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RESEARCH ARTICLE

Perceptions and Knowledge of Testicular Cancer in the General Population of Saudi Arabia

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ABSTRACT

Testicular cancer (TC) is prevalent among young men, but public awareness and knowledge about it remain insufficient. This study evaluates Saudi Arabia's TC and testicular self-examination (TSE) awareness. TC primarily affects young and middle-aged men, with germ cell tumors being the most common. Early detection is crucial for better prognosis. However, awareness is lacking globally. The study emphasizes the importance of promoting TSE through education, especially in young adults, and highlights the need for tailored awareness campaigns to bridge knowledge gaps and facilitate early diagnosis. It is a cross-sectional study that included Saudi participants via social media platforms using a 21-question questionnaire to assess knowledge about testicular cancer (TC) and testicular self-examinations (TSEs). Data is analyzed by IBM SPSS 29 software. Our study involved 1592 participants in Saudi Arabia, primarily aged 18-25 (40.1%), with normal weight (42.9%) and Bachelor's degrees (61.6%) being predominant. TSE prevalence was 17%, with 16.9% familiar with accurate procedure & 45.5% considering it during warning symptoms. Knowledge about TC differed by age, education, province (Makkah and Riyadh), employment, marital status, and accommodation. Medical professionals showed higher TSE awareness (65.6%) than the general population (58.9%). Perceptions toward self-exam were influenced by BMI, Region, and Educational Level. The study's findings on testicular cancer awareness in the Saudi population provide a basis for focused health interventions. Customized campaigns, bridging gaps in health literacy, and collaboration between professionals and the public can enhance early detection and outcomes.

INTRODUCTION

TC is the most common cancer among men aged 18 to 50, but there is little effort to educate the public about TC and TSEs. This study aims to assess the level of knowledge of TC and TSEs among the Saudi population. TC is a rare cancer worldwide and locally. It is a tumor disorder that mainly affects young and middle-aged men, with about 7% of cases occurring in children. TC represents about 1% of all male cancers. Nearly half of all TC cases are in men in their 30s. Almost 98% of TC is germ cell tumors. They have a very good prognosis, especially if detected early with a survival rate of over 95% in five years. The main treatment is radical surgery along with radiotherapy and or cisplatin-based combination chemotherapy (1). The incidence of TC varies depending on geography, race, and socioeconomic status and is increasing with significant differences among countries. According to recent literature in 2020, the incidence of testicular cancer has been increasing in many countries due to more screening and awareness. However, the mortality rates remain low, with only 50,000 cases of Testicular carcinoma reported annually (1). In comparison to other more common urological cancers such as prostate, kidney, or bladder cancer, testicular cancer has a much lower incidence rate. For instance, in the United States, there were an estimated 191,930 new cases of prostate

