

Investigation of knowledge, attitude and behaviors of university students on testicular cancer: results from two different cities

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ABSTRACT

Objectives: Testicular tumors are the most common malign tumor in men aged 15-35 years. Early diagnosis and treatment is crucial in testicular cancer because if detected at an early stage, testicular cancer can be completely cured. Because of this reason increase in awareness and regular testicular self-examination (TSE) is recommended in the early diagnosis of testicular cancer. This study aimed to investigate the knowledge, attitude and behaviors of students about testicular cancer and testicular self-examination.

Methods: This descriptive and cross-sectional study was conducted in Health care vocational schools of 2 different universities between November 2018 and January 2019. Data were obtained by a self-applied questionnaire comprised of four sections.

Results: One hundred and six (37.7%) participants could not answer any question correctly. While 65.8% (n = 185) of the participants stated that they had heard of testicular cancer, the rate of those who heard about TSE was 17.8% (n = 50). Only 5.7% (n = 16) of the participants reported performing TSE. Binary logistic regression analysis was shown that the following factors increase men's intention to perform TSE: Students' academic unit [OR = 4.36, 95% CI: 1.37-13.88], age [OR = 0.2; 95% CI: 0.008-0.72], city [OR = 0.64; 95% CI: 1.15-1.49], those who have heard of TC before [OR = 0.71, 95% CI: 0.016-0.917], received information about TC [OR = 0.001, 95% CI: 0.015-0.309], and those who have heard of TSE before [OR = 0.01; 95% CI: 0.001-0.079].

Conclusions: One-third of the university students had never heard of testicular cancer, and TSE was not sufficiently practiced. There is a lack of information on this issue. It was thought that organizing training programs on the subject would raise awareness and save lives by early diagnosis.

Keywords: Testicular neoplasms, testicular cancer, cancer screening, testicular self-examination, knowledge, behaviours

Testicular tumors are the most common malignant tumor in men aged 15-35 years [1]. The probability of developing testicular tumors is 0.2% throughout the entire life [2]. Testicular cancer (TC) comprises 1-1.5% of male neoplasms, constitutes 13-23% of male urogenital system tumors, and 3-6 cases develop each year for every 100,000 men in Western societies [3]. In Turkey, 4.7% of all cancers originate from the re-

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productive system, while TC makes 1.3% of male neoplasms [4, 5].

A history of cryptorchidism or undescended testis, Klinefelter's syndrome, the presence of testicular tumors among first-degree relatives (sibling, father) in the family history, the presence of testicular tumors or testicular intraepithelial neoplasia (TIN) in the contralateral testicle and infertility were reported as the epidemiological risk factors of in the development of testicular tumors [6, 7].

Although testicular cancer is a relatively rare tumor, it has a very important place in urological oncology because it forms a curable cancer model [8]. Because of this feature, early diagnosis and treatment is crucial in testicular cancer. When detected at an early stage, testicular cancer can be completely cured. The 5-year survival rate with early diagnosis is 99% [9, 10].

In the literature, it was emphasized that young men should increase their knowledge and awareness of testicular cancer for early diagnosis [11]. Despite the increase in its incidence, many studies have confirmed that young men do not know about the prevalence of this tumor in their age group, and seldom perform testicular self-examination (TSE) [12-14]. In a study conducted with 7,304 university students across Europe, only 3% of the respondents reported having regular monthly TSE [15]. Routine TSE should be conducted by the person at least once a month and regularly in the shower or after the shower in front of a mirror. It has advantages such as being easy to learn and apply, safe and economical, not requiring special equipment, not being invasive, and not taking much time. Additionally, when the TSE is performed regularly every month, the person gets familiar with the testis tissue, and thus, can promptly recognize any changes [16].

Since testicular cancer is treatable if detected at an early stage, and TSE is applicable, easy, and effective for early diagnosis, testicular cancer should be explained to all males, especially the group with risk factors, and testicular self-examination should be performed by all males.

Because testicular cancers threaten males, especially in the 15-35 age groups, researches targeted especially this group, mentioning that further information is required in this area. Based on the lack of sufficient research on this topic in Turkey, we aimed to determine the knowledge, attitudes, and behaviors

of the university students about TC and TSE, to determine the frequency of performing TSE, and to investigate the affecting factors.

