. Several studies conducted in different countries have revealed suboptimal levels of awareness among the general public.

These studies consistently report that many individuals are unaware of testicular torsion, its symptoms, and its status as a medical emergency. Furthermore, research suggests that awareness levels may vary among different demographic groups, including age, sex, educational background, and socioeconomic status (Friedman et al., 2016). Understanding the baseline awareness and identifying sociodemographic factors influencing learning can inform targeted educational interventions and public health campaigns.

Study Aim

The current study focuses on Arar City, located in the Northern border region of Saudi Arabia. The study aims to assess the awareness and knowledge of testicular torsion among the residents of Arar City and explore the impact of sociodemographic factors on this awareness. The findings of this research will contribute to public health efforts aimed at improving cognition, early diagnosis, and timely treatment of testicular torsion in the region, ultimately enhancing the overall well-being and reproductive health of the population.

Objectives

We will evaluate the awareness level among the residents about testicular torsion.
We will assess the general population's practice toward testicular torsion.

2. METHODOLOGY

Study Design

This research employs a descriptive cross-sectional study design to assess the awareness and knowledge of testicular torsion among the residents of Arar City, Kingdom of Saudi Arabia.

Study Setting

The study was conducted in Arar City in the Northern border region of Saudi Arabia from 1/4/2023 to 1/6/2023.

Study Population

The study population consists of the general residents of Arar City, encompassing individuals aged 18 and above who are willing to participate in the study.

Sampling Tool

The questionnaire was meticulously designed through a review of relevant literature and consultation with experts in the field to ensure content validity.

Sampling Method

Ethical approval was by the local bioethics committee at Northern Border University with decision number (31/44/H) before data collection. After obtaining ethical clearance, the survey was conducted using an online questionnaire method, primarily utilizing

social media platforms to reach a diverse range of participants. Social media platforms offer a comprehensive outreach, allowing for data collection from the population.

Informed Consent

Before participating in the study, potential participants were provided a comprehensive explanation of the research objectives. Informed consent was obtained from all willing participants to ensure voluntary and informed participation.

Sample Size Calculation

The sample size was calculated using the Epi Info software program version 7.2.4.0. The following assumptions were considered: A 95% confidence interval, a 5% margin of error, and an expected awareness rate of 50%. Based on these parameters, the estimated sample size required was 383 participants.

Data Collection

Data collection involved the distribution of the structured questionnaire through online platforms. Participants were requested to complete the questionnaire, which included questions related to sociodemographic characteristics, awareness, and knowledge of testicular torsion.

Data Analysis

The collected data were analyzed using SPSS version 26. Qualitative data were analyzed using a chi-squared test. A significance level of 5% ($p < 0.05$) was considered for all statistical tests.

Inclusion Criteria

Participants who were aged 18 years and above were included in the study.

Exclusion Criteria

Participants below the age of 18 were excluded from the study.

Ethical Consideration

The research adhered to ethical principles, including obtaining informed consent from all participants. The study also received ethical approval from relevant authorities before commencing data collection to ensure compliance with ethical standards.

Data Quality Control

The questionnaire was pre-tested on a small sample of participants to identify any ambiguities or potential issues and the necessary modifications were made based on the pre-test feedback to enhance the clarity and comprehensibility of the questionnaire.

Data Privacy and Confidentiality

Participant data was kept confidential, and all information was anonymized. Data were stored securely, accessible only to authorized researchers, to protect participant privacy.

3. RESULTS

Out of the 411 participants, the majority were male (88.3%), aged between 18 to 29 years (89.8%), and single (83.9%). Most participants held at least an undergraduate degree (71%), and a significant proportion were not currently employed (46.5%). Regarding offspring, 10.2% of participants reported having offspring, with a higher prevalence of male offspring (78.6%). Only 40.5% of participants had their offspring checked for testicular pain before, and a small number (4.8%) reported that their child had been diagnosed with testicular torsion early (Table 1).

Table 1 Sociodemographic characters of participants and history of testicular torsion among offspring (n=411).