cancer, 45,520 new cases of kidney cancer, and 62,100 new cases of bladder cancer in 2020 (2)(3). Histologically, Testicular carcinoma is divided into Germ cells tumors which represent Almost 85% of the reported cases, while paratesticular and gonadal stromal tumors represent only 15%. Germ cell tumors are further divided into seminomas and nonseminomas with 40.7% and 44.6% prevalence in Saudi Arabia respectively. Furthermore, 70.4% of the cases in the first decade were seminomas, while in the second decade 65.9% of the cases were noneminomas. Moreover, the most the commonly affected group is men in their 20-30 years (4). a study was conducted in Dhahran, Eastern region of Saudi Arabia in which they studied 19 cases of testicular cancer from 2006-2009, and half of the studied cases were seminoma and the other half were nonseminomas, with varying clinical presentations with most patients presenting with a scrotal mass (58%), and some with an abdominal mass (26%)(5). However, in the West region 42 cases of testicular cancer over a period of 11 years (2000–2010), with almost 62% of them being seminoma and 38% nonseminoma(6). More on that topic, El-Hsseiny has studied 270 cases of testicular cancer from KFSH Riyadh (1975–1997) and 85% of the tumors are seminomas(7). Early detection of testicular cancer has significant role in reducing mortality and increasing the survival rates, and prognosis of the disease(9). However, none of the scientific societies recommends a specific standard screening method for TC, and self-examination (TSE) is the most basic testing method available(10,11). The European guidelines state that TSE should be performed among young patients with a high risk of developing TC. Those risk factors include Caucasian ethnicity, Age, Cryptorchidism, Tumor in the second testicle, Patient height, and other risk factors like fertility disorders, hypocrisy, Klinefelter's syndrome, Down's syndrome, and HIV(10). Therefore, screening patients with these risk factors is essential. Along with detection, awareness is also an important factor and the lower the awareness the later the diagnosis will be therefore the prognosis won't be as good as we hope, and many studies have shown that the awareness and knowledge of testicular cancer aren't optimal. For example, a study in Poland aimed to assess the level of knowledge and awareness of testicular cancer in which 1077 male students from high schools and medical university students participated showed that there's a low knowledge of testicular cancer among the participants however medical students were able to some extent to differentiate TC from other pathologies such as spermatocele, hydrocele or varicocele in which it showed A low percentage (approx. 20–38%) of the participants have correctly identified a majority of well-known TC risk factors. (12). another cross-sectional study was done in turkey in which 345 participants were enrolled (50.4% were medical students) with the same goal as the previously mentioned study showed the same results (13). Another study at the University of Munich in which 473 students enrolled to find out the tendencies of medical students to perform testicular and breast self-examination and associated factors. And the rate of regular self-examination is high in medical students in contrast to previous studies on young adults and non-medical personnel (14). It is important to explore the existing perceptions and understandings of testicular cancer in the general population of Saudi Arabia in order to assess the level of knowledge and awareness. However, there have been few studies focused specifically on Saudi Arabians' perceptions and knowledge of testicular cancer. It appears from the available literature that Saudi citizens are severely deficient in information regarding testicular cancer. (Bokhari et al., 2022) https://scite.ai/reports/10.54905/disssi/v26i129/ms492e2515. In Saudi Arabia, limited research has been conducted on public perceptions and knowledge of testicular cancer. In light of the lack of information in this area, it is very difficult for researchers to assess the level of awareness and knowledge of testicular cancer among the general public. When it comes to the number of cases in Saudi Arabia, the Saudi Cancer Registry (SCR) reported 1004 TS cases from 1994 to 2013, with a gradually considerable increase in incidence rate reaching an annual rate of 94 cases in 2013. However, Middle Eastern countries have a poor record at estimating TC cases but in Asia, there was a study done in 2020, in which 20651 cases were reported from both Asia and the middle east. The top five countries with the highest number of cases were India, China, Japan, Turkey, and Indonesia with respectively 4638 (22.7%), 4502 (21.8%), 2458 (11.9%), 1605 (7.8%) and 1497 (7.2%) cases (15). The age-standardized rate is generally low; Turkey leads with a reported ASR of 4 cases per 100,000 men followed by Japan and China which respectively reported 2.9 and 1.6 cases per 100,000 men recorded in 2012 and 2010 (16). Asia and the middle east seem to be following the rest of the world with a progressive and steady increase in cases every year, with just a few exceptions. With that said, Testicular self-examination is very important in that it enables men to identify any lumps or any physical abnormality of any kind in their testes. which can facilitate early detection and

presentation at hospitals in which the prognosis will be much better. in Saudi Arabia, the society's understanding of TC, and Testicular self-examination remains to be questioned due to the lack of literature on the mentioned topics. This further that such studies are needed to assess the level of knowledge and awareness about testicular self-examination and TC in general because those studies will enable us to find the gap and correct it to avoid late stages of TC and therefore promote self-examination in teenagers and young adults should be included in education curriculum due the high incidence of occurrence in young adults.

BACKGROUND AND SIGNIFICANCE

Testicular cancer is a rare malignancy internationally and locally too. It is a neoplasm disorder that mostly affects young and middle-aged men, with approximately 7% of cases occurring in children. Testicular cancer accounts for around 1% of all cancer in males. Almost half of all cases of testicular cancer are in men in their third decade. Roughly, 98% of testicular cancer is germ cell tumors. Which has a very good prognosis, especially when diagnosed early with a 5-year survival rate is over 95%. Radical surgery is the mainstay treatment in addition to radiotherapy and or cisplatin-based combination chemotherapy (1). The incidence of testicular cancer varies based on geography, race, and socioeconomic status and is on rising with substantial differences among countries. With more screening and awareness, the incidence of testicular cancer has been increasing in many countries, however, mortality rates remain low with 50,000 cases of Testicular carcinoma reported annually. A study was conducted in Dhahran, Eastern region of Saudi Arabia in which they studied 19 cases of testicular cancer from 2006-2009, and half of the studied cases were seminoma and the other half were nonseminomas, with varying clinical presentations with most patients presenting with a scrotal mass (58%), and some with an abdominal mass (26%)(5). However, in the West region 42 cases of testicular cancer over a period of 11 years (2000–2010), with almost 62% of them being seminoma and 38% nonseminoma(6). More on that topic, El-Hsseiny has studied 270 cases of testicular cancer from King Faisal Specialized Hospital and Research Center in Riyadh (1975–1997) and 85% of the tumors are seminomas (7). Early detection of testicular cancer has an effective role in reducing mortality and increasing the survival rates, and prognosis of the disease (9). However, none of the scientific societies recommends a specific standard screening method for TC, and self-examination (TSE) is the most basic testing method available (10,11). The European guidelines state that TSE should be performed among young patients with a high risk of developing TC. Those risk factors include Caucasian ethnicity, Age, Cryptorchidism, Tumor in the second testicle, Patient height, and other risk factors like fertility disorders, hypocrisy, Klinefelter's syndrome, Down's syndrome, and HIV(10). Therefore, screening patients with these risk factors is essential. Along with detection, awareness is also an important factor and the lower the awareness the later the diagnosis will be therefore the prognosis won't be as good as we hope and many studies have shown that the awareness and knowledge of testicular cancer aren't optimal. For example, a study in Poland aimed to assess the level of knowledge and awareness of testicular cancer in which 1077 male students from high schools and medical university students participated showed that there's a low knowledge of testicular cancer among the participants however medical students were able to some extent to differentiate TC from other pathologies such as spermatocele, hydrocele or varicocele (12). another cross-sectional study was done in turkey in which 345 participants were enrolled (50.4% were medical students) with the same goal as the previously mentioned study showed the same results (13). Another study at the University of Munich in which 473 students enrolled to find out the tendencies of medical students to perform testicular and breast self-examination and associated factors. And the rate of regular self-examination is high in medical students in contrast to previous studies on young adults and non-medical personnel (14). When it comes to the number of cases in Saudi Arabia, the Saudi Cancer Registry (SCR) reported 1004 TS cases from 1994 to 2013, with a gradually considerable increase in incidence rate reaching an annual rate of 94 cases in 2013. However, Middle Eastern countries have a poor record at estimating TC cases but in Asia, there was a study done in 2020, in which 20651 cases were reported from both Asia and the middle east. The top five countries with the highest number of cases were India, China, Japan, Turkey, and Indonesia with respectively 4638 (22.7%), 4502 (21.8%), 2458 (11.9%), 1605 (7.8%) and 1497 (7.2%) cases (15). The age-standardized rate is generally low; Turkey leads with a reported ASR of 4 cases per

