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# Knowledge, awareness and attitudes of adults towards the practice of testicular self-examination in the Kingdom of Saudi Arabia: A cross sectional study

**Akram Bokhari**[1], **Osama Alnizari**[2*], **Tamara Hafiz**[3], **Akram F Aljohani**[4], **Naif Alnoman**[4], **Ranim F Alhejaily**[2], **Saffanah F Alhejaili**[4]

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**Authors' Affiliation:**
[1]Department of Urology, College of Medicine, University of Hail, Hail, Kingdom of Saudi Arabia
[2]College of Medicine, University of Hail, Hail, Kingdom of SaudiArabia
[3]College of public health, Umm Al Qura University, Makkah, Kingdom of Saudi Arabia
[4]College of Medicine, Taibah University, Medina, Kingdom of Saudi Arabia

[*]**Corresponding author**
College of Medicine, University of Hail, Hail,
Kingdom of SaudiArabia
Email: alnizariosama@gmail.com

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## ABSTRACT

*Introduction:* The appearance of swelling may be temporary in certain circumstances, but it may also be an indication of danger in others. There is evidence that a regular self-exam can successfully detect testicular issues in their early stages, including testicular cancer. Testicular self-examination is therefore advised. *Aims:* Measuring the prevalence of testicular swelling in males in Saudi Arabia, the awareness knowledge of the adults toward the practice of testicular self-examination and investigating the role of social and demographic factors in their level of awareness and knowledge. *Methodology:* From August 2021 to March 2022, 3,500 adult participants from all regions of Saudi Arabia, between the ages of 18 and 50 participated in a cross sectional survey. *Results:* Most of the participants had limited knowledge and compared to the other participants, most of them belonged to the age group (18 to 25 years old), unmarried, bachelor's degree holders and residents of Mecca. In terms of the frequency of testicular swelling in men, 668 individuals reported having it and 191 people detected it through self-examination of the testicles. *Conclusion:* Shedding light on launching educational initiatives on testicular self-examination and its significance and boosting people's self-efficacy, particularly fathers.

**Keywords:** Testicular Swelling, Scrotal Swelling, Self-Testicular Examination, Young Adult Awareness

## 1. INTRODUCTION

The male reproductive system may be plagued with a variety of issues, such as testicular cancer, a tumor that grows in the testicles (Garner et al., 2005a). According to statistics, testicular cancer affects roughly one in 500 males under 50 and nearly a quarter of those who have it die. It is the most frequent type of cancer among men, especially those between the ages of 15 and 34 (Ghazarian et al., 2018; Manecksha & Fitzpatrick, 2009). Since the middle of the 20th century, testicular cancer has been present in all of the following nations: The North (Adami et al., 1994), Canada (Liu et al., 1999), England (Nur et al., 2008) and the United States (Zheng et al., 1996). As for Saudi Arabia, published national data are absent there is a severe shortage of information on testicular cancer among Saudi citizens. However, there was a study conducted previously on testicular cancer in adults showed that registered 1004 cases of testicular cancer between 1994 and 2013, with the incidence rate increasing significantly over time to 94 cases per year in 2013. The age of the patients ranged from 15–93 years, with an average age was 34.5 years (Abomelha et al., 2017). Testicular cancer is the third most common malignancy among males between the ages of 18 and 50, despite advances in therapy (Cronholm et al., 2009). Thus, if testicular cancer is discovered early, the survival percentage is greater than 90% (Ghazarian et al., 2018; Manecksha & Fitzpatrick, 2009).

The National Health Service advises, men, to see a general practitioner if they experience any of the following symptoms in their testicles: A lump, swelling, change in shape, change in sensation, the different size of one testicle, or nagging pain, where testicular swelling may be an indication of testicular cancer. Although testicular swelling should be highlighted as a sign of testicular cancer, the majorities of cases are caused by benign conditions such as a cyst or enlarged testicular veins varicocele (Moch et al., 2022).