Parameter		Frequency (%)
Sex	Female	48 (11.7%)
	Male	363 (88.3%)
Age, y	18 to 29	369 (89.8%)
	30 or more	42 (10.2%)
Marital status	Married	59 (14.4%)
	Single	345 (83.9%)
	Divorced	7 (1.7%)
Educational level	Illiterate	5 (1.2%)
	Intermediate education	2 (0.5%)
	Secondary education	94 (22.9%)
	Undergraduate degree	292 (71%)
	Postgraduate degree	18 (4.4%)
Occupation	Not working	191 (46.5%)
	Working	123 (29.9%)
	Housewife	6 (1.5%)
	Free worker	11 (2.7%)
	Retired	4 (1%)
	Other	76 (18.5%)
Do you have offspring?	No	369 (89.8%)
	Yes	42 (10.2%)
Offspring sex (n=42)	Female	9 (21.4%)
	Male	33 (78.6%)
Was the offspring checked for testicular pain before (n=42)	No	25 (59.5%)
	Yes	17 (40.5%)
Child diagnosed with testicular torsion before (n=42)	Maybe	2 (4.8%)
	No	38 (90.5%)
	Yes	2 (4.8%)

Interestingly, 37.2% of participants had heard of testicular torsion before, indicating some awareness in the population. When asked if they knew that testicular torsion was an emergency, 35.3% of participants answered yes, while 51.3% said no. A similar pattern emerged for recognizing a swollen scrotum as a sign of testicular torsion, with 22.9% correctly identifying it and 62.3% not knowing. For scrotal pain as a symptom, 29.4% answered yes, while 58.2% were unaware. Regarding the proper management of testicular torsion, a significant proportion of participants (62.8%) believed conservative and surgical approaches were necessary. In comparison, 25.8% thought surgical intervention alone was sufficient, and only 11.4% considered it in a traditional approach (Table 2) (Figures 1, 2).

Table 2 Knowledge of participants towards testicular torsion (n=411).

Parameter		Frequency (%)
Heard of testicular torsion before	Maybe	67 (16.3%)
	No	191 (46.5%)
	Yes	153 (37.2%)
Testicular torsion is an emergency	Maybe	55 (13.4%)
	No	211 (51.3%)
	Yes	145 (35.3%)
A Swollen scrotum is a sign of testicular torsion	Maybe	61 (14.8%)
	No	256 (62.3%)
	Yes	94 (22.9%)

Scrotal pain is a symptom of testicular torsion	Maybe	51 (12.4%)
	No	239 (58.2%)
	Yes	121 (29.4%)
Proper management of testicular torsion	Conservative	47 (11.4%)
	Surgical	106 (25.8%)
	Both	258 (62.8%)

