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Keywords: testicular cancer; self-examination; family medicine



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Article

Evaluation of Knowledge, Attitudes and Behaviors of Family Physicians about Testicular Cancer and Testicular Self-Examination

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Abstract: The aim of this study was to investigate the knowledge, attitudes, and behaviors of family physicians regarding testicular cancer and testicular self-examination. This study was conducted with 307 physicians, including family physician specialists, family physician residents, contracted family physician specialist assistants (SAHU), and general practitioners, who agreed to participate in the study. All participants were administered a 33-item questionnaire consisting of sociodemographic questions and questions about testicular cancer and testicular self-examination, developed through literature review. Data analysis was performed using SPSS 22.0 software. 307 family physician specialists, family physician residents, SAHU residents and general practitioners participated in the study. 10.4% of the participants were working as family medicine specialists, 67.4% as family physician assistants, 13.7% as SAHU residents and 8.5% as general practitioners. The mean time spent in the profession was found to be 5.93±5.89. 65.8% of the participants thought that they had partially sufficient knowledge about testicular cancers. 57.7% of the participants stated that they did not know how testicular self-examination was performed. 49.7% of male participants stated that they had never done testicular self-exam before. While 95.8% of the participants thought that regular testicular self-examination was beneficial, 71.0% stated that they did not recommend testicular self-examination to their male patients. 53.4% of the participants thought that testicular self-examination was important; It was determined that 79.2% of them thought it was as important as breast self-examination. The rate of stating that all of the risk factors presented for testicular cancer are risks was found to be statistically significantly higher in specialist family physicians than in general practitioners and resident family physicians. The study revealed that family physicians lacked sufficient knowledge about testicular cancer and testicular self-examination, leading them not to recommend self-testicular examination to patients due to inadequate knowledge. In light of these findings, although self-testicular examination may not be recommended as a screening method, increasing awareness and knowledge among both family physicians and the public is crucial.

Keywords: Testicular Cancer; Family Medicine; Self-Examination

Introduction

Cancer is a public health issue worldwide and is the second leading cause of death globally and in our country (1,2). One in every five people worldwide is diagnosed with cancer at some point in their life (3). Although mortality has decreased with advancements in medicine, cancer morbidity remains high, and its incidence is increasing (1). It is estimated that the number of cancer diagnoses, which was 19.3 million in 2020, will rise to 30.2 million by 2040 (4).

Testicular cancer is relatively rare, accounting for about 1% of all male tumors. However, it is the most common solid tumor in men aged 15-35 and its incidence has been increasing globally over the past few decades (5). The rising incidence of testicular cancer highlights the importance of early detection and treatment. The significance of early diagnosis and treatment of testicular cancer has been known for many years (6). With early diagnosis, the 5-year survival rate is known to be 99% (7). Before curative treatments were available, early diagnosis and treatment were among the few ways

to prevent mortality in young and healthy men. Although mortality rates have decreased with advancements in treatment, comprehensive chemotherapy or surgery required in cases of late diagnosis increases morbidity (8). Despite the value of early detection, various studies around the world have reported an average delay of 26 weeks from the first symptom to surgical diagnosis (6,8). These delays can be attributed to both patients and healthcare personnel. Patient-related causes of delayed diagnosis include ignorance, shame, fear of results, and fear of emasculation, leading to late presentation to healthcare services (9).

Self-examination of the testicles (TSE) is a simple, cost-free, non-invasive method that does not require technical tools and can be performed quickly, enabling the early diagnosis of testicular cancer or testicular diseases for all men. Additionally, regular monthly TSE helps in the early recognition of changes by familiarizing oneself with the testicular tissue (10,11). TSE increases the chance of early detection of testicular cancer by 9-10 times (12). Despite the increasing incidence of testicular cancer, studies have shown that men are not well-informed about testicular cancer and its prevalence, do not recognize its general symptoms, and almost never perform TSE (13–16). Similar results were found in a study conducted with final-year medical students in Nigeria (17).