METHODS

Participants

This descriptive and cross-sectional study was conducted in Elazığ and Diyarbakır cities between November 2018 and January 2019. The population of our study consisted of male students attending the vocational school of health services at Fırat University in Elazığ and Dicle University in Diyarbakır. In the 2018-2019 academic years, all 1st and 2nd-year male students enrolled in the Vocational Schools of Health Services (VSHS) were included in this study. We aimed to include the whole population without sampling. The target population attending both universities was 330 (160 from Fırat University, 170 from Dicle University). A total of 281 (85%) students volunteered to fill out the study questionnaires and gave written consent. Criteria for inclusion were "being a student in one of the mentioned VSHS's," "male sex," and "age above 18," while participants with a history of testicular cancer were excluded.

Ethical Clearance and Permissions

This study was approved by the local ethics committee of Fırat University Non-Invasive Research Ethics Committee (Date: 17.05.2018, IRB number: 09/17). Also, permissions were obtained from the directorates of Fırat University and Dicle University Vocational Schools of Health Services.

Data Collection

The questionnaires used in the research were applied to the students in the two universities by researchers. Questionnaire forms were distributed to students and they were asked to fill out. A researcher was kept ready to answer the questions of the participants. In order to reach the whole universe, we went to both universities 3 times.

A 10-item questionnaire was prepared to determine the sociodemographic characteristics of the participants. To measure the knowledge about testicular cancer, a multiple-choice testicular cancer knowledge test about the most common symptom of testicular

cancer, the most common age group affected, the probability of recovery, and risk factors were prepared. Information about testicular cancer and TSE characteristics were collected through a 10-item questionnaire, which was prepared after a literature search. Participants' awareness and attitudes about TSE were examined with a seven-item questionnaire of the yes/no response type. In the awareness and attitudes survey of the participants about TSE, 'yes' responses reflected positive attitudes and behaviors, while the 'no' answers were evaluated as negative attitudes and behaviors. The attitude questionnaire cronbach alpha score was 0.735. Four or more positive responses were categorized as 'sufficient', while three or fewer scores were regarded as "inadequate."

Statistical Analysis

Data were analyzed using the SPSS 22.0 SPSS (SPSS Inc., Chicago, IL, USA,) package program. Descriptive data were presented as percentages, means, and standard deviations. Awareness and attitudes survey reliability was calculated with the Kuder-Richardson 20 formula. The reliability coefficient calculated in this way was also stated as a measure of the internal consistency of the test. The Chi-square test was used to examine the relationships between categorical variables. Statistical significance was accepted as $p < 0.05$. The relationship between the number of correct answers given to the testis cancer knowledge test and the number of positive behaviors was evaluated by the Spearman correlation analysis. Multivariate logistic regression analysis was applied to statistically significant variables ($P < 0.05$). TSE application status (Performing TSE: 0, Not performing TSE: 1) was compared with risk factors. Odds ratio (OR) and 95% confidence intervals (CI) were calculated for each categorical variable.

RESULTS

Mean age of the 281 participants was 22 (3.7) years old. Of the students, 59.4% (n = 167) were from Firat University in Elazığ and 40.6% (n = 114) from Dicle University in Diyarbakır. The proportion of first and second grade students was 57.3% (n = 161) and 42.7% (n = 120), respectively. 6.4% of the participants were married. 76.9% (n = 216) of the students attended for-

mal education, while 23.1% (n = 65) were receiving evening education. The smoking rate was 44.5%, and no participant had a known history of cancer.

The level of knowledge about testicular cancer was measured with four multiple-choice questions. One hundred and six (37.7%) participants could not answer any question correctly. The number of correct answers in the knowledge test is presented in Table 1.

While 65.8% (n = 185) of the participants stated that they had heard of testicular cancer, the rate of those who heard about TSE was 17.8% (n = 50). Only 5.7% (n = 16) of the participants reported performing TSE. Characteristics of the participants on testicular cancer and TSE are given in Table 2.

Of the participants, 59.1% (n = 166) were aware of the importance of TSE for their health. Only 20.3% (n = 57) of the respondents stated that they knew how to perform TSE. Fifty-two percent (n = 146) of the participants said that they would do regular TSE if reminded by somebody (Table 3).