100,000 men followed by Japan and China which respectively reported 2.9 and 1.6 cases per 100,000 men recorded in 2012 and 2010(16). Asia and the middle east seem to be following the rest of the world with a progressive and steady increase in cases every year, with just a few exceptions. Since 1990, countries such as Turkey, Japan, and China witnessed their cases doubling.). With that said, Testicular self-examination is very important in that it enables men to identify any lumps or any physical abnormality of any kind in their testes. which can facilitate early detection and presentation at hospitals in which the prognosis will be much better. in Saudi Arabia, the society's understanding of TC, and Testicular self-examination remains to be questioned due to the lack of literature on the mentioned topics. This further that such studies are needed to assess the level of knowledge and awareness about testicular self-examination and TC in general because those studies will enable us to find the gap and correct it to avoid late stages of TC and therefore promote self-examination in teenagers and young adults should be included in education curriculum due the high incidence of occurrence in young adults.

OBJECTIVES AND AIMS

Overall objective

- To assess the level of knowledge of testicular self-examination among the Saudi population and the medical field personnel
- Assessing the knowledge of testicular cancer among the Saudi population and medical personnel
- Compare both categories in the levels of perception and knowledge
- Awareness based on Socio-demographic Features

Research design and methods

Overview

This cross-sectional study was conducted using a structured questionnaire distributed online through social media platforms (Twitter, Whats App, and Telegram). The questionnaire consisted of 21 questions related to TC and TSEs. The sampling technique involved convenience sampling (nonprobability), and the process of sampling included whoever happened to be available at the time. The survey was completed by 1585 participants from the general population of Saudi Arabia. All participants were Saudis living in Saudi Arabia. And the Consent was taken prior to participation in the questionnaire.

Results

Our study "Perceptions And Knowledge Of Testicular Cancer In The General Population Of Saudi Arabia" included 1592 participants, out of which the majority were between aged 18-25 **(40.1%)**, followed by 26-35 **(33.8%).** BMI distribution indicated **(42.9%)** were normal weight and **(32.9%)** participants were overweight. The majority **(64.1%)** were primarily single**.** Educational levels vary, with Bachelor's Degree being the highest **(61.6%).** A notable portion was medical personnel **(30.5%).** Regarding occupation, employees were **(49.8%)** and students were **(34.0%)**. Most participants were earning 1000-10000 SAR **(6.2%).** Housing were mainly owned **(8.4%)** and rented **(5.7%).**

Table 1: Socio-demographic characteristics of participants assessed for perception and knowledge of testicular cancer self-examination (n=1592)

		Frequency (n)	Percent (%)
Age	18-25	639	40.1
	26-35	538	33.8
	36-45	219	13.8
	46-55	120	7.5
	56-65	50	3.1
	>65	26	1.6