The aim of this study is to evaluate family physicians' knowledge, attitudes, and behaviors regarding testicular cancer and testicular self-examination.

Materials and Methods

This descriptive and cross-sectional study was conducted between 01.08.2021 and 01.12.2021 with 307 physicians, including family medicine specialists, general practitioners, family medicine residents, and SAHU (contracted family physician) residents, who were working and voluntarily participated in the study. Data were obtained by administering a web-based online survey, which included informed consent and was created through a literature review, to family physicians suitable for participation in our study.

Data Collection Forms

Data were collected using a questionnaire developed by reviewing the literature and previous similar studies. The questionnaire included sociodemographic characteristics (age, gender, marital status, information about the institution and unit where they work, years in the profession, professional title), general information about testicular cancer, risk factors, characteristics of TSE (frequency of performance, when it should be done, how it is done), and symptoms of testicular cancer. Before administering the survey, it was given to 20 family physicians working in primary care at different institutions to evaluate the understandability of the survey and identify any issues with the questions.

Statistical Analysis

The data obtained from the study were analyzed using the SPSS (Statistical Package for Social Sciences) 18.0 software. In descriptive analyses, frequency data were presented as number (n) and percentage (%), while numerical data were presented as mean±standard deviation (SD) and minimum-maximum. The chi-square (χ^2) test and Fisher's Exact test were used to compare categorical data. The results were evaluated within a 95% confidence interval, with significance considered at $p < 0.05$.

Results

This study included 307 participants working as family medicine residents, family medicine specialists, and general practitioners. Of the participants, 55% (n=169) were male and 45% (n=138) were female. Among the participants, 67.4% (n=207) were family medicine residents, 13.7% (n=42) were SAHU residents, 10.4% (n=32) were family medicine specialists, and 8.5% (n=26) were general practitioners. The other sociodemographic characteristics of the participants are shown in Table 1.

Table 1. Sociodemographic Characteristics of Participants.

Variables	Categories	n	%
Gender	Female	138	45.0
	Male	169	55.0
Age (years) (Mean ± SS, Min-Max)*		30.54±6.01	(24.00-60.00)
Age category	24-40 years	288	93.8
	41-60 years	19	6.2
Marital status	Married	169	55.0
	Single	138	45.0
Profession	Family medicine	32	10.4
	General practitioner	26	8.5
	SAHU	42	13.7
	Family medicine resident	207	67.4
Instituion	ASM(Family Health Center)	78	25.4
	TSM(Community Health Center)	4	1.3
	Medical faculty	73	23.8
	City Hospital	125	40.7
	Training and Research hospital	23	7.5
	Other	4	1.3
Years in profession (years) (Mean ± SS, Min-Max)*		5.93±5.89	(0.00-37.00)

*: Mean ± Standard Deviation, Minimum-Maximum.

65.8% of the participants (n=202) believed they had partially sufficient knowledge about testicular cancer, while 32.2% (n=99) believed they did not have sufficient knowledge (Table 2).

Table 2. Distribution of Participants’ Knowledge Levels About Testicular Cancer.

	n	%
Are you adequately knowledgeable about testicular cancers?		
Yes	6	2.0
Partially	202	65.8
No	99	32.2
What is the most common age range for testicular cancers?		
0-15 years	26	8.5
16-35 years	157	51.1
36-55 years	35	11.4
Over 55 years	33	10.7
I don’t know	56	18.3
What are the risk factors for testicular cancer? *		
Family history	286	93.2

Genetic predisposition	289	94.1
Age	236	76.9
Mumps infection	137	44.6
Cryptorchidism	196	63.8
Estrogen use during pregnancy	120	39.1
All	113	36.8
I don't know	12	3.9
What is the most common risk factor for testicular cancer?		
Family history	78	25.4
Genetic predisposition	92	30.0
Cryptorchidism	70	22.8
I don't know	67	21.8

*Participants marked multiple options.