The general rule of thumb when it comes to a swollen testicle is that you should consult a doctor as soon as the swelling appears, in order to complications if the reason is cancer, serious trauma, infection or a varicocele. It may be transient in some circumstances, but in some cases, there is permanent damage to the testicular tissue and it may be challenging to have children or preserve fertility or maintain appropriate testosterone levels (Moch et al., 2022). If testicular cancer is detected and managed at an early stage, it can be cured, so the possibility for employing a cheap technology for the early identification of testicular malignancies like TSE is significant (Ugboma & Aburoma, 2011).

Therefore, it is recommended to perform testicular self-examination (TSE) for early detection and management of testicular cancer in its early stages and to raise the cure rate (Bresciani et al., 2021; Fard-Esfahani et al., 2016). In fact, evidence shows that routine self-examination can effectively identify testicular problems in their early stages, including testicular cancer. The risk of death and the likelihood that it will be treated are both reduced the earlier the testicles are discovered (Rudberg et al., 2005a; Stephenson et al., 2019). Due to this, it's critical to increase public knowledge about testicular cancer, place an emphasis on early detection and control subjects and educate males in high-risk groups about the TSE process. Therefore, this study aims to find out the duration of the prevalence of testicular swelling in males in Saudi Arabia, in addition to measuring the awareness and knowledge of the adults, in all regions of the Kingdom of Saudi Arabia about the importance of self-examination of the testicles and investigating the role of social and demographic factors in their level of awareness and knowledge.

## 2. MATERIALS AND METHODS

**Sampling and Sample size**

The study utilized a descriptive cross-sectional web-based survey to collect quantitative data via a questionnaire that assessed the prevalence and awareness of the practice of testicular self-examination among adults in the Kingdom of Saudi Arabia. A representative sample (N=3,500) took part in the survey. The study took place from August 2021 to March 2022.

**Preparing the study instrument**

The researchers and research supervisor created a structured questionnaire with 31items after doing a thorough literature review and consulting with specialists in the field. This helped to ensure that all necessary information was included and that the objectives of the study were addressed. The questionnaire was designed to gauge participants' knowledge about and attitudes regarding TSE. The demographic intelligence collected from participants included their age, gender, nationality, place of residence, level of education and marital status.

The questionnaire was self-administered and took 4 to 8 minutes to complete. The categories were as follows:

1. Acceptance of participation in the questionnaire.
2. Socio-demographic characteristics, including age, gender, place of residence, nationality, marital status and educational level.

3. Investigation through the level of awareness, knowledge and attitude of the participants about testicular swelling and testicular self-examination.
4. Investigation of the frequency of testicular swelling in males across the entire Kingdom of Saudi Arabia.

**Data reliability and quality**

Reliability of the questionnaires was pre checked before the beginning of the real data collection process, as the study instrument was evaluated on ten randomly selected males of different age groups. Any issues were dealt with accordingly and all modifications were made to make the survey simpler and more concise. Each respondent received the questionnaire once. Based on the scoring system, reliability testing of the knowledge scale revealed a Cronbach's alpha of 0.709.

**Statistical analyses**

Data processing followed data extraction, as all descriptive and statistical analyzes were performed via IBM SPSS statistical software version 22 (SPSS, Inc Chicago, IL). For the awareness and knowledge items, each correct answer was valued at one point the separate total scores for the different items were calculated. Participants were deemed to have poor awareness if their scores fell below (3 points) of the possible total. If they scored (3 points or higher), they were deemed to have good awareness. All variables were described using frequency distributions and percentage distributions (demographic data, items of awareness, knowledge and attitudes). Two tailed tests were used to statistically assess the data. Statistical significance was defined as a p-value of 0.05. Tables, graphs and pie charts are used to display all results.

## 3. RESULTS

3500 participants from various parts of the Kingdom of Saudi Arabia completed the survey. From August 21 to October 3, 2021, a total of 43 days were devoted to the responses. All participant responses to questions assessing awareness, knowledge and attitudes toward testicular self-examination were examined. Then, the participant's awareness and knowledge levels were measured based on their responses and the score of their awareness level was tested whether there was an association between the score of their awareness and the socio demographic data of the participants, including age, gender, region, nationality, marital status, education levels and residence.