BMI	Underweight	72	4.5
	Normal	683	42.9
	Overweight	523	32.9
	Obese Type 1	211	13.3
	Obese Type 2	55	3.5
	Obese Type 3	32	2.0
Marital Status	Single	1020	64.1
	Married	514	32.3
	Divorced	58	3.6
Educational Level	Elementary School	18	1.1
	Middle School	26	1.6
	Secondary School	326	20.5
	Bachelor's Degree	981	61.6
	Master	62	3.9
	Doctorate	28	1.8
	Diploma	151	9.5
Medical Personnel (Doctor, Med Student & Others)		486	30.5
Employment Status	Employee	793	49.8
	Student	542	34.0
	Other	257	16.1
Monthly Income	0-1000	76	4.8
	1000-10000	99	6.2
	10000-20000	35	2.2
	20000-30000	8	.5
	> 30000 SAR	5	.3
Accommodation Type	Owned	133	8.4
	Rental	90	5.7

Figure 1 shows the distribution of participants' places of residence in Saudi provinces. Makkah Province has the highest representation **(30%)**, followed by Riyadh **(24.6%)** and Aseer **(14.6%)** provinces.

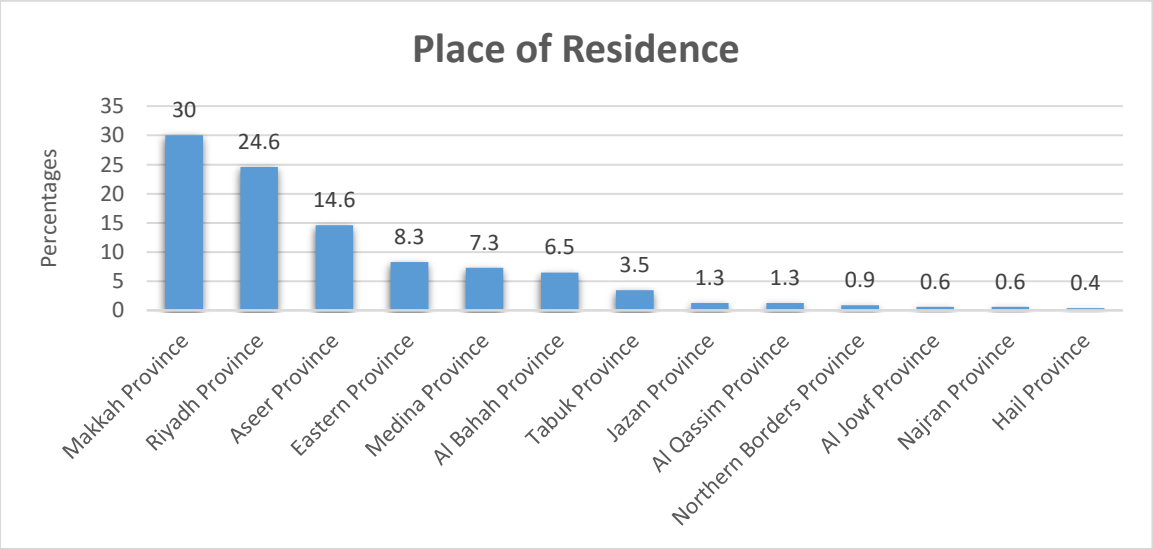


Figure 1: Place of residence of participants

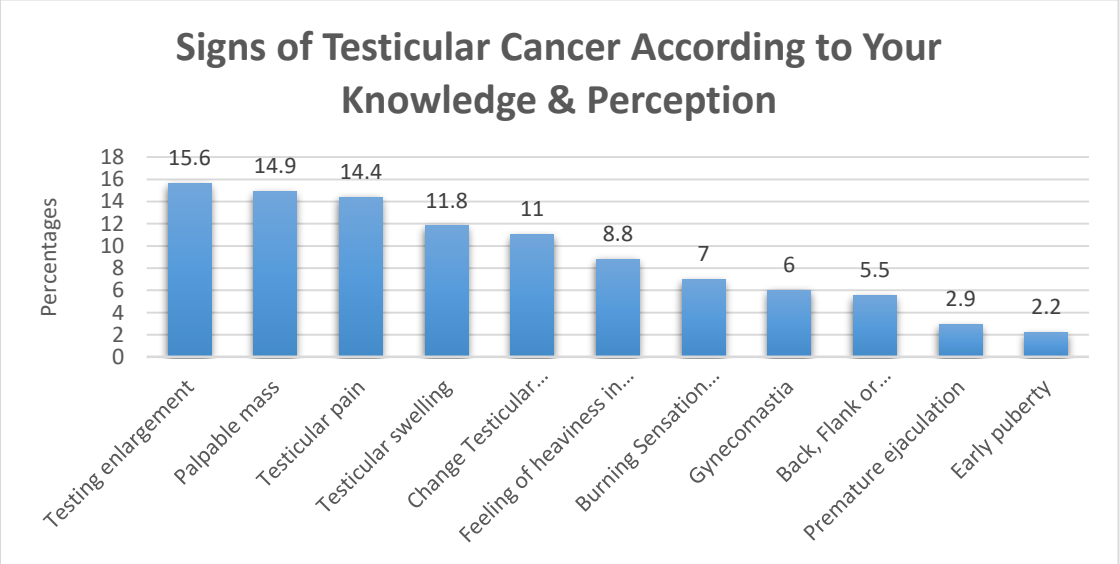
Table 2 shows the knowledge and perceptions of Testicular Cancer and Self-Examination (n=1592). About **17%** have conducted self-testicular examinations, with **16.9%** familiar with the procedure. The majority **45.5%** consider Self-examination during warning symptoms, while others do it periodically. **10.4%** know the Annual Movember Campaign while **23.4%** wanted to participate in it. **12.2%** of participants knew someone in the family who had been diagnosed with Testicular Cancer. According to their perception, the most common incidence age group was 46-65 years **(33.6%)** followed by 15-45 years **(31.9%)**.