Male participants had statistically significantly higher rates of watching educational videos and reading informative sources about testicular cancer compared to female participants (p<0.001). The rate of not receiving any education other than medical school education about testicular cancer was significantly higher in female participants compared to male participants (p<0.001). Male participants were statistically significantly more likely to believe they had sufficient knowledge about testicular cancer and to have an understanding of testicular cancer risk factors (p values were 0.020 and 0.006, respectively). In male participants, the rates of reading informative sources about TSE, receiving at least one different type of education other than medical school, and knowing how to perform TSE were statistically significantly higher compared to female participants (p values were 0.009, 0.005, and <0.001, respectively). The rate of finding testicular examination beneficial was statistically significantly higher in female participants (p=0.006) (Table 3).

Table 3. Comparison of Knowledge and Education Status Regarding Testicular Cancer and TSE by Gender.

		Gender n (%) **			
Characteristic		Female(n=138) n (%)	Male(n=169) n (%)	χ^{2***}	p
Educational Video					
Yes		1 (0.7)	19 (11.2)*	13.799	<0.001
No		137 (99.3)	148 (88.8)		
Reading Informative Sources					
Yes		23 (16.7)	64 (37.9)*	15.818	<0.001
No		115 (83.3)	105 (62.1)		
Education					
Received different Education		32 (23.2)	81 (47.9)	19.991	<0.001
Did not receive different education		106 (76.8) *	88 (52.1)		
Adequate Knowledge Level					

Yes / Partially	84 (60.9)	124 (73.4) *	5.436	0.020
No	54 (39.1)	45 (26.6)		
Testis Ca Risk Factors				
I don't know	10 (7.2)	2 (1.2)	7.435	0.006
I am aware	128 (92.8)	167 (98.8)*		
Reading Informative Sources on TSE				
Yes	16 (11.9)	39 (23.1)*	6.811	0.009
No	122 (88.4)	130 (76.9)		
TSE Education				
Received different education	24 (17.4)	53 (31.4)*	7.890	0.005
Did not receive different education	114 (82.6)	116 (68.6)		
Knowledge of how to perform TSE				
Yes / Partially	42 (30.4)	88 (52.1)*	14.566	<0.001
No	96 (69.6)	81 (47.9)		
Perception of Testicular Examination as Beneficial				
Yes	137 (99.3)*	157 (92.9)	7.616	0.006
No	1 (0.7)	12 (7.1)		

TSE: Testicular Self-Examination. *Indicates the source of the difference. **Column percentages are provided. ***Chi-square test and Fisher’s Exact test were used.

Married participants included in the study were found to have statistically significantly higher rates of following up on testicular cancer patients and having a family history of testicular cancer compared to single participants (p values were 0.037 and 0.002, respectively). The rate of attending presentations on TSE was statistically significantly higher in single participants (p=0.029). The rate of attending educational presentations on testicular cancer was statistically significantly higher in participants aged 41-60 compared to those aged 24-40 (p=0.005) (Table 4).

Table 4. Comparison of Knowledge and Education Status Regarding Testicular Cancer and TSE by Marital Status and Age Category.

Marital Status**				
Characteristic	Married(n=169) n (%)	Single(n=138) n (%)	χ ^{2***}	p
Testicular Cancer Patient Follow-up				
Yes	52 (30.8)*	28 (20.3)	4.330	0.037
No	117 (69.2)	110 (79.7)		
Family History of Testicular Cancer				
Yes	17 (10.1)*	2 (1.4)	9.700	0.002
No	152 (89.9)	136 (98.6)		

Attendance to Presentations on TSE				
Yes	9 (5.3)	17 (12.3)*	4.793	0.029
No	160 (94.7)	121 (87.7)		
Age Category (years)**				
	24-40 (n=288)	41-60 (n=19)		
	n (%)	n (%)		
Attendance to Education Presentations				
Yes	23 (8.0)	6 (31.6)*	11.599	0.005
No	265 (92.0)	13 (68.4)		

TSE: Testicular Self-Examination. *Indicates the source of the difference. **Column percentages are provided. ***Chi-square test and Fisher’s Exact test were used.

