

ORIGINAL ARTICLE

Knowledge and Practice of Testicular Self-Examination Among Male Students at Universiti Putra Malaysia

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ABSTRACT

Introduction: Testicular cancer poses a significant public health threat, especially among young men, underscoring the importance of testicular self-examination (TSE) as a vital preventive measure. Despite its significance, awareness and adherence to TSE guidelines remain low, particularly among university students. This study aims to assess the knowledge and practice of TSE among male students at Universiti Putra Malaysia (UPM) to bridge this gap in understanding. **Methods:** Conducted between January and April 2020 at UPM, this cross-sectional study targeted male students aged 18 to 30 from non-medical faculties, selected via random sampling. Data collection involved online surveys distributed to participants, with statistical analyses utilizing descriptive and inferential methods. **Results:** The study unveiled a concerning lack of TSE awareness and practice among male UPM students. A majority reported never having performed TSE, indicating a significant gap in preventive healthcare behaviours. Sociodemographic factors such as age, marital status, and level of education influenced TSE knowledge and practice, underscoring the necessity for tailored interventions to address these disparities. **Conclusion:** This study highlights the pressing need for targeted educational interventions to bolster TSE awareness and encourage regular practice among young men, especially university students. By overcoming barriers to TSE uptake and equipping individuals with the knowledge and skills to monitor their testicular health effectively, we can enhance health outcomes and alleviate the burden of testicular cancer in this demographic. Future research should explore the efficacy of diverse educational strategies and engage healthcare providers in promoting testicular health awareness.

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INTRODUCTION

Testicular self-examination (TSE) is a simple, non-invasive procedure men use to assess the condition of their testes and detect abnormalities. Among the methods available for early detection of testicular abnormalities, TSE is considered one of the most effective due to its accessibility, cost-effectiveness, and ability to be

performed regularly without the need for professional equipment or medical appointments (1). Unlike clinical examinations or imaging methods, such as ultrasound, which are often conducted in medical settings and may not be performed frequently, TSE allows for continuous, proactive monitoring. Studies have shown that regular TSE can lead to earlier detection of testicular cancer, significantly improving treatment outcomes and survival rates (2). Research supports TSE as a valuable tool in testicular cancer screening, particularly for men aged 15 to 35, who are at the highest risk of developing the disease (3).

For example, a previous study demonstrated that men who performed monthly TSE were more likely to detect abnormalities at an earlier stage, compared to those who relied solely on routine medical check-ups (4). While imaging techniques like ultrasound are more sensitive in detecting small or non-palpable masses, they are typically used after a testicular abnormality is already suspected. In contrast, TSE can alert individuals to changes that may warrant further investigation, thereby serving as a preventive measure and complementing other diagnostic tools (5). According to the Malaysian National Cancer Registry, testicular cancer has a relatively low incidence, accounting for approximately 12.4% of all cancers in men. However, it disproportionately affects men aged 15 to 24, the period typically considered their most productive years. This highlights the critical need for early detection and awareness of preventive measures such as TSE (6).

Understanding testicular cancer and making TSE a standard procedure for detecting abnormal testicular conditions is still permitted. In Malaysia, there is still a lack of TSE knowledge, especially among young men (7). Comparative studies indicate that awareness and practice of TSE in Malaysia are lower compared to other countries such as (7). According to a previous study, university students, especially those aged 18 to 25 years, have limited understanding of TSE (8). This limited knowledge has significant implications for their health-seeking behavior and overall health outcomes. A lack of awareness about TSE can delay the early detection of testicular abnormalities, such as lumps or swelling, which are often the first signs of testicular cancer. Without regular self-examinations, these students may not seek medical attention promptly, potentially leading to delayed diagnosis and treatment. As testicular cancer is one of the most treatable cancers when detected early, failure to perform TSE can result in more advanced disease at the time of diagnosis, reducing survival rates. This highlights the need for targeted educational interventions to promote TSE knowledge and practice among this age group, fostering proactive health behaviors that improve early detection and, ultimately, health outcomes (7). This study aims to investigate how TSE knowledge and practice affect young men's awareness and education about the early signs of testicular cancer, with a focus on male students at Universiti Putra Malaysia (UPM).

MATERIALS AND METHODS

This cross-sectional study investigates the relationship between knowledge and practice of TSE among male students at UPM. The study was conducted at UPM on male students between January and April 2020.