Table 2: Knowledge & perception of participants about testicular cancer & self-examination (n=1592)

		Frequency (n)	Percent (%)
Ever Done Self Testicular Examination	Yes	271	17.0
You Know How to Do Examination	Yes	269	16.9
How often do you do self-Testicular Examination	Once a Year	104	6.5
	Once in 3 Months	98	6.2
	Once a Month	94	5.9
	Every week	59	3.7
	Everyday	34	2.1
How often do you think to do self-Testicular Examination	Whenever Feel Warning Symptoms in Testis	724	45.5
	Once a Year	289	18.2
	Once Three Month	267	16.8
	Every Week	174	10.9
	Every Week	100	6.3
	Every Day	36	2.3
Know About Annual Movember Campaign or Participate in it	Yes	165	10.4
Want to Participate in Annual Movember Campaign	Yes	373	23.4
	Maybe	887	55.7
Know Anyone Diagnosed with Testicular Cancer	Yes	195	12.2
Any Of Your Siblings Have Testicular Cancer/Tumor	Yes	57	3.6
Highest Incidence Age Group in Your Perception	< 14 Years	49	3.1
	15 - 45 Years	508	31.9
	46 - 65 Years	535	33.6
	> 65 Years	498	31.3

Participants' knowledge and perception of Testicular Cancer signs include testing enlargement **(15.6%)**, palpable mass **(14.9%)**, testicular pain **(14.4%),** swelling **(11.8%),** and texture/weight change **(11%) (Figure 2).**

Figure 2: Perception & knowledge of participants about testicular cancer signs



Perceived causes of Testicular Cancer include 1st-degree relative's cancer **(10.4%)**, past benign testis tumor **(10.2%),** migratory testicles **(10%),** genetic abnormalities **(9.3%),** and testicular injury **(9.1%)** ***(Figure 3)***.

Figure 3: Perception & knowledge of participants about causes of testicular cancer