The rates of family medicine residents following up on testicular cancer patients were found to be statistically significantly lower compared to general practitioners and family medicine specialists (p=0.003). Family medicine specialists were statistically significantly more likely to indicate that mumps infection, estrogen use during pregnancy, and other risk factors presented for testicular cancer were all risks compared to general practitioners and resident family physicians (p values were 0.001, 0.004, and 0.002, respectively). The rate of indicating that gynecomastia, hematuria, abdominal pain, and other symptoms presented for testicular cancer could all be symptoms of testicular cancer was also statistically significantly higher in family medicine specialists compared to the group of general practitioners and residents (p values were 0.008, 0.015, 0.003, and <0.001, respectively). The rate of receiving education other than medical school education about TSE was statistically significantly higher in family medicine specialists compared to general practitioners and residents (p=0.036) (Table 5).

Table 5. Distribution of Responses Regarding Testicular Cancer (Testis Ca) and Testicular Self-Examination (TSE) by Title Groups.

Title **					
Characteristic	Specialist (n=32) n (%)	Practitioner (n=26) n (%)	Resident (n=249) n (%)	χ^{2***}	p
Testicular Cancer					
Patient Follow-up					
Yes	16 (50.0)	8 (30.8)	56 (22.5)*	11.465	0.003
No	16 (50.0)	18 (69.2)	193 (77.5)		
Is Mumps Infection a Risk for Testicular Cancer?					
Yes	24 (75.0)*	9 (34.6)	104 (41.8)	13.825	0.001
No	8 (25.0)	17 (65.4)	145 (58.2)		
Is Estrogen Use during Pregnancy a Risk for Testicular Cancer?					
Yes	21 (65.6)*	8 (30.8)	91 (36.5)	10.896	0.004

No	11 (34.4)	18 (69.2)	158 (63.5)		
Are all factors risks for testicular cancer?					
Yes	21 (65.6)*	8 (30.8)	84 (33.7)	12.843	0.002
No	11 (34.4)	18 (69.2)	165 (66.3)		
Is Gynecomastia a symptom of testicular cancer?					
Yes	22 (68.8)*	15 (57.7)	105 (42.2)	9.554	0.008
No	10 (31.2)	11 (42.3)	144 (57.8)		
Is Hematuria a symptom of testicular cancer?					
Yes	22 (68.8)*	12 (46.2)	104 (41.8)	8.360	0.015
No	10 (31.2)	14 (53.8)	145 (58.2)		
Is Abdominal Pain a symptom of testicular cancer?					
Yes	22 (68.8)*	15 (57.7)	99 (39.8)	11.723	0.003
No	10 (31.2)	11 (42.3)	150 (60.2)		
Are all symptoms indicative of testicular cancer?					
Yes	22 (68.8)*	11 (42.3)	79 (31.7)	17.189	<0.001
No	10 (31.2)	15 (57.7)	170 (68.3)		
TSE Education					
Received at least one different education	14 (43.2)*	6 (23.1)	57 (22.9)	6.626	0.036
Did not receive any different education	18 (56.3)	20 (76.9)	192 (77.1)		

*Indicates the source of the difference. **Column percentages are provided. ***Chi-square test was used.

Participants who had a family history of testicular cancer or cancer in close relatives were found to have statistically significantly higher rates of attending educational presentations other than medical school education about testicular cancer, reading informative sources, receiving at least one different type of education, believing they had partially sufficient knowledge about testicular cancer, reading informative sources about TSE, and receiving at least one different type of education about TSE compared to participants without a family history of cancer (p values were 0.005, 0.003, <0.001, 0.036, <0.001, <0.001, respectively) (Table 6).

Table 6. Comparison of Participants’ Education and Knowledge Status Regarding Testicular Cancer and TSE by Family Cancer History.