Participants were selected using random sampling from undergraduate courses. The inclusion criteria for this study were male UPM students aged 18 to 30 years

from faculties unrelated to medicine or health sciences. The exclusion of students from medical-related faculties (e.g., medicine, health sciences, and veterinary studies) was implemented to avoid biases associated with pre-existing knowledge of TSE, ensuring that the study focused on students with potentially lower awareness of the procedure. The sample size of 218 students was determined using Raosoft software, which calculates the required sample size based on several parameters. We used a 5% margin of error, a 95% confidence level, and an estimated response distribution of 50%. This sample size is representative of the total male undergraduate population at UPM, ensuring the generalizability of the findings within the target population.

The selection of faculties was done randomly by cutting a sheet of paper into 15 small pieces representing one of the 15 colleges of non-medical studies and writing the name of each faculty on each piece. The paper was folded, and seven pieces were randomly selected. The selected faculties were listed for data collection. Potential biases include the exclusion of medical-related faculties, which could have affected the generalizability of the results to all UPM students. However, this exclusion was necessary to focus on students less likely to have prior knowledge of TSE.

The questionnaires used for data collection were adopted and modified from a previous study with permission (8). The questionnaire comprised three sections: Section 1 included sociodemographic questions about the participants' background; Section 2 contained 15 TSE knowledge questions with "true" and "false" response options; and Section 3 included questions about TSE practice. The questionnaire also included a section with the participants' written consent indicating their agreement to participate in this study.

The questionnaires were distributed on the campuses of each selected faculty for data collection. Due to the global pandemic and the enforcement of the Movement Control Order (MCO), which limited social interactions, the study was conducted as an online survey using Google Forms for data collection. To ensure the reliability of the data, pilot testing of the questionnaire was conducted with 15 students prior to the main study, and Cronbach's alpha was 0.78, suggesting high internal reliability. Measures such as data encryption, secure storage, and the use of anonymized identifiers were implemented to ensure confidentiality and anonymity of the participants. The dean of each selected faculty was asked for permission to collect data. Ethical Considerations: Ethical approval for this study was obtained from the relevant institutional review board at UPM (JKEUPM-2020-018). All participants provided written informed consent before participating in the study, and measures were taken to ensure the confidentiality and anonymity of the data collected.

Statistical Analysis

The findings and results of this study were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.0. Descriptive analysis was used to display frequency and percentage. Depending on the distribution and nature of the data, both non-parametric and parametric tests were employed to explore the relationships between the study's variables. For non-parametric data, Spearman's correlation and Kruskal-Wallis tests were used. Spearman's correlation was employed to measure the strength and direction of the association between ranked variables. The Kruskal-Wallis test was used to compare differences between three or more independent groups. For parametric data, Pearson's correlation and ANOVA were used. Pearson's correlation measured the linear relationship between continuous variables, while ANOVA was used to compare the means of three or more groups to determine if there were statistically significant differences.

RESULTS

Sociodemographic

A total of 138 students responded to the questionnaire (Table I). The frequency of individuals aged 18 to 25 was 132 (95.7%), while those between 26 and 30 were 6 (4.3%). The marital status of respondents was also studied, showing that 135 (97.8%) were single, 2 (1.4%) were married, and 1 (0.7%) was divorced. Malays accounted for 118 (85.5%), Chinese for 7 (5.1%), Indians for 3 (2.2%), and others for 10 (7.2%).

The respondents according to the faculties were: Faculty of Agriculture 28 (20.3%), Faculty of Forestry 27 (19.6%), Faculty of Science and Food Technology 22 (15.9%), Faculty of Human Ecology 12 (8.7%), Faculty of Modern Languages and Communication 26 (18.8%), Faculty of Economy and Management 7 (5.1%), and Faculty of Design and Architecture 16 (11.6%).

The respondents who reside in urban and rural regions were 79 (57.2%) and 59 (42.8%), respectively. The total number of respondents with a family history of cancer were 36 (26.7%), and no history were 102 (73.9%).

The percentage of knowledge on TSE

More than half of the respondents answered 'Correct' for all the questions except for questions number 6, 'People who suffered from testicular cancer cannot have kids', whereby only 50 (36.2%) answered 'Correct' (Table II).