The rate of hearing TC was higher among the participants who declared that they had been informed about TC before ($p < 0.001$) and were informed by health personnel ($p < 0.001$). The rate of hearing TSE ($p = 0.003$) and the rate of getting information about TSE ($p = 0.013$) were higher in those who had heard of TC before. TSE practice rate was higher in those who heard TC before ($p = 0.021$). TSE awareness and positive attitude scores ($p < 0.001$) were found to be higher in those who had heard of TC before (Table 4). The final binary logistic regression model demonstrated that the following factors have an independent influence on whether students undertake TSE. Students aged 22 years and above (OR = 0.24; 95% CI: 0.08-0.72; $p = 0.006$), second-year students (OR =

Table 1. Distribution of the correct answers in the testicular cancer knowledge test

Number of correct responses	Frequency (n)	Percent (%)
0	106	37.7
1	105	37.4
2	57	20.3
3	11	3.9
4	2	0.7
Total	281	100.0

Table 2. Participant features on testicular cancer and TSE

Feature (n = 281)	Frequency (n)	Percent (%)
Having any health issues concerning the testicles		
Yes	2	0.7
No	279	99.3
Having heard of testicular cancer		
Yes	185	65.8
No	96	34.2
Information about testicular cancer		
Yes	100	35.6
No	181	64.4
The information source of testicular cancer knowledge		
Didn't get any information	181	64.4
Internet	30	10.7
School	25	8.9
Health personnel	30	10.7
Friend	15	5.3
Having heard of testicular self-examination		
Yes	50	17.8
No	231	82.2
Information about TSE		
Yes	41	14.6
No	240	85.4
TSE information source		
Did not get any information	240	85.4
Internet	8	2.8
School	9	3.2
Health personnel	21	7.5
Friend	3	1.1
TSE practice		
Yes	16	5.7
No	265	94.3
TSE frequency		
Does not perform	265	94.3
Once a month	9	3.2
Once every three months	1	0.4
Once every six months	2	0.7
Once a year	4	1.4
Reasons for not practicing TSE** (n = 265)		
I do not know how to do a TSE myself.	186	70,2
I feel guilty due to examination	9	3.4
I think this examination is a sin	12	4.5
I am negligent on this issue	59	22.3
Afraid of finding something bad	19	7.2

** more than one answer given

1.37; 95% CI: 1.37-13.88; $p = 0.007$), students of Elazig Firat University (OR = 0.64; 95% CI: 1.15-1.49; $p < 0.001$), those who had heard about TC (OR = 0.71; 95% CI:0.02-0.92; $p = 0.015$), those who received information about TC (OR = 0.001; 95% CI: 0.02-0.31; $p < 0.001$), and those who had heard and got information on TSE (OR = 0.01; 95% CI: 0.001-0.079; $p < 0.001$) higher rate of TSE compared to the other students (Table 5).

DISCUSSION

The majority (65.8%) of the participants stated that they had previously heard of testicular cancer. As to other studies from Turkey, proportions of 80% and 44% of students from the vocational school of health services had heard about testicular cancer [17, 18]. In a school of education from Turkey, the same proportion was reported as 57.6% [19]. In a study from Ethiopia, 66.8% of the respondents in a vocational school had heard about TC [20]. We found comparable results with studies using similar populations. On the other hand, studies conducted in risk groups but in the general population, have reported knowing TC as 10.4% in France and 26.4% in Nigeria [21, 22]. Although the rate of hearing about TC among the studied students was higher compared to the general population, it is parallel to the individuals in a similar population. Even though the rate of hearing is higher than the normal population, the students were considered not at the desired level.

The sociodemographic factors had no statistically significant relationship with testicular cancer aware-

ness. In a similar study, Ward *et al.* [23] studied the effects of sociodemographic characteristics of the participants on hearing testicular cancer and reported that except college graduation, the sociodemographic factors were not related to the hearing of TC. In a study conducted on vocational high school students, Pour *et al.* [17] found that education on testicular cancer was the most important factor in raising awareness. Higher rates of awareness among participants who received information about TC suggest that education is a crucial factor in this issue. It has been thought that research about testicular cancer awareness and the effects of education on testicular cancer awareness will unveil the effects of education.

