

Better Knowledge about Testicular Cancer Might Improve the Rate of Testicular (Self-)Examination: A Survey among 1,025 Medical Students in Germany

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Keywords

Testicular cancer · Testicular self-examination · Awareness · Medical students · Germany

Abstract

Introduction: Testicular cancer (TC) is the most common malignancy among young men. Public awareness of the disease and testicular (self-)examination (TSE) is low. This study aims to evaluate the awareness of German medical students on TC. **Methods:** A 25-item questionnaire on TC was handed out during a medical student's football tournament in Germany. Data collection was anonymous. **Results:** Questionnaires were answered by 573 (56%) female and 452 (44%) male medical students. Most students had gaps in their knowledge about TC: 483 (48%) students knew, the most common age at which TC occurs, and 413 (41%) knew its cure rate. Having dealt with TC during their studies was significantly associated with a better knowledge about TC ($p = 0.001$). These students also had a higher rate of TSE among male students (66% vs. 52%, $p = 0.002$). This also applies to examining the partner's testicles by female students (25% vs. 13%, $p < 0.001$). **Conclusion:** Even in a positively selected collective like medical students, the knowledge about TC is low.

Better knowledge might improve the chance of detecting the disease early. Therefore, our joint project of urologists, patients, and supporters called Prevention and Advocacy of Testicular Education e.V. (PATE) works on rising public TC awareness in Germany.

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Introduction

The most common malignancy among young adults between the ages of 15–44 is testicular cancer (TC) and its incidence is rising in industrial countries [1, 2]. Whereas symptoms like cough or cachexia appear in very advanced stages of the disease, it is almost asymptomatic in early stages. The easiest and most effective way to diagnose TC early is to perform regular testicular (self-)examination (TSE/TE). Performing TSE can help to detect a firm painless mass in the scrotum as the very first clinical symptom [3]. The early detection of this malignant disease can avoid invasive measures such as chemotherapy, radiotherapy, and extensive surgery.

Table 1. Participant characteristics (mean \pm SD; median and range)

	All participants (n = 1,025)	Women (n = 573)	Men (n = 452)	p value
Age	23.0 \pm 2.8 22 (18–33)	22.5 \pm 2.5 22 (18–33)	23.6 \pm 3.1 23 (18–33)	<0.001
Year of medical school	3.2 \pm 1.6 3 (1–8)	3.1 \pm 1.5 3 (1–8)	3.3 \pm 1.7 3 (1–8)	0.002
Already had urology as a subject, n (%)	395 (39)	208 (36)	187 (42)	0.087
TC was discussed in medical school, n (%)	471 (46)	258 (45)	213 (47)	0.55
Never received any information about TC, n (%)	163 (16)	103 (18)	60 (13)	0.044

Obviously, the lower the clinical stage at diagnosis, the higher is the survival rate. The 5-year survival rate for metastasized seminoma and nonseminoma of the poor prognosis group is between 48% and 64% [4], whereas the 10-year survival rate of TC in clinical stage I is 99.7% [5]. In addition, psychosocial complications and negative impacts on quality of life are seen frequently in TC survivors [6]. Therefore, compendious early detection and treatment of the disease are reasonable. The German S3-medical guideline of the Association of the Scientific Medical Societies in Germany does not recommend preventive testicular check-ups at a doctor's office, but regular TSE [7]. Performing regular testicular education showed that the knowledge on testicular diseases and TC rises [8]. It is not known whether better knowledge about TC affects the rate of TSE or the time of diagnosis in case of TC. Aim of this study was to evaluate the knowledge on TC and the use of TSE among German medical students.

Methods

We conducted a survey among medical students to evaluate the knowledge on TC and the use of TSE. This survey was performed by Prevention and Advocacy of Testicular Education e.V. (PATE), a German nonprofit association. PATE focuses on men's health especially in younger age groups. This includes benign as well as malignant diseases like TC. Student working groups at ten German medical faculties support PATE and help to provide regional and virtual education.

In an iterative development process, the authors and members of PATE created a thematically focused questionnaire with 25 items. During this process, we optimized the wording and finally 15 volunteers tested the questionnaire. The results showed good face validity [9]. The survey consisted of three parts. The first part collected general information like age, sex, the current semester, the medical school, and if urology and TC had been thematized during the studies. The second part evaluated the knowledge about TC, its risk factors, symptoms, and where the information was tak-

en from. The last part was gender-determined and enquired their own or one's partner's testicular self-awareness, including attitude, knowledge, and general information about TSE.