**Table 1** Selected characteristics of the sample and the association with the awareness and knowledge level regarding testicular self-examination, in Saudi Arabia.

| characteristics | | *N=3500* | *%* | *Good awareness* | | *Poor awareness* | | *P* |
|---|---|---|---|---|---|---|---|---|
| Age in year | 18-25 | 1542 | (44.1) | 318 | (9.1) | 1224 | (35) | 0.000* |
| | 25-30 | 934 | (26.7) | 241 | (6.9) | 693 | (19.8) | |
| | 30-40 | 511 | (14.6) | 147 | (4.2) | 364 | (10.4) | |
| | 40-50 | 296 | (8.5) | 67 | (1.9) | 229 | (6.5) | |
| | Less than 18 | 85 | (2.4) | 14 | (0.4) | 71 | (2) | |
| | More than 50 | 132 | (3.8) | 19 | (0.5) | 113 | (3.2) | |
| Gender | Male | 3045 | (87) | 709 | (20.3) | 23363 | (66.7) | 0.353 |
| | Female | 455 | (13) | 97 | (2.8) | 58 | (10.2) | |
| Nationality | Saudi | 3242 | (92.6) | 742 | (21.2) | 2500 | (71.4) | 0.481 |
| | Non-Saudi | 258 | (7.4) | 64 | (1.8) | 194 | (5.5) | |
| Residence | Urban | 3026 | (86.5) | 708 | (20.2) | 23183 | (66.2) | 0.191 |
| | Rural | 474 | (13.5) | 98 | (2.8) | 76 | (10.7) | |
| Marital status | Married | 1479 | (42.3) | 382 | (10.9) | 10971 | (31.3) | 0.000* |
| | Unmarried | 2021 | (57.7) | 424 | (12.1) | 597 | (45.6) | |
| Education | Elementary/Intermediate | 67 | (1.9) | 15 | (0.4) | 52 | (1.5) | 0.000* |
| | High school | 743 | (21.2) | 137 | (3.9) | 606 | (17.3) | |
| | Bachelor's | 2388 | (68.2) | 549 | (15.7) | 1839 | (52.5) | |
| | Master's/PhD | 271 | (7.7) | 101 | (2.9) | 170 | (4.9) | |
| | Uneducated | 31 | (0.9) | 4 | (0.1) | 27 | (0.8) | |

**: Significant. All associations were examined with $\chi 2$ analyses*

When investigating the socio demographic data of the participants, it was noted that the majority of study participants were Saudi Arabian, between the ages of 18 and 25, married, with a bachelor's degree and from an urban region (Table 1). When investigating the association of participants' socio demographic characteristics with their level of awareness and knowledge level regarding testicular swelling and testicular self-examination, it was shown the following:

Regarding the ages of the participants, the majority of them had inadequate awareness, with the age group (18 to 25 years) scoring the highest, followed by 25 to 30 years (19.8%), 30 to 40 years (10.4%) and 6.5%, (40-50 years old). The age range between 18 and over 50 had the lowest proportion of participants who had poor awareness. Given that the majority of the participants who came with low awareness belonged to the age group (18 to 25 years), there was a significant association between age and the level of poor awareness in those cases (p =.000). For gender differences, there was no significant association between gender and awareness level (p = 0.353), likewise, for differences in nationality (p = 0.353) and place of residence (p = 0.353). However, Marital status and good awareness were poorly associated (p =.000), with poor awareness present in 45.6% of unmarried participants and 31.3% of married participants, with unmarried persons displaying less awareness than married people. A significant association between education level and poor awareness was also found (p =.000), as most of the participants with good awareness had bachelor's degrees, as opposed to those with lower levels of education (Table 1).