Family cancer history **				
Feature	Present(n=19)	Absent(n=288)	χ^{2***}	p

	n (%)	n (%)		
Attendance to educational presentation				
Yes	6 (31.6)*	23 (8.0)	11.599	0.005
No	13 (68.4)	265 (92.0)		
Information source reading				
Yes	11 (57.9)*	76 (26.4)	8.712	0.003
No	8 (42.1)	212 (73.6)		
Education				
Received at least one different education	16 (84.2)*	97 (33.7)	19.566	<0.001
Did not receive any different education	3 (15.8)	191 (66.3)		
Adequate knowledge level				
Yes	-	6 (2.1)		
No	2 (10.5)	97 (33.7)	4.374	0.036
Partially	17 (89.5)*	185 (64.2)		
TSE Information Source Reading				
Yes	10 (52.6)*	45 (15.6)	16.599	<0.001
No	9 (47.4)	243 (84.4)		
TSE Education				
Received at least one different education	13 (68.4)*	64 (22.2)	20.245	<0.001
Did not receive any different education	6 (31.6)	224 (77.8)		

TSE: Testicular Self-Examination. *Indicates the source of the difference. **Column percentages are provided. ***Chi-square test and Fisher’s Exact test were used.

Participants with a history of following up on testicular cancer patients were found to have statistically significantly higher rates of reading informative sources and receiving at least one different type of education other than medical school education about testicular cancer, believing they had partially sufficient knowledge about testicular cancer, and reading informative sources about TSE compared to participants without a history of following up on testicular cancer patients (p values were 0.007, 0.010, 0.006, and 0.003, respectively). It was also determined that all participants with a history of following up on testicular cancer patients believed that regular testicular examinations were beneficial (Table 7).

Table 7. Comparison of Participants’ Education and Knowledge Status Regarding Testicular Cancer and TSE by Testicular Cancer Follow-up History.

Testicular Cancer Follow-up **				
Feature	Present(n=80)	Absent (n=227)	χ^{2***}	p
	n (%)	n (%)		
Informative source reading				

Yes	32 (40.0)	55 (24.2)	7.245	0.007
No	48 (60.0)	172 (75.8) *		
Education				
Received different education	39 (48.8)	74 (32.6)	6.634	0.010
No different education	41 (51.3)	153 (67.4) *		
Adequate knowledge level				
Yes	1 (1.3)	5 (2.2)		
No	16 (20.0)	83 (36.6)	7.428	0.006
Partially	63 (78.8)*	139 (61.2)		
TSE informative source				
reading				
Yes	23 (28.8)*	32 (14.1)	8.637	0.003
No	57 (71.2)	195 (85.9)		
Regular testicular examination				
Beneficial	80 (100.0)	214 (94.3)		
No beneficial	-	13 (5.7)		

TSE: Testicular Self-Examination. *It denotes the group from which the difference originated. **Column percentages are provided. ***Chi-square test was used..

Discussion

The knowledge, attitudes, and behaviors regarding testicular cancer (TC) and testicular self-examination (TSE) of 307 physicians, including family medicine specialists, general practitioners, and family medicine residents who voluntarily participated in our study, were examined. In our literature review, we did not come across any study examining the knowledge, attitudes, and behaviors of family physicians regarding TSE, hence we were unable to make comparisons with the literature. Previous studies have predominantly focused on young men, medical students, and allied health personnel.

In our study, 51.1% of participants correctly identified the most common age range for TC. While 63.2% of participants were unaware of all TC risk factors, 22.8% correctly identified the most common risk factor. Similarly, 63.5% of participants were unaware of all TC symptoms, while 59.7% correctly identified the most common symptom. Only 27% of participants correctly identified the testicle most commonly affected by TC, and only 16% correctly identified the level of curability with early diagnosis. Regarding TSE, 57.7% of participants did not know how it is performed, 18.6% gave the correct timing for its implementation, 64.8% correctly identified the age to start, and 46.6% gave the correct frequency. Furthermore, 71% of participants did not recommend TSE, with the main reason being a perceived lack of adequate knowledge (85.8%). Additionally, half of the male participants had never performed TSE.