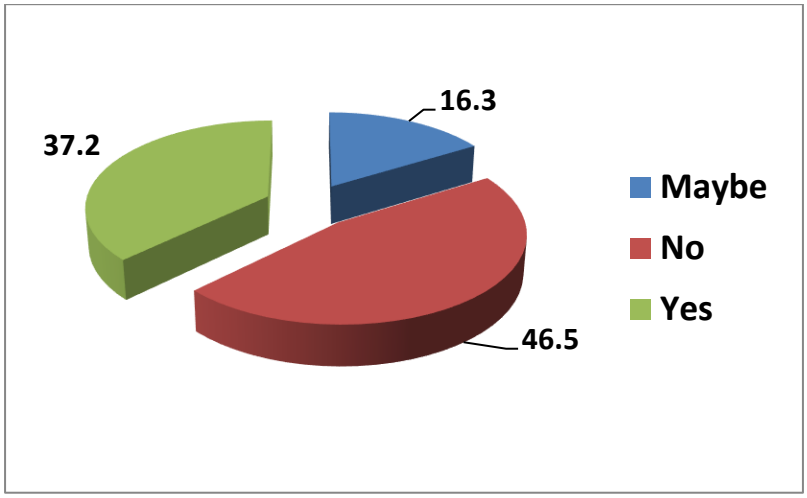

Figure 1 Participants heard of testicular torsion before

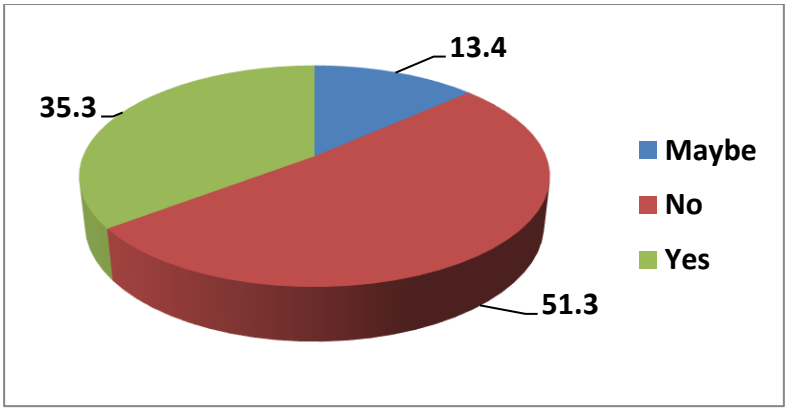

Figure 2 Participants consider testicular torsion is an emergency

Regarding gender, it is noteworthy that a higher proportion of males (37.7%) reported having heard of testicular torsion than females (33.3%). There is a statistically significant association between gender and awareness ($X^2 = 6.680$, $p = 0.035$), suggesting that males in the study have slightly better attention to testicular torsion than females. Age plays a significant role in awareness, with younger individuals (aged 18 to 29) demonstrating a higher level of knowledge about testicular torsion (40.1%) compared to those aged 30 or more (11.9%). This association is highly significant ($X^2 = 33.123$, $p < 0.001$), indicating that younger individuals are more likely to be aware of testicular torsion.

Marital status also appears to influence awareness, as singles exhibited the highest understanding (40.9%), while married individuals had the lowest understanding (20.3%). This difference is statistically significant ($X^2 = 35.322$, $p < 0.001$). The educational level shows a similar pattern, with those holding undergraduate degrees exhibiting the highest awareness (38%) and illiterate individuals having the lowest understanding (0.5%). The chi-squared test demonstrates a significant association between educational level and cognition ($X^2 = 25.223$, $p = 0.001$), emphasizing the importance of education in increasing awareness.

Occupation also plays a significant role, with those not working showing the highest awareness (46.1%) compared to other occupational categories. This difference is statistically significant ($X^2 = 37.978$, $p < 0.001$), indicating that employment status influences awareness. The presence of offspring also affects awareness, with those having offspring demonstrating higher

understanding (37.7%) compared to those without offspring (18.2%). This association is statistically significant (X^2 = 11.922, p = 0.003), suggesting that parenthood may lead to more excellent knowledge of testicular torsion (Table 3).

Table 3 Knowledge of testicular torsion associated with sociodemographic characters (n=411).

Parameter		Heard of testicular torsion before			X^2	P-value
		Maybe	No	Yes		
Sex	Female	14 (29.2%)	18 (37.5%)	16 (33.3%)	6.680	0.035
	Male	53 (14.6%)	173 (47.7%)	137 (37.7%)		
Age, y	18 to 29	67 (18.2%)	154 (41.7%)	148 (40.1%)	33.123	0.000
	30 or more	0 (0%)	37 (88.1%)	5 (11.9%)		
Marital status	Married	2 (3.4%)	45 (76.3%)	12 (20.3%)	35.322	0.000
	Single	65 (18.8%)	139 (40.3%)	141 (40.9%)		
	Divorced	0 (0%)	7 (100%)	0 (0%)		
Educational level	Illiterate	0 (0%)	3 (60%)	2 (40%)	25.223	0.001
	Intermediate education	0 (0%)	2 (100%)	0 (0%)		
	Secondary education	27 (28.7%)	31 (33%)	36 (38.3%)		
	Undergraduate degree	40 (13.7%)	141 (48.3%)	111 (38%)		
	Postgraduate degree	0 (0%)	14 (77.8%)	4 (22.2%)		
Occupation	Not working	37 (19.4%)	66 (34.6%)	88 (46.1%)	37.978	0.000
	Working	12 (9.8%)	80 (65%)	31 (25.2%)		
	Housewife	0 (0%)	4 (66.7%)	2 (33.3%)		
	Free worker	2 (18.2%)	7 (63.6%)	2 (18.2%)		
	Retired	0 (0%)	4 (100%)	0 (0%)		
	Other	16 (21.1%)	30 (39.5%)	30 (39.5%)		
Do you have offspring?	No	67 (18.2%)	163 (44.2%)	139 (37.7%)	11.922	0.003
	Yes	0 (0%)	28 (66.7%)	14 (33.3%)		
Offspring sex	Female	0 (0%)	7 (77.8%)	2 (22.2%)	0.636	0.425
	Male	0 (0%)	21 (63.6%)	12 (36.4%)		
Was the offspring checked for testicular pain before?	No	0 (0%)	17 (68%)	8 (32%)	0.049	0.824
	Yes	0 (0%)	11 (64.7%)	6 (35.3%)		
Child diagnosed with testicular torsion before	Maybe	0 (0%)	2 (100%)	0 (0%)	2.211	0.331
	No	0 (0%)	24 (63.2%)	14 (36.8%)		
	Yes	0 (0%)	2 (100%)	0 (0%)		

Age remains a significant factor, with younger individuals (aged 18 to 29) being more likely to perceive testicular torsion as an emergency (38.2%) compared to those aged 30 or more (9.5%). This association is highly significant (X^2 = 17.309, p < 0.001), indicating that younger individuals are more likely to recognize the urgency of testicular torsion. Educational level does not significantly influence the perception of testicular torsion as an emergency, as there is no statistically significant difference between educational groups. The occupational status reveals a substantial association in participants with jobs, with those not working being more likely to consider testicular torsion an emergency (42.4%). This association is highly significant (X^2 = 32.815, p < 0.001), suggesting that employment status plays a role in understanding the urgency of testicular torsion. The presence of offspring does not significantly impact the recognition of testicular torsion as an emergency (Table 4).