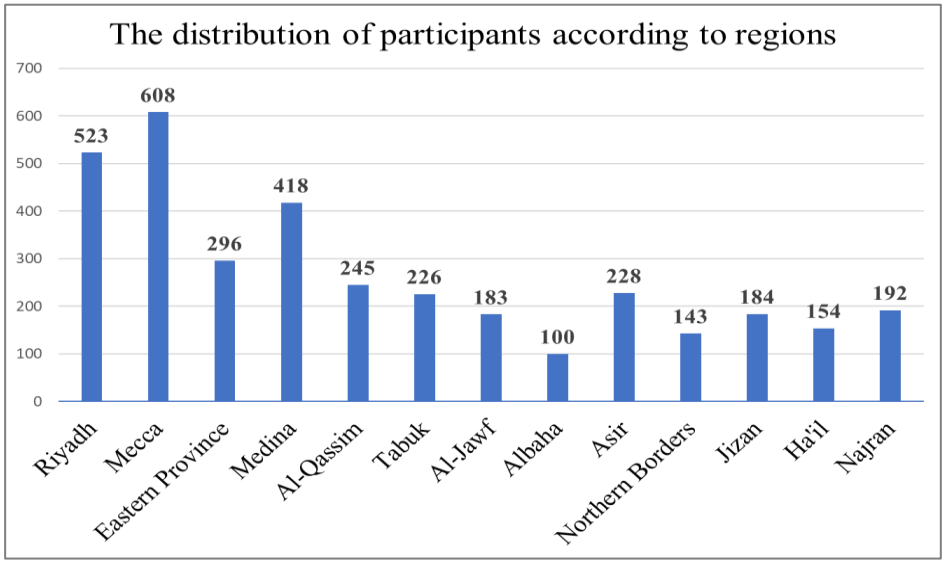


**Figure 1** The distribution of participant according to the regions.

According to the distribution of the participants who responded to the questionnaire, (608, 17.4%) of the participants living in the Mecca region, which formed the largest number of responses, then followed by the Riyadh region (523, 14.9%), then Madinah region was (418,11.9%). Then there was a close distribution in each of the regions: Eastern, Al-Qassim, Tabuk and Asir. Similarly, Najran, Jizan, Al-Jouf, Hail and the northern frontier followed in close distribution. The Al-Baha region had the lowest participant distribution (100, 2.9%), as well (Figure 1).