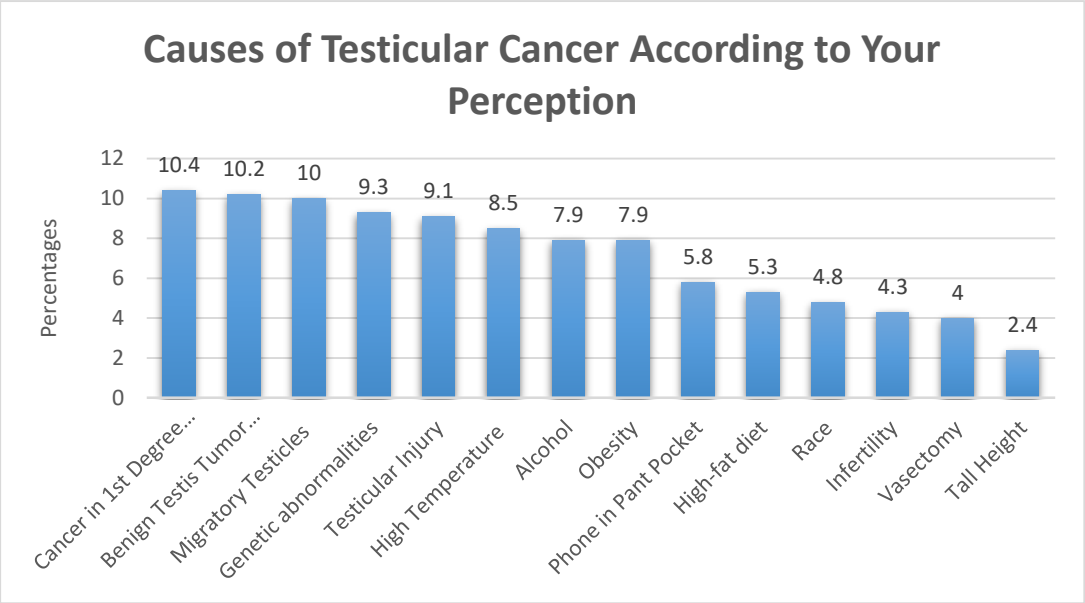


Table 3 compares testicular cancer knowledge levels between medical professionals and the general population, analyzing sociodemographic factors. The level of Knowledge about testicular cancer is not related significantly to medical professionals or the general population (p = 0.088). Age significantly impacted knowledge, peaking at 34.8% among those aged 18-25 and decreasing with age ***(p < 0.001)***. Normal BMI was associated with greater knowledge (42.2%) among participants ***(p = 0.036)***. Varied knowledge levels were noted among provinces, with Makkah and Riyadh having more knowledge significantly ***(p = 0.006)***. Education influenced knowledge, with bachelor's degree holders showing the highest awareness (63.1%, ***p = 0.025***). Employment status, marital status, and accommodation type also influenced the knowledge of testicular cancer ***(P < 0.001)***, while monthly income had less impact. Tailored educational efforts can enhance awareness, targeting specific demographics and professions.

Table 3: Comparison of knowledge level between medical personals and the general population and its association with other socio-demographic features

		Knowledge Level About Testicular Cancer		***Sig. Value***
		Poor Knowledge	***Higher Knowledge***	
Population Type	General Population	338(72.5)	768(68.2)	0.088
	Medical Professionals	128(27.5)	358(31.8)	
Age	18-25	247(53)	392(34.8)	***<0.001***
	26-35	14831.8)	390(34.6)	
	36-45	34(7.3)	185(16.4)	
	46-55	24(5.2)	96(8.5)	
	56-65	21(2.1)	40(3.6)	
	>65	3(0.6)	23(2.0)	
BMI	Underweight	30(6.6)	42(3.8)	***0.036***
	Normal	211(46.2)	472(42.2)	
	Overweight	129(28.2)	394(35.2)	
	Obese Type 1	62(13.6)	149(13.3)	
	Obese Type 2	17(3.7)	38(3.4)	
	Obese Type 3	8(1.8)	24(2.1)	
Province	Makkah	129(27.7)	348(30.9)	***0.006***
	Madinah	42(9)	75(6.7)	
	Riyadh	139(29.8)	253(22.5)	
	Aseer	49(10.5)	183(16.3)	
	Eastern	43(9.2)	89(7.9)	

	Al Bahah	28(6)	76(6.7)	
	Tabuk	14(3)	42(3.7)	
	Others	22(4.7)	60(5.3)	
Educational Level	Elementary School	10(2.1)	8(0.7)	***0.025***
	Middle School	7(1.5)	19(1.7)	
	Secondary School	107(23)	219(19.5)	
	Bachelor's Degree	271(58.2)	710(63.1)	
	Master	12(2.6)	50(4.4)	
	Doctorate	7(1.5)	21(1.9)	
	Diploma	52(11.2)	99(8.8)	
Employment Status	Employee	179(38.4)	614(52.5)	***<0.001***
	Student	195(41.8)	347(30.8)	
	Other	92(19.6)	165(14.8)	
Marital Status	Divorced	20(4.3)	28(3.4)	***<0.001***
	Married	104(22.3)	410(36.4)	
	Single	342(73.4)	678(60.2)	
Accommodation Type	Owned	64(13.7)	69(6.1)	***<0.001***
	Rental	36(7.7)	54(4.8)	
Monthly Income	0-1000 SAR	42(42)	34(27.6)	0.114
	1000-10000 SAR	42(42)	57(46.3)	
	10000-20000 SAR	10(10.0)	25(20.3)	
	20000-30000 SAR	4(4)	4(3.3)	
	> 30000 SAR	2(2)	3(2.4)	

Table 4 shows awareness levels of testicular self-examination among medical professionals and the general population, along with sociodemographic factors. Notable observations include higher self-examination awareness among medical professionals (65.6%) than the general population (58.9%) ***(p=0.012)***. Age, BMI, and monthly income showed limited influence on awareness. Regionally, awareness varied, with Makkah (29.4%) showing higher awareness among all provinces ***(p = 0.027)***. Education correlated with awareness, with bachelor's degree holders having the highest awareness (60.2%) and elementary education the lowest (1.6%, ***p = 0.019***). Employment status and marital status affected awareness, while owned accommodations (6.9%) exhibited greater awareness than rentals (4.3%, ***p < 0.001***).

Table 4: Comparison of awareness level of self-examination between medical personals and the general population and its association with other socio-demographic features

		Knowledge Level About Testicular Self Examination		***Sig. Value***
		Low Knowledge	***High Knowledge***	
Population Type	General Population	454(41.1)	652(58.9)	***0.012***
	Medical Professionals	167(34.3)	319(65.6)	
Age	18-25	248(39.9)	391(40.3)	0.254
	26-35	223(35.9)	315(32.4)	
	36-45	83(13.4)	136(14.1)	
	46-55	42(6.8)	78(8.1)	
	56-65	20(3.2)	30(3.1)	
	>65	5(0.8)	21(2.2)	
BMI	Underweight	36(5.8)	36(3.8)	0.481
	Normal	262(42.5)	421(43.9)	
	Overweight	197(32.1)	326(34.1)	
	Obese Type 1	86(14.1)	125(13.1)	
	Obese Type 2	22(3.6)	33(3.4)	
	Obese Type 3	13(2.1)	19(2.1)	
Province	Makkah	192(30.9)	285(29.4)	***0.027***
	Madinah	34(5.5)	83(8.5)	
	Riyadh	174(28.1)	218(22.5)	
	Aseer	75(12.1)	157(16.2)	
	Eastern	47(7.6)	85(8.8)	