The practice of TSE

Based on the practice of TSE among UPM male students, 71.7% (n = 99) of the participants mentioned that they never performed TSE. Next, the frequency of TSE in

Table I: The sociodemographic distributions

	Criteria	Frequency (n)	Percentage (%)
Age	18 to 25	132	95.7
	26 to 30	6	4.3
Marital Status	Single	135	97.8
	Married	2	1.4
	Divorced	1	0.7
Ethnics	Malay	118	85.5
	Chinese	7	5.1
	Indian	3	2.2
	Others	10	7.2
Level of Study	Bachelor	134	97.1
	Master	3	2.2
	Doctorate	1	0.7
Faculty	Faculty of Agriculture	28	20.3
	Faculty of Forestry	27	19.6
	Faculty of Sciences and Food Technology	22	15.9
	Faculty of Human Ecology	12	8.7
	Faculty of Modern Languages and Communication	26	18.8
	Faculty of Economy and Management	7	5.1
	Faculty of Design and Architecture	16	11.6
Stay Place	Rural	59	42.8
	Urban	79	57.2
Family History of Cancer	Yes	36	26.1
	No	102	73.9
Know about TSE	Yes	35	25.4
	No	103	75.6

Table II: Knowledge of Testicular Self-Examination

	Knowledge of TSE	Correct (n, %)	False (n, %)
1.	Common age in men to get testicular cancer	115 (83.3)	23 (16.7)
2.	Pain in testicle is the symptom of testicular cancer	85 (61.6)	53 (38.4)
3.	Lump in testis the sign of testicular cancer	111 (80.4)	27 (19.6)
4.	Testicular cancer is curable if found early	115 (83.3)	23 (16.7)
5.	Treatment of testicular cancer is removal of testicle surgery	93 (67.4)	45 (32.6)
6.	People who suffered for testicular cancer cannot have kids	50 (36.2)	88 (63.7)
7.	Testicular examination is only done by skilled professional	81 (58.7)	57 (41.3)
8.	Testicular self-examination help detect the masses in the testis	119 (86.2)	19 (13.8)
9.	Testicular self-examination once a month help in detecting testicular cancer	122 (88.4)	16 (11.6)
10.	Examine after warm shower is very convenient	111 (80.4)	27 (19.6)
11.	Testicular self-examination is very painful	34 (24.6)	104 (75.4)

the past month shows that 57.2% of respondents never perform TSE as a regular self-checkup. Besides the question about the technique of performing TSE, 114 (82.6%) chose to look and feel the testis as the technique of performing TSE. Competency was the reason for never performing the TSE in 99 (71.7%) respondents (Table III).

Table III: The practice of testicular self-examination

		Yes (n, %)		No (n, %)	
Have done testicular self-examination		39 (28.3)		99 (71.7)	
	Every-day (n, %)	Once a week (n, %)	Once in two weeks (n, %)	Once a month (n, %)	Never (n, %)
Frequency of testicular self-examination in a month	8 (5.8)	7 (5.1)	4 (2.9)	40 (29.0)	79 (57.2)
		Look and feel the testis (n, %)		Look the testis only (n, %)	
How testicular self-examination was performed		114 (82.6)		24 (17.4)	
	I know I will never get testicular cancer (n, %)	Not competent to perform testicular self-examination (n, %)	Perceiving testicular self-examination as embarrassing (n, %)		
Reasons why not perform testicular self-examination	9 (6.5)	99 (71.7)	30 (21.7)		

The association of sociodemographic factors with the knowledge and practice of TSE among UPM male students.

The table shows the results obtained from the Kruskal-Wallis test used to determine the association of the sociodemographic data with the practice of TSE, where the p-value is significant (p-value < 0.05) towards the knowledge of TSE. The mean rank for those who answered "Yes" is 45.63, and for "No", is 77.61, showing that the "No" mean level is higher than those who answered "Yes" (Table IV).

The association between sociodemographic and practice of TSE (frequency done TSE).

The respondents' age is significantly associated with the frequency of practicing TSE (p = 0.008), as stated in Table V. The mean rank shows apparent differences between those aged 18 to 25 years (71.20) and those aged 26 to 30 years (54.50). The association of sociodemographic criteria, which is the frequency of TSE, also shows another significant p-value (p < 0.005), which is with the knowledge of TSE (p = 0.000). This proves that the

Table IV: The association between sociodemographic factors and the practice of TSE (Have done TSE before)

	Variable	Mean Rank	P-value
Age	18 to 25	70.18	0.228
	26 to 35	54.50	
Status	Single	69.58	0.652
	Married	54.50	
	Divorced	89.00	
	Others	82.10	
Ethnicity	Malay	67.95	0.452
	Chinese	79.14	
	Indian	66.00	
	Others	82.10	
	Others	82.10	
Level Of study	Bachelor	69.95	0.275
	Master	43.00	
	Doctorate	89.00	
Faculties	Faculty of Agriculture	66.85	0.596
	Faculty of Forestry	66.00	
	Faculty of Sciences and Food Technology	67.05	
	Faculty of Human Ecology	60.25	
	Faculty of Modern Languages and Communication	78.38	
	Faculty of Economy and Management	74.14	
	Faculty of Design and Architecture	71.75	
	Rural	70.26	
	Urban	68.91	
	Urban	68.91	
Staying Area	Rural	70.26	0.787
	Urban	68.91	
Family History of Cancer	Yes	71.75	0.615
	No	68.71	
Knowledge about TSE	Yes	45.63	0.000*
	No	77.61	

Kruskal Wallis *=p-value<0.05

high differences in the mean rank will get a significant value, and the mean rank of "Yes" and "No" is 48.76 and 76.55, respectively. There is no other significant p-value obtained from other characteristics.