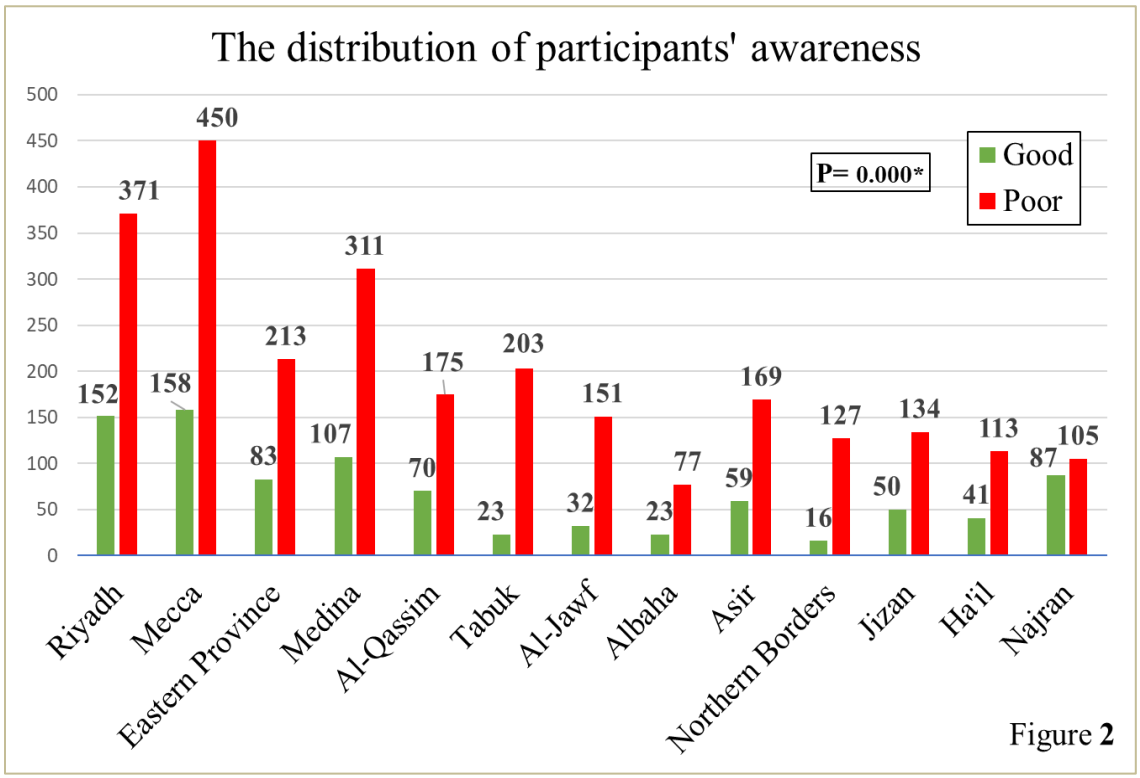


**Figure 2** Distribution of participants' awareness according to the regions.

According to the distribution of awareness, it was found that the majority of the participants who answered the questionnaire had a poor level of awareness and knowledge about testicular self-examination, compared to those who were distinguished by good awareness and knowledge Figure (2).

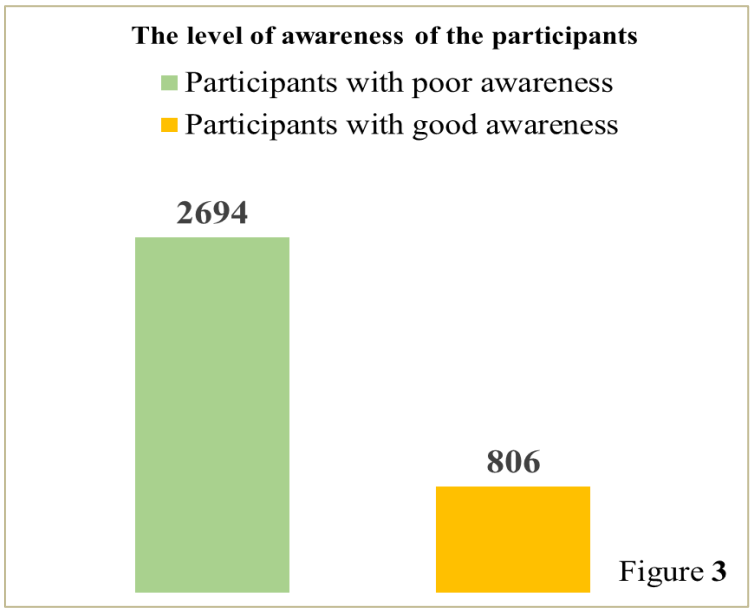


**Figure 3** The Participants' level of awareness toward testicular self-examination.

As a whole, the percentage of people with low awareness of testicular self-examination was (2694, 77%), whereas the percentage of those with good awareness was (806, 23%), according to the results of evaluating awareness and knowledge Figure (3).

**Table 2** The questions that were used to gauge participants' awareness and Knowledge toward testicular self-examination are listed in. The outcomes are described below:

| Awareness and Knowledge of testicular self-examination and its importance | | N | % |
|---|---|---|---|
| Did you know about testicular self-examination? | Yes (correct answer) | 916 | 26.2 |
| Did anyone have taught you how to do testicular self-examination? | Yes | 534 | 15.3 |
| | No | 2966 | 84.7 |
| If you know how to do testicular self-examination, will you do it regularly | Yes | 1912 | 64.7 |
| The testicular self-examination is performed every? | Month (correct answer) | 663 | 18.9 |
| | 3 months | 789 | 22.5 |
| | 6 months | 1087 | 31.1 |
| | annually | 961 | 27.5 |
| Do you think it's important to do testicular self-examination regularly even in the absence of any complaints or symptoms? | Yes (correct answer) | 2050 | 58.6 |
| Are you willing to teach the people around you how to do testicular self-examination and its importance? | Yes | 3304 | 94.4 |
| If there is a reason, preventing you from teaching the people around you, how to perform a TSE, what is it? | I found it embarrassing | 837 | 35.2 |
| | I prefer that a qualified person should teach how to do it | 1140 | 47.9 |
| | I don't see it as an important subject to know | 354 | 14.9 |
| | Other | 48 | 2 |
| How many times did you do testicular self-examination in the past year? | Never | 2582 | 73.8 |
| | Few times in the past year | 379 | 10.8 |
| | Few times in the past 6 months | 446 | 12.7 |
| | Every month | 93 | 2.7 |