Table 4 Knowing that testicular torsion is an emergency associated with sociodemographic characters (n=411).

Parameter		Testicular torsion is an emergency			X^2	P-value
		Maybe	No	Yes		
Sex	Female	5 (10.4%)	22 (45.8%)	21 (43.8%)	1.783	0.410
	Male	50 (13.8%)	189 (52.1%)	124 (34.2%)		

Age, y	18 to 29	51 (13.8%)	177 (48%)	141 (38.2%)	17.308	0.000
	30 or more	4 (9.5%)	34 (81%)	4 (9.5%)		
Marital status	Married	6 (10.2%)	38 (64.4%)	15 (25.4%)	9.317	0.054
	Single	47 (13.6%)	168 (48.7%)	130 (37.7%)		
	Divorced	2 (28.6%)	5 (71.4%)	0 (0%)		
Educational level	Illiterate	0 (0%)	3 (60%)	2 (40%)	8.544	0.382
	Intermediate education	0 (0%)	2 (100%)	0 (0%)		
	Secondary education	18 (19.1%)	45 (47.9%)	31 (33%)		
	Undergraduate degree	33 (11.3%)	151 (51.7%)	108 (37%)		
	Postgraduate degree	4 (22.2%)	10 (55.6%)	4 (22.2%)		
Occupation	Not working	26 (13.6%)	84 (44%)	81 (42.4%)	32.815	0.000
	Working	18 (14.6%)	77 (62.6%)	28 (22.8%)		
	Housewife	0 (0%)	0 (0%)	6 (100%)		
	Free worker	0 (0%)	9 (81.8%)	2 (18.2%)		
	Retired	0 (0%)	4 (100%)	0 (0%)		
	Other	11 (14.5%)	37 (48.7%)	28 (36.8%)		
Do you have offspring?	No	49 (13.3%)	186 (50.4%)	134 (36.3%)	1.735	0.420
	Yes	6 (14.3%)	25 (59.5%)	11 (26.2%)		
Offspring sex	Female	0 (0%)	9 (100%)	0 (0%)	7.789	0.020
	Male	6 (18.2%)	16 (48.5%)	11 (33.3%)		
Was the offspring checked for testicular pain before?	No	4 (16%)	17 (68%)	4 (16%)	3.322	0.190
	Yes	2 (11.8%)	8 (47.1%)	7 (41.2%)		
Child diagnosed with testicular torsion before	Maybe	0 (0%)	2 (100%)	0 (0%)	3.006	0.557
	No	6 (15.8%)	21 (55.3%)	11 (28.9%)		
	Yes	0 (0%)	2 (100%)	0 (0%)		

Each knowledge parameter scored as 1 (yes) or 0 (no or maybe), and these scores were analyzed with the participant's ages. The analysis reveals a statistically significant negative correlation between age and awareness of testicular torsion (Pearson Correlation = -0.164, p = 0.001). It suggests that younger individuals in the study are more likely to be aware of testicular torsion, while older individuals are less knowledgeable about this condition (Table 5).

Table 5 Correlation between age and knowledge items (n=411).

Parameter	Correlation	Age, y
Heard of testicular torsion before	Pearson Correlation	-0.164
	P-value	0.001
Testicular torsion is an emergency	Pearson Correlation	-0.096
	P-value	0.053

4. DISCUSSION

Testicular torsion is a critical urological emergency that requires prompt diagnosis and intervention to preserve testicular function (Sharp et al., 2013; Laher et al., 2020; Jacobsen et al., 2020). This study aimed to assess the awareness and knowledge of testicular torsion among the residents of Arar City, Kingdom of Saudi Arabia, focusing on several critical sociodemographic factors. The findings provide insights into the current state of awareness and knowledge of testicular torsion in this region, shedding light on areas for potential improvement and educational interventions.