Overall, our findings indicate that participants generally lacked sufficient knowledge about TC and TSE, with correct response rates close to or below the average. This deficiency in knowledge may be attributed to the reluctance of international and local health organizations to recommend TSE, the relatively low prevalence of TC, its exclusion from national cancer screening programs, and insufficient emphasis on TC and TSE in medical school curricula.

Ugwumba et al., in a study among final-year medical students in Nigeria, found that only 32.7% correctly identified the most common age range for TC, and only 8% correctly identified the rate of cure with early diagnosis. They also found that 58.9% of students considered TSE very important for male health, and 82.2% considered it as important as mammography and Pap smear. The proportion of students considering TSE as important as mammography is similar to our findings. Uyar et al. found that 73.4% of final-year medical students were unaware of TSE, and the TSE implementation

rate was 32.1%. Similarly, Bektaş et al. found that 91.8% of male nursing students lacked sufficient knowledge about TSE, 65.6% did not know how to perform TSE, and only 11.6% performed TSE. In another study, Altinel et al. found that 93.8% of students had never heard of TSE, 3.3% did not know how to perform it, and 18.8% of those who claimed to know how to perform it did so incorrectly. Göçgeldi et al., in a study among young adult males, found that only 20.7% had heard of TSE, 8.8% had performed it at least once, and 57.6% of those who had not performed it were unaware of the TSE technique. They also found that 69.8% of participants did not perform testicular examinations on patients diagnosed with or suspected of infertility, possibly due to the condition's association with urology rather than primary care.

Male participants in our study had significantly higher rates of watching educational videos and reading informative sources about TC compared to female participants. They were also more likely to consider themselves sufficiently knowledgeable about TC risk factors. Moreover, male participants had higher rates of reading informative sources about TSE, receiving at least one different type of education other than medical school education, and knowing how TSE is performed compared to female participants. We believe that this might be due to the fact that TC and TSE are specific to the male gender, and societal norms may lead women to be less interested in learning about conditions related to the male reproductive system.

Female participants were more likely to find testicular examination beneficial compared to male participants. This finding is consistent with a study by Frank E. and Harvey LK., which showed that female physicians are more likely to provide preventive advice than male physicians. In our study, participants aged 41-60 were more likely to attend presentations on TC, possibly due to the increased likelihood of attending such presentations with age.

Family medicine specialists had significantly more knowledge about TC risk factors and symptoms compared to other participants. They also had a higher rate of receiving different types of education outside medical school education about TC. Medical specialization appears to contribute to greater knowledge and expertise in TC and TSE.

Participants with a family history of TC were more knowledgeable about TC and TSE. Attending educational presentations and reading informative sources other than those provided in medical school were effective ways of acquiring more knowledge about TC. The heightened sensitivity and awareness of individuals who have experienced TC may contribute to this increased knowledge.

Participants with a history of following up on TC patients were found to have more knowledge about TC and TSE. This suggests that physicians who follow TC patients have more knowledge and expertise in this area.

Strengths and Limitations of the Study

Being the first study focusing on Testicular Self-Examination (TSE) among family physicians is a significant contribution to the literature and is one of the strengths of the study. Another strength is the inclusion of family physicians from various institutions, which enhances the generalizability of the findings. However, one limitation is the lack of a validity and reliability study for the scale or data collection form used in the research. Instead, a questionnaire form was developed based on studies in the literature, which is another weakness of the study.

Conclusion

The study revealed that family physicians lack sufficient knowledge about testicular cancer and Testicular Self-Examination (TSE), leading them to not recommend TSE to their patients due to inadequate awareness.

In light of these findings, although TSE is not currently recommended as a screening method, raising awareness on this topic is crucial. It is necessary to increase the knowledge level of family physicians and the community, organize informative meetings for family physicians, include this topic in the training programs of family medicine assistants, and assign projects related to this topic to 6th-year medical students and students in community-based medical education programs. We believe that these measures will increase awareness of testicular cancer and be highly beneficial.

Conflict of Interest: There is no conflict of interest.

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