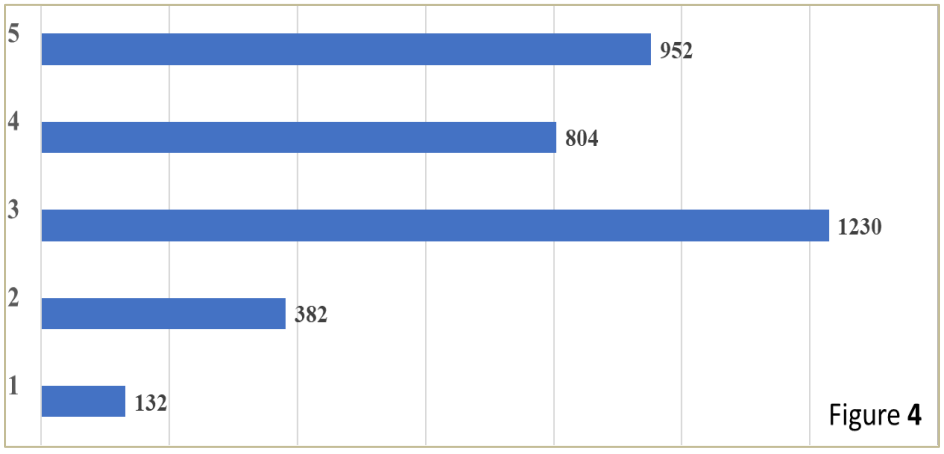


**Figure 4** shows the distribution of participants' opinions on the importance of testicular self-examination, rated its importance from 1 (not at all important) to 5 (very important):

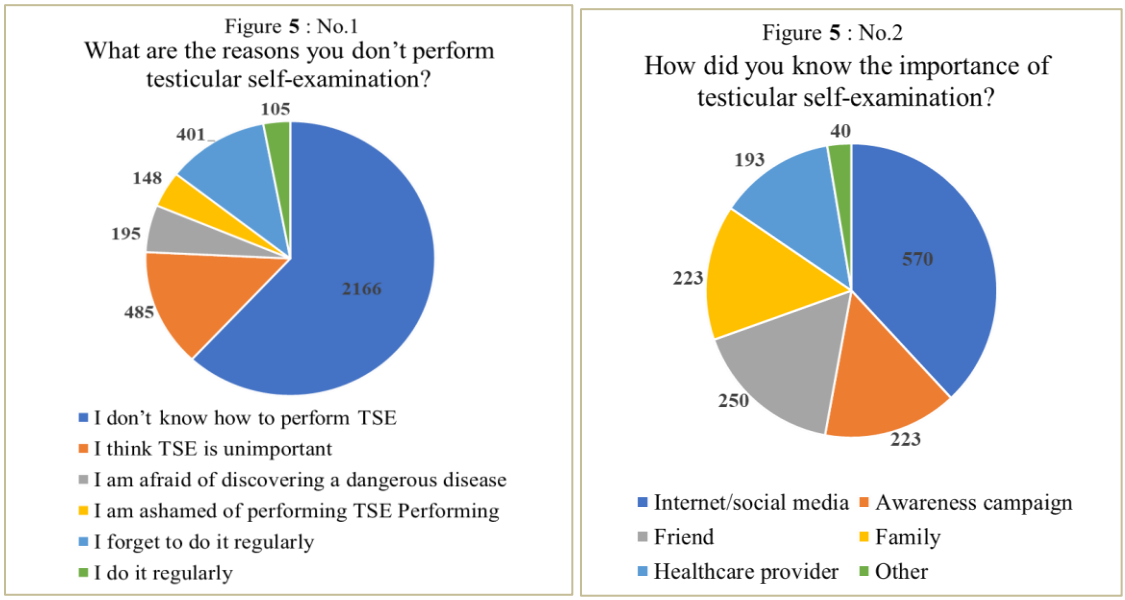


**Figure 5** (1) Participants' responses to reasons for performing a testicular self-examination; (2) Participants' responses to the importance of testicular self-examination