During a medical student's football tournament with about 25,000 participants in Germany from June 7 to 9, 2019, PATE handed out the questionnaires. We received 1,025 completed surveys from medical students representing a convenience sample of 4%. As an estimated number of 1,500 medical students visited the PATE booth, the questionnaire's return rate was approximately 67%.

χ^2 -test and *T* test were used for descriptive statistics to compare groups. Because of the explorative study setting and the large sample size, we defined the significance level at $p < 0.01$. All calculations were performed with SPSS 26.0 (IBM, Corp., Armonk, NY, USA).

Results

In the survey, 1,025 German medical students participated. Table 1 lists the main characteristics of the participants. 573 (56%) of the students were women. The mean age was about 1 year higher in men. Male students were a little ahead in their mean year of medical school (3.3 vs. 3.1) compared to women. Due to the large number of participants, these small differences are statistically significant. 39% of participants had urology and 46% TC as a topic during their medical studies. 103 (18%) of women and 60 (13%) of men had never received any information about TC ($p = 0.04$).

Table 2 compares the percentage of correct answers to the questions about TC between students who had TC as a topic during their studies and those who did not. Students who have already had TC as a topic in their studies significantly more often gave correct answers to most knowledge questions. Nevertheless, these students also had gaps in their knowledge about TC. More than one-third (37%) did not know the most common age at which

Table 2. Correct answers to the questions about TC between students who had TC as a topic during their studies and those who did not

	All participants (n = 1,022)	TC was discussed (n = 471)	TC not discussed (n = 551)	p value
Most common age at which TC occurs: 15–35 years, n (%)	483 (48)	293 (63)	190 (35)	<0.001
Early TC is asymptomatic, n (%)	434 (44)	267 (57)	167 (32)	<0.001
Cure rate of TC is 76–100%, n (%)	413 (41)	239 (51)	174 (33)	<0.001
Undescended testicle is a risk factor, n (%)	637 (64)	350 (76)	287 (54)	<0.001
Tight underpants are not a risk factor, n (%)	731 (74)	346 (75)	385 (72)	0.31

Table 3. Differences in TSE/TE aspects between students who had TC as a topic during their studies and those who did not

	All students	TC was discussed	TC not discussed	p value
<i>Male</i>	<i>n</i> = 452	<i>n</i> = 213	<i>n</i> = 239	
Past experience of testicular pain, n (%)	220 (51)	106 (53)	114 (49)	0.52
TSE performed, n (%)	257 (59)	136 (66)	121 (52)	0.002
Knowledge about TSE, n (%)	216 (50)	139 (67)	77 (34)	<0.001
TSE has been taught, n (%)	116 (27)	73 (35)	43 (19)	<0.001
<i>Female</i>	<i>n</i> = 550	<i>n</i> = 258	<i>n</i> = 292	
Performed a TE on their partner, n (%)	100 (18)	62 (25)	38 (13)	<0.001
Knowledge about TE, n (%)	154 (28)	102 (41)	52 (17)	<0.001
TE has been taught, n (%)	97 (18)	66 (27)	31 (10)	<0.001

TC occurs and around half of them (49%) did not know the high cure rate.

Table 3 describes several aspects of TSE in men and women. About half (51%) of male students reported having experienced testicular pain in the past. 59% of male students had already performed TSE. We asked for the reason why they did not perform TSE: 96 (49%) of the remaining 195 students responded that it was not important to them, and 36 (18%) claimed insufficient knowledge about TSE. A higher rate of knowledge about TSE/TE was regarded among students who had TC as a topic during their studies. The percentage of male students (27%) who had been taught how to perform TSE/TE is slightly higher than in female students (18%).

Discussion

Information about TC is highly associated with better knowledge about the topic and a higher rate of TSE. However, the numbers are low. 136 male students (66%) and 62 female students (25%) have discussed TC and performed TE even though the examined cohort of medical

students is highly selected compared to the general population. This result is in line with other studies evaluating the same aspects among medical students from other countries. In Nigeria, a questionnaire-filled-out pre- and post-lecture on TC by final-year medical students showed a low knowledge level on TC and TSE [10]. Comparable results were seen in a survey in Turkey in first-year medical students. Among 11% of the participants who mentioned that they had knowledge on TC, only 1.4% answered all questions correctly [11]. Similar deficiencies have been seen in an Ethiopian cross-sectional study where familial educational status showed an impact on the knowledge of TC and TSE [12].