The results revealed that approximately 37.2% of participants had heard of testicular torsion before, indicating that a significant portion of the population has some awareness of testicular torsion. However, many participants remained unaware, with 46.5% having never heard of it and 16.3% being uncertain. This finding highlights the need to raise awareness about testicular torsion in the community (Alsulaimani et al., 2023). The study also explored the association between awareness and various sociodemographic factors. Notably, sex, age, marital status, educational level, and occupation were found to be significantly associated with cognition.

Male participants, those aged 18 to 29, single individuals, and those with secondary education or below exhibited higher awareness levels. Interestingly, participants who were not currently employed displayed the most heightened awareness. These findings suggest that awareness campaigns should reach specific demographic groups with lower attention, such as married individuals and those with higher education levels (Alsulaimani et al., 2023). These findings align with existing literature, which often reports a lack of awareness of testicular torsion among the general population (Yap et al., 2018; Friedman et al., 2016; Alsulaimani et al., 2023). Testicular torsion is a relatively rare condition, and its symptoms can be mistaken for less severe issues, contributing to delayed diagnosis.

Moreover, the study results reflect the need for educational initiatives tailored to different sociodemographic groups, as observed in previous studies that have emphasized the role of targeted awareness campaigns in increasing knowledge of testicular torsion (Yap et al., 2018; Alyami et al., 2019; Friedman et al., 2016; Alsulaimani et al., 2023). The results also indicate that while many participants knew testicular torsion, only 35.3% recognized it as a medical emergency. It is a critical finding as delayed treatment can result in irreversible damage to the testicle, underscoring the importance of public knowledge about the urgency of seeking medical attention (Alsulaimani et al., 2023). The results provide insights into the relationship between age and knowledge parameters related to testicular torsion.

The negative correlation between age and awareness of testicular torsion is a notable finding. It suggests that younger individuals are more likely to have knowledge about testicular torsion than older counterparts. It could be due to differences in educational backgrounds, exposure to health information, or generational factors that influence awareness of health conditions (Sharp et al., 2013). The statistically significant nature of this correlation highlights the importance of targeting older age groups in public health campaigns to enhance cognition and knowledge about testicular torsion, which can lead to more timely interventions and improved outcomes. Regarding the perception of testicular torsion as an emergency, the negative correlation with age, while not statistically significant, also indicates a trend worth noting.

Younger individuals seem more inclined to recognize testicular torsion as an urgent medical condition. The lack of statistical significance might be due to a smaller effect size or the need for a larger sample size to detect a significant difference. Nonetheless, this finding underscores the importance of continuing efforts to educate individuals of all age groups about the critical nature of testicular torsion to ensure that appropriate actions are taken promptly (Friedman et al., 2016; Alsulaimani et al., 2023). Younger participants, those who were not working, and individuals who acquired knowledge from healthcare providers demonstrated higher awareness of the condition's urgency (Friedman et al., 2016).

These findings resonate with the existing literature, which consistently emphasizes the need for public education regarding the emergency nature of testicular torsion (Yap et al., 2018; Alyami et al., 2019; Friedman et al., 2016). Delayed diagnosis and treatment are common contributors to testicular loss in cases of torsion, making it crucial for individuals to recognize the urgency and seek immediate medical attention.

Implications and Recommendations

The findings of this study have important implications for public health initiatives in Arar City and similar regions. To improve awareness and knowledge of testicular torsion, targeted educational programs should be developed, considering the sociodemographic variations identified in this study. These programs should emphasize the signs and symptoms of testicular torsion, stress its status as a medical emergency, and provide guidance on seeking prompt medical care. Additionally, healthcare providers are vital in disseminating information about testicular torsion to the public. Collaborative efforts between healthcare professionals, educational institutions, and media outlets can enhance public awareness through informative campaigns and outreach programs.

5. CONCLUSION

In conclusion, this study provides valuable insights into the current state of awareness and knowledge of testicular torsion among the residents of Arar City, Kingdom of Saudi Arabia. While some participants exhibited attention, there is room for improvement,

particularly in recognizing testicular torsion as a medical emergency. Tailored educational interventions targeted at specific demographic groups can help bridge these knowledge gaps and ultimately contribute to the early diagnosis and treatment of testicular torsion, thereby preserving testicular function and improving patient outcomes.

Acknowledgment

We thank the participants who were all contributed samples to the study.

Author contributions

The authors confirm their contribution to the paper as follows: Study conception and design: 1. Amin; data collection: 1. Irfan; analysis and interpretation of results: 1. Sarwar, 2. Naif; draft manuscript preparation: 1. Muhannad, 2. Shehab. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the local bioethics committee at Northern Border University with decision number (31/44/H).

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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