	Al Bahah	44(7.1)	60(6.2)	
	Tabuk	24(3.9)	32(3.3)	
	Others	31(5.0)	51(5.3)	
Educational Level	Elementary School	2(0.3)	16(1.6)	***0.019***
	Middle School	10(1.6)	16(1.6)	
	Secondary School	117(18.8)	209(21.5)	
	Bachelor's Degree	396(63.6)	585(60.2)	
	Master	21(3.4)	41(4.2)	
	Doctorate	6(1.1)	22(2.3)	
	Diploma	69(11.1)	82(8.4)	
Employment Status	Employee	328(52.8)	465(47.9)	***0.002***
	Student	180(29.0)	362(37.3)	
	Other	113(18.2)	144(14.8)	
Marital Status	Divorced	16(2.6)	42(4.3)	***0.038***
	Married	219(35.3)	295(30.4)	
	Single	386(62.2)	634(65.3)	
Accommodation Type	Owned	66(10.6)	67(6.9)	***<0.001***
	Rental	48(7.7)	42(4.3)	
Monthly Income	0-1000 SAR	41(36)	35(32.1)	0.341
	1000-10000 SAR	51(44.7)	48(44.0)	
	10000-20000 SAR	16(14.0)	19(17.4)	
	20000-30000 SAR	2(1.8)	6(5.5)	
	> 30000 SAR	4(3.5)	1(0.9)	

Table 5 delves into perceptions of testicular cancer self-examination, comparing medical professionals and the general population across socio-demographic factors. There were positive perceptions towards the Testicular Self-Examination in both (Medical & General Population) groups (60.0% and 60.6%), with no significant disparity (p = 0.803). There were no significant differences in perception among different ages. Overweight and obese individuals had marginally higher negative perceptions ***(p = 0.048)***. The highest positive perceptions were observed in Makkah (29.0%) ***(p = 0.007).*** Positive perception rose with higher education; bachelor's degree holders exhibited the highest (62.8%, ***p = 0.041***). Employment status, marital status, and accommodation type had less influence on perceptions.

Table 5: Perception of self-examination between medical personals and the general population and its association with other socio-demographic features

		Perception of Testicular Cancer Self-Examination		***Sig. Value***
		Negative Perception	***Positive Perception***	
Population Type	General Population	442(40.0)	664(60.0)	0.803
	Medical Professionals	191(39.4)	295(60.6)	
Age	18-25	251(39.7)	388(40.5)	0.474
	26-35	209(33.0)	329(34.3)	
	36-45	84(13.3)	135(14.1)	
	46-55	53(8.4)	67(7.0)	
	56-65	26(4.1)	24(2.5)	
	>65	10(1.6)	16(1.7)	
BMI	Underweight	20(3.2)	52(5.5)	***0.048***
	Normal	273(43.8)	410(43.0)	
	Overweight	226(36.3)	297(31.2)	
	Obese Type 1	78(12.6)	133(14.0)	
	Obese Type 2	16(2.6)	39(4.1)	
	Obese Type 3	101.6)	22(2.3)	
Province	Makkah	199(31.4)	278(29.0)	***0.007***
	Madinah	47(7.4)	70(7.3)	
	Riyadh	175(27.6)	217(22.6)	
	Aseer	71(11.2)	161(16.8)	
	Eastern	44(7.0)	88(9.2)	

	Al Bahah	44(7.0)	60(6.3)	
	Tabuk	16(2.5)	40(4.2)	
	Others	37(5.8)	45(4.7)	
Educational Level	Elementary School	9(1.4)	9(0.9)	***0.041***
	Middle School	18(2.8)	8(0.8)	
	Secondary School	138(21.8)	188(19.6)	
	Bachelor's Degree	379(59.9)	602(62.8)	
	Master	24(3.8)	38(4.0)	
	Doctorate	12(1.9)	16(1.7)	
	Diploma	53(8.4)	98(10.2)	
Employment Status	Employee	315(49.8)	478(49.8)	0.715
	Student	221(34.9)	321(33.5)	
	Other	99(15.3)	160(16.7)	
Marital Status	Divorced	29(4.6)	29(3.0)	0.259
	Married	200(31.6)	314(32.7)	
	Single	404(63.8)	616(64.2)	
Accommodation Type	Owned	44(7.0)	89(9.3)	0.096
	Rental	30(4.7)	60(6.3)	
Monthly Income	0-1000 SAR	28(37.8)	48(32.2)	0.683
	1000-10000 SAR	30(40.5)	69(46.3)	
	10000-20000 SAR	10(13.5)	25(16.8)	
	20000-30000 SAR	4(5.4)	4(2.7)	
	> 30000 SAR	2(2.7)	3(2.0)	