When we look at the situation in the early diagnosis of testicular cancer and the state of TSE awareness, only 17.8% of the participants reported that they had heard of TSE; 14.6% of them had previously received information about TSE, and as a result, only 5.7% reported that they performed TSE. The study of Pour *et al.* [17] reported the STE hearing proportion as 27.6%, education on TSE as 9.4%, and TSE performance as 10.6% among Turkish vocational school of health services' students. Ramim *et al.* [24] from Iran found the rate of getting information about TSE as 5% and TSE practice rate as 7.9%. As to studies conducted among the general public, the proportion of practicing TSE was reported as 1.0% in Nigeria [22], 17.4% in Poland [25], and 3.3% in Turkey [18]. Our findings are similar to the literature. Besides, the results are similar in both the health-related populations and the general population, suggesting insufficient TSE awareness and practice.

When we examined factors affecting the TSE

Table 3. Students' awareness and attitudes of TSE

Variables	Yes		No	
	n	%	n	%
I know TSE is important for my health	166	59.1	115	40.9
I know TSE is effective if done at the same time each month	125	44.5	156	55.5
It is easy for me to remember that I will examine my testicles every month	109	38.8	172	61.2
I know how to perform TSE	57	20.3	224	79.7
I think I can practice TSE correctly	135	48.0	146	52.0
If someone reminds me, I can examine my testicles every month	146	52.0	135	48.0
I know where to seek help if I have pain, swelling, or size differences in my testicles	182	64.8	99	35.2

Table 4. Comparison of the TC knowledge status of the students with some features

Variables	Hearing about testicular cancer before						Statistics	
	Yes, heard		No, did not hear		Total		χ^2	p value
	n	%	n	%	n	%		
Age							2.61	0.114
≤ 21	111	62.4	67	37.6	178	100.0		
≥ 22	74	71.8	29	28.2	103	100.0		
Marital status							0.35	0.563
Married	13	72.2	5	27.8	18	100.0		
Single	172	65.4	91	34.6	263	100.0		
Class							3.17	0.079
1 st	99	61.5	62	38.5	161	100.0		
2 nd	86	71.7	34	28.3	120	100.0		
Type of instruction							0.29	0.593
Formal	144	66.7	72	33.3	216	100.0		
Evening	41	63.1	24	36.9	65	100.0		
City							1.08	0.304
Elazığ	114	68.3	53	31.7	167	100.0		
Diyarbakır	71	62.3	43	37.7	114	100.0		
Father's educational status							1.03	0.314
Below high school	102	63.4	59	36.6	161	100.0		
High school and above	83	69.2	37	30.8	120	100.0		
Income perception							0.31	0.856
Good	34	68.0	16	32.0	50	100.0		
Medium	117	66.1	60	33.9	177	100.0		
Bad	34	63.0	20	37.0	54	100.0		
Mostly resided place							3.66	0.159
City	134	67.0	66	33.0	200	100.0		
District	34	70.8	14	29.2	48	100.0		
Village	17	51.5	16	48.5	33	100.0		
Tobacco use							0.01	0.943
No	103	66.0	53	34.0	156	100.0		
Yes	82	65.6	43	34.4	125	100.0		
Received information on testicular cancer							20.33	< 0.001
Yes	83	83.0	17	17.0	100	100.0		
No	102	56.4	79	43.6	181	100.0		
Source of TC information (n = 83)							22.34	< 0.001
Internet	26	86.7	4	13.3	30	100.0		
School	19	76.0	6	24.0	25	100.0		
Health personnel	27	90.0	3	10.0	30	100.0		
Friend	11	73.3	4	26.7	15	100.0		
Have you ever heard of TSE?							8.92	0.003
Yes	42	84.0	8	16.0	50	100.0		
No	143	61.9	88	38.1	231	100.0		
Have you ever been informed about TSE?							6.23	0.013
Yes	34	82.9	7	17.1	41	100.0		
No	151	62.9	89	37.1	240	100.0		
Can you do TSE practice?							5.88	0.021
Yes	15	93.8	1	6.2	16	100.0		
No	170	64.2	95	35.8	265	100.0		
TSE awareness and attitude							15.82	< 0.001
Insufficient awareness and attitude	79	54.9	65	45.1	144	100.0		
Sufficient awareness and attitude	106	77.4	31	22.6	137	100.0		