**Table 3** Questions that measured the prevalence of testicular swelling in adult males in the Kingdom of Saudi Arabia.

| The prevalence of testicular swelling in adult males in Saudi Arabia | | *N* | % |
|---|---|---|---|
| How did you notice this change? | Self-examination of the testicle | 191 | 28.6 |
| | During a visit to the doctor for another problem | 161 | 24.1 |
| | Accidentally | 316 | 47.3 |
| What did you do in that case? | Consult a doctor | 1921 | 54.9 |
| | I searched for the problem on the internet | 241 | 36.2 |
| | I consulted a relative/friend | 112 | 16.8 |
| | I did not do anything | 89 | 13.4 |
| | Other | 220 | 33 |
| If you saw a doctor, did you get a diagnosis? If yes, write it. | Spermatocele | 87 | 18.5 |
| | Varicocele | 124 | 26.4 |
| | Hydrocele | 59 | 12.6 |
| | spermatic cord | 32 | 6.8 |
| | Orchitis epididymitis | 58 | 12.3 |
| | Benign mass | 43 | 9.1 |
| | Tumor | 26 | 5.5 |
| | ectopic testis | 41 | 8.7 |
| What was your diagnosis? | Clinical examination | 278 | 55.2 |
| | (US) Ultrasound (US) | 147 | 29.2 |
| | MRI | 79 | 15.7 |
| What was the management you had by your doctor? | Non-surgical treatment (Drugs, chemotherapy, etc.) | 200 | 36.2 |
| | surgical treatment | 151 | 27.3 |
| | The condition did not require any treatment | 202 | 36.5 |
| After you knew about your case, how often did you do testicular self-examination? | Regularly | 155 | 25.7 |
| | In interrupted form. | 189 | 31.3 |
| | I haven't done it before | 259 | 43 |
| Did you know anyone that had been suffering | No | 2880 | 82.6 |

| | | | |
|---|---|---|---|
| from swelling/ mass in the testis or scrotum? | Yes, father | 83 | 11.2 |
| | Yes, son | 61 | 8.2 |
| | Yes, husband | 41 | 5.5 |
| | Yes, brother | 134 | 18 |
| | Yes, friend | 376 | 50.6 |
| | Other | 48 | 6.5 |
| How old was the person when he suffered from this case? | Under 18 years old | 162 | 18.5 |
| | 18-50 | 371 | 42.3 |
| | More than 50 years old | 130 | 14.8 |
| | I don't know | 214 | 24.4 |
| What are the signs and symptoms that you faced (Besides swelling/mass)? | Redness in the skin of the scrotum | 165 | 4.7 |
| | Secretions | 103 | 2.9 |
| | Nausea/vomiting | 90 | 2.6 |
| | Fever | 92 | 2.6 |
| | Hardening of the testicle | 128 | 3.7 |
| | I didn't have any other symptom | 315 | 9 |
| | Other | 34 | 1 |

## 4. DISCUSSION

Numerous issues with the male reproductive system, such as testicular cancer, which frequently affects young to middle aged men and is treatable if caught early, are possible (Garner et al., 2005) and (Rudberg et al., 2005). This study evaluated the knowledge, awareness and attitudes of Saudi society about testicular self-examination, as well as measured the prevalence of testicular swelling and methods of detection. Nearly three quarters of the participants had poor knowledge of testicular self-examination, it was discovered. Investigation into how social and demographic characteristics affected the participants' awareness levels revealed that age, social standing and educational attainment all significantly influence awareness.

The married individuals knew more about testicular self-examination than the single individuals. Age also had a crucial influence, with the results showing that those between the ages of 18 and 25 have higher levels of awareness than those at other ages. The participants' educational background also played a part, as those with high school, bachelors and master's degrees were more informed than those with primary, intermediate and uneducated. Regarding Testicular self-examination, 15.3% of the individuals expressed to have learned about testicular self-examination from others, whereas 84.7% expressed that no one had ever told them about it. When asked how frequently used the self-examination, 93 participants gave the right response (once a month), but 2582 people said never.