DISCUSSION

Testicular cancer is a significant public health concern, particularly among young men. The key findings from our study "Perceptions and Knowledge of testicular cancer and Self-examination in the general population and the medical personnel of Saudi Arabia" provide valuable insights into the awareness, knowledge, and perceptions of testicular cancer and self-examination within the Saudi population. This section sheds light on important findings in detail, highlighting the implications for healthcare strategies and the potential for targeted interventions.

Our study participants exhibit a diverse demographic profile, encompassing a broad age spectrum. Most participants are between the ages of 18 and 25 (40.1%) and 26 to 35 (33.8%). This distribution is especially important in the context of studying TSE & awareness about testicular cancer, a disease that primarily affects young people & self-examinations (16, 17). The study cohort's higher prevalence of single participants (64.1%) highlights the need for targeted health education efforts aimed at this specific demographic. Given their likely lack of exposure to TC and TSE information in family contexts, targeting informative messages to this group could result in significant benefits (18). By addressing their unique needs and potential information gaps, we can empower these individuals to make informed decisions about their health and well-being, potentially contributing to the early detection and effective management of testicular cancer.

Educational attainment is a crucial factor influencing health knowledge and awareness about Testicular Cancer Self-Examination. The prevalence of participants with a Bachelor's Degree (61.6%) offers an encouraging opportunity for effective health education campaigns (19). Furthermore, the involvement of medical personnel (30.5%) in the study sample highlights their potential role as advocates for disseminating accurate health information regarding self-examination.

The findings reveal a gap in awareness and knowledge regarding testicular cancer TSE. While 17% of participants reported having conducted self-testicular examinations, only 16.9% were familiar with the proper procedure. This is in contrast to a previous study in which almost all participants were unaware of & don’t have enough knowledge about self-examination for testicular cancer (20). This emphasizes the need for comprehensive educational initiatives that not only stress the importance of self-examination but also provide guidance on its correct execution.

Almost half of the participants (45.5%) view self-examination during warning signs as a demonstration of concern and acknowledgment of its importance for early detection. This suggests that the participants in our study have a certain level of awareness about the warning signs of

testicular cancer (21). However, the relatively low awareness (10.4%) of the Annual Movember Campaign suggests an opportunity to enhance engagement with awareness campaigns that focus on men's health issues. A notable proportion of participants (12.2%) had a personal connection to testicular cancer through a family member's diagnosis. This underscores the potential influence of personal experiences in raising awareness, encouraging proactive health behaviors, and promoting self-examination practices Age plays a significant role in determining knowledge levels about testicular cancer. The highest knowledge rate (34.8%) among participants aged 18-25 emphasizes the need to focus health education initiatives on this age group. Additionally, regional disparities in knowledge levels, with Makkah and Riyadh exhibiting greater awareness, highlight the importance of developing targeted campaigns that address regional variations(23)(24). Educational level is a strong predictor of knowledge and awareness about TSE. Bachelor's degree holders exhibited the highest awareness (63.1%, p = 0.025), highlighting the need for educational materials that cater to diverse educational backgrounds for maximum impact(24). The findings of our study have significant implications for healthcare strategies aimed at improving awareness of testicular cancer and self-examination practices. The notably higher awareness of testicular self-examination (TSE) among medical professionals (65.6%) compared to the general population suggests that healthcare providers can play a crucial role as advocates for promoting self-examination practices among the wider population(25).

The observed differences in cancer-related health literacy across various educational levels highlight the urgent need to address and bridge these knowledge gaps. Creating clear, accessible educational resources is crucial to mitigate these disparities and ensure that individuals from all educational backgrounds have equal access to essential health information.

Prospective research endeavors could duly explore the efficacy of multimedia campaigns, strategic utilization of social media platforms, and community engagement interventions in engendering heightened awareness and augmenting knowledge dissemination. This pursuit may yield insights into effective mechanisms for enhancing public consciousness. A synergistic approach, uniting medical practitioners, policy framers, and public health entities, stands poised to yield dividends in terms of heightened awareness and enhanced outcomes concerning testicular health. Collaboration across these spheres holds potential to effectuate meaningful improvements in the landscape of testicular health awareness and well-being.

CONCLUSION

The study's insights into the perceptions, knowledge, and awareness of testicular cancer and self-examination within the Saudi population offer a foundation for targeted health interventions. Tailoring awareness campaigns to specific demographics, addressing health literacy gaps, and fostering collaboration between healthcare professionals and the public can contribute to early detection, increased awareness, and improved health outcomes in relation to testicular cancer.

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