Table 5. Multiple logistic regression model of predictors of TSE status

Variables	Odds Ratio	Confidence Interval (95.0%)	p value
Age			0.006
≤ 21	1		
≥ 22	0.24	0.08-0.72	
Class			0.007
1st	1		
2nd	4.36	1.37-13.88	
City			< 0.001
Diyarbakir	1		
Elazig	0.64	1.15-1.49	
I've heard of TC before			0.015
No	1		
Yes	0.71	0.016-0.917	
I was informed about TC			< 0.001
No	1		
Yes	0.001	0.015-0.309	
I've heard of TSE before			< 0.001
No	1		
Yes	0.01	0.001-0.079	
I was informed about TSE			< 0.001
No	1		
Yes	0.001	0.000	

TSE = Testicular self-exam, TC = Testicular cancer

practice, it was seen that being aged 22 years and above, studying in the second class, being at Elazığ vocational school of health services, having previously heard of TC, and having received some information on TC were statistically significant factors affecting TSE practice. In the literature, factors affecting the TSE practice were examined in two studies, which reported that father's education, family history of cancer, TC and TSE awareness, having a high level of knowledge, and being under TC risk were more likely to practice TSE [23, 25]. TSE practices of the vocational school of health services students were investigated in Iran, which revealed that the rates of practicing TSE were increasing with the school year and knowledge and experience on TSE [24]. Two studies from Turkey have indicated a lack of knowledge on TSE and negligence as the reasons for not practicing TSE [17, 18], while Farrow's study identified lack of knowledge as the primary reason for not practicing TSE [26]. In our

study, the participants stated that they did not know how to perform TSE as the most common reason for not applying TSE. Our findings were similar to the literature. When considering factors affecting TSE practice as well as barriers to perform TSE, lack of knowledge and awareness emerged as the two fundamental reasons.

Based on the data we have obtained, and hypothesizing that the most important factor affecting TSE was knowledge, a multivariate logistic regression analysis was applied to the factors that significantly affected TSE practice. As a result of the logistic regression analysis, the ratio of applying TSE was 4.3 times higher in the second-class students compared to the first class. It is possible that the knowledge level of the participants was increasing with advancing school class, thus, leading to higher TSE practice. In a similar study conducted in Iran, the acquaintance and knowledge with TC were increasing as the study years

progressed [24]. Also, in a study conducted among medical students in Nigeria, a comparison was made before and after training on TC and TSE, and it was revealed that the knowledge levels and TSE practices increased [27]. Our results are conforming to the literature. To support our hypothesis, a correlation analysis was done between the TC knowledge and the positive attitude scores, which showed a significant positive relationship. Supported by the literature, we considered that the level of TC and TSE knowledge was one of the most crucial factors affecting TSE practice and early diagnosis.

Limitations

Although our research has been conducted in two different centers, it is not representative of the general population. Besides, the study data relied on self-report. The information on TC education could be retrieved by reviewing the school curricula. Thus, the difference between the schools could not be elaborated. Future studies should investigate the effects of educational status and educational content on TC and TSE.

CONCLUSION

As a conclusion, our study revealed that the knowledge and awareness of TC and TSE are insufficient even in the health team of the future, and the rates of practicing TSE are much lower. The aim of management of testicular cancer is to prevent delayed diagnosis and to make an early diagnosis. The aim of testicular cancer management is to prevent delayed diagnosis and to make an early diagnosis; this goal can be achieved with education programs that will increase cancer awareness among young people. This study demonstrated that the implementation of TSE is still not sufficient by men. The obtained data suggest that the main reasons for not practicing TSE are lack of knowledge and awareness. Since half of the participants were ready to apply TSE if reminded to do so, and students with higher knowledge and awareness were practicing considerably more TSE, we considered that programs targeting to increase knowledge and awareness of men would attract the attention of the people and contribute to increasing the early diagnosis of TC. As men aged 15-35 can be easily reached

at the school and during their military services, these two activities can be an opportunity to implement educational activities. Another suggestion is that family physicians provide counseling on health education and testicular cancer to their patients at risk during periodic examinations.

Authors' Contribution

Study Conception: BY, EP; Study Design: BY, EP; Supervision: BY, EP; Funding: MAŞ, EY; Materials: MAŞ, EY; Data Collection and/or Processing: MAŞ, EY; Statistical Analysis and/or Data Interpretation: BY, EP; Literature Review: BY, EP, MAŞ, EY; Manuscript Preparation: MAŞ, EY and Critical Review: BY, EP, MAŞ, EY.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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