These findings are consistent with those of (Alamri et al., 2021), who looked at people's knowledge of testicular cancer and testicular self-examination in the Saudi Arabian province of Asser, according to the study, more than half of the sample group, was not familiar with testicular self-examination or the proper way to administer it. Also, the results are consistent with those of Alaradi et al., (2020), who reported that about four out of every five Bahrani men were unaware of the existence of testicular cancer and testicular self-examination. Additionally, the current research found that more than two thirds of those who said they did not know how to perform TSE would do so regularly if they did know. Besides, about half of the survey participants gave testicular self-examination a four or five out of five relevance rating its importance, stating that it is crucial to regularly self-examine even in the absence of any complaints or symptoms. Only (132, 3.7%) of respondents assigned testicular self-examination a score of one out of five, suggesting they may not be aware of its true significance. These findings are consistent with those of (Alaradi et al., 2020). According to their research, 84% of people think it's crucial to examine oneself.

The majority of participants acknowledged the helpful influence of healthcare professionals in helping them comprehend the significance of testicular self-examination. About 16.2% of the participants, or 570 participants, said that doctors, nurses and other healthcare providers are to blame for their awareness of the value of testicular self-examination. While some study participants expressed that their knowledge of the significance of testicular self-examination was influenced by various awareness campaigns, family and friends, when considering the impact of the awareness campaigns, (223, 6.4%) of study participants expressed that the awareness campaigns are to blame for their understanding of the significance of testicular self-examination. This result is consistent with several researches. (Alamri et al., 2021), (Atuhaire et al., 2019) & (Sawale et al., 2020), also suggested that the low levels of

Testicular self-examination knowledge are due to ineffective health programs and campaigns.

In terms of testicular self-examination performance, only a very small percentage roughly three out of every hundred said they do it regularly. Nine out of ten participants said they would be prepared to educate others about the importance of testicular self-examination, whereas nearly two thirds of research participants claimed that their lack of awareness was the reason they did not perform self-examination. The biggest excuse given by research participants for why they might not want to educate others was an embarrassment. These findings are consistent with prior studies on knowledge, attitudes and practice surrounding testicular self-examination (Alamri et al., 2021; Moore et al., 1999; Roy et al., 2017).

The strengths of this study come from the rarity of cross-sectional studies focusing on assessing the prevalence and awareness of testicular self-examination in a specifically Saudi environment. Because of the cultural and religious sensitivity surrounding the problems at hand, there is also a dearth of published research in this context discussing the inadequate provision of health education programs relating to male reproductive organs. These problems, along with the various local cultures, offer obstacles that make the growth of population awareness more difficult. Poor knowledge of the signs and problems of testicular cancer, as well as the necessity of testicular self-examination, leads to worse results, such as complications that can cause infertility or the testicle to stop producing testosterone.

To increase the generalizability of the findings, this study recruited people from each of the thirteen Saudi governorates, which is strength. There are, however, some restrictions on this study. First, even though the study's target age group ranges from 15 to 35 years old, recruiting volunteers younger than the legal consent age of 18 was not possible. Therefore, future research must focus on creating creative solutions to this issue that can enable the evaluation of awareness and prevalence among men under the age of eighteen. The second drawback is recall bias's vulnerability.

## 5. CONCLUSION

Despite the differences between the regions of the Kingdom, the results show that although there is a little bit of good awareness and knowledge among the population of the regions, there is a very high percentage of people who have a low level of awareness in addition to there are unfavorable feelings among the study community towards testicular self-examination and its importance, which calls for shedding light on the activation of programs Educational by incorporating education about testicular self examination and its importance, aimed at adults, into the curricula of health education programs delivered through the media or in health care facilities. This will help promote community awareness and practice and reduce deaths from highly treatable diseases. Besides, it is important to shed light on raising the selfefficacy of fathers, because of the importance of the role of fathers in raising the level of awareness of their young children about testicular swelling and the importance of conducting testicular self-examination and encouraging them to do so.

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**Author Contributions**

This manuscript has been the genuine labor of all authors.

**Ethical approval**

Ethical approval No: H-2021-194 was granted by the Hail University Medical Research Ethics Committee.

**Informed consent**

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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**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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