The United States Preventive Services Task Force (USPSTF) on the contrary recommends neither preventive testicular check-ups by a physician nor regular TSE [13], although the required awareness of TC in young ages is not present [14–16]. The reason for this is that the USPSTF believes that TSE and check-ups do not reduce the mortality of TC as a high curable disease (>90%). Furthermore, the statement says that TSE can lead to false-positive results which can cause anxiety and negative impacts on the quality of life of the performer [17]. A report

from the Institute for Quality and Efficiency in Health Care argues that there is a lack of evidence of the advantage of screening young men for TC routinely, but recommends to educate young men to see a physician immediately when having suspicions of a scrotal mass [18]. This recommended educational work can be done by nonprofit organizations to save financial and healthcare resources and promote TC awareness.

Whereas the knowledge on TC and TSE among medical students rises in higher semesters, a comparison between medical and nonmedical students in Germany showed even a higher lack of knowledge in the nonmedical student group [19]. Comparable results have been seen in other examined cohorts. High school students in the 11th and 12th grade in Hamburg (Germany) showed that boys knew male anatomy better, whereas girls knew more on TC [14].

In consequence, more education about TC leads to more awareness. The medical J2-preventive check-up at the age of 17 (a voluntary adolescent screening check-up in Germany) would be a great possibility to inform also about TC and TSE next to sexuality and puberty. Unfortunately, the check-up is not covered by every German insurance [20]. Therefore, the role of prevention campaigns especially of those which include men's health gets even more important. An evaluation of TC awareness campaigns showed that a majority of students was not aware of their existence. Moreover, in a gender comparison study female students heard more about testicular prevention campaigns than male students [21]. A study that evaluated the Internet search activity on a famous male prevention campaign "Movember" showed that the name was associated more with a moustache than prostate cancer or TC. TC was associated with the campaign significantly in only one of eleven analyzed years [22]. This attitude toward a healthy preventive self-awareness is a problem which is independent of age but based on gender difference. A study among medical students from Munich showed that comparing breast cancer and TC women performed self-examinations of their breasts more frequently (72%) than men performed TSE (64%) [23].

This study recruited a good convenience sample of German medical students with a very good response rate of approximately two-thirds. A higher participation rate might have provided a better-balanced population. Our collective represents the knowledge on TC among medical students throughout Germany. Every German medical faculty compiles their own curriculum which might or might not contain TC. This information could not be

considered. Also, a matching between the teaching of PATE and the medical faculties was not performed. Unfortunately, the sample does not cover the basic population and is not representative for Germany. Nevertheless, our results show the same deficiencies on TSE and TC knowledge as other national and international studies do. Our data highlight that campaigns must become more present to educate more people.

Conclusion

This study demonstrated that even in a highly selected group like medical students, the presence of TC knowledge is low. Considering no regular doctor's office visits and rare presence of prevention campaigns for the most common disease among young men, more education on testicular diseases is mandatory. Therefore, PATE will continue to rise awareness of TC.

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Statement of Ethics

The data collection was anonymous. To ensure anonymity, participants gave consent only verbally after being fully informed about the study. Ethical approval for this study was not required in accordance with local and national guidelines. The study was conducted in accordance with the World Medical Association Declaration of Helsinki.

Conflict of Interest Statement

Dr. Huber reports grants and nonfinancial support from Intuitive Surgical, Takeda, Janssen, and Coloplast outside the submitted work. Moreover, he is managing director of the Urological Foundation for Health. All other authors declare that there is no conflict of interest.

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Author Contributions

Cem Aksoy: project development, data collection, data management, and manuscript writing/editing. Andreas Ihrig: data analysis, management, and manuscript writing/editing. Philipp Reimold: data management and manuscript writing/editing. Ruth Himmelsbach: data collection and manuscript writing/editing. Georgi Tosev: manuscript writing/editing. Jessica Jesser: project development, data collection or management, and manuscript writing/editing. Güven Babayigit: data collection and management, and manuscript writing/editing. Johannes Huber: data management, data analysis, and manuscript writing/editing.

Data Availability Statement

Data are available from the corresponding author on request. The generated and analyzed data during this study are included in this article. Any further inquiries can be directed to the corresponding author.

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