The Association between sociodemographic and practice of TSE (Why you perform TSE?)

The result of the association between sociodemographic data and the practice of TSE showed a significant p value of 0.008. The level of study with a higher mean rank is obtained by the bachelor students, which is 70.14, the master's level is 23.00, and the doctorate level is 123.50, showing significant differences in mean rank. Table VI explains all the results obtained from the Kruskal-Wallis test. There are no other significant values in the other variables with the sociodemographic data.

The relationship between knowledge and practice of TSE

Spearman's correlation was used to determine the relationship between knowledge and practice of TSE among UPM students. A p-value less than 0.05 indicates the significant value of the relationship between the knowledge and practice of TSE. There was a significant relationship between knowledge of TSE and the practice of TSE with a p-value < 0.05 and the R value was 0.533. There were no other significant values recorded (Table VII).

Table V: The association between sociodemographic and the practice of TSE (Frequency done TSE)

	Variable	Mean Rank	P-value
Age	18 to 25	71.20	0.008*
	26 to 35	54.50	
Status	Single	69.73	0.698
	Married	69.25	
	Divorced	39.5	
Ethnicity	Malay	68.75	0.900
	Chinese	70.36	
	Indian	70.00	
	Others	77.65	
Level Of study	Bachelor	69.95	0.612
	Master	59.33	
	Doctorate	39.50	
Faculties	Faculty of Agriculture	72.29	0.318
	Faculty of Forestry	62.61	
	Faculty of Sciences and Food Technology	63.77	
	Faculty of Human Ecology	74.75	
	Faculty of Modern Languages and Communication	73.42	
	Faculty of Economy and Management	77.21	
	Faculty of Design and Architecture	70.44	
Staying Area	Rural	66.83	0.445
	Urban	71.49	
Family History of Cancer	Yes	72.04	0.617
	No	68.60	
Knowledge about TSE	Yes	48.76	0.000*
	No	76.55	

Kruskal Wallis *=p-value<0.05

Table VI: The association between sociodemographic and the practice of TSE (Why you perform TSE)

	Variable	Mean Rank	P-value
Age	18 to 25	69.41	0.874
	26 to 35	71.50	
Status	Single	68.78	0.138
	Married	91.25	
	Divorced	123.50	
Ethnicity	Malay	69.55	0.169
	Chinese	51.29	
	Indian	59.00	
	Others	84.80	
Level Of study	Bachelor	70.14	0.008*
	Master	23.00	
	Doctorate	123.50	
Faculties	Faculty of Agriculture	70.89	0.772
	Faculty of Forestry	67.72	
	Faculty of Sciences and Food Technology	67.80	
	Faculty of Human Ecology	60.75	
	Faculty of Modern Languages and Communication	69.33	
	Faculty of Economy and Management	86.64	
	Faculty of Design and Architecture	71.75	
Staying Area	Rural	75.02	0.075
	Urban	65.38	
Family History of Cancer	Yes	71.54	0.651
	No	68.78	
Knowledge about TSE	Yes	74.34	0.292
	No	67.85	

Kruskal Wallis *=p-value<0.05

Table VII: The relationship between knowledge and practice on TSE

Knowledge Score	R	p
Performed the TSE	0.533	0.000*
Frequency of TSE	0.161	0.060
How to perform TSE	-0.010	0.907
Why Not Perform TSE	-0.015	0.866

Spearman's Correlation *=p-value <0.05

DISCUSSIONS

The findings of this study underscore the importance of enhancing awareness and education about TSE among young men, particularly university students (9). Despite TSE being recognized as an effective method for detecting physical testicular abnormalities and as a preventive measure for testicular cancer, the study reveals a concerning lack of awareness among participants. This highlights the need for targeted educational campaigns and interventions aimed at increasing knowledge and promoting the practice of TSE among this demographic (10).

Furthermore, the study sheds light on the sociodemographic factors that influence the knowledge and practice of TSE. Most participants were young males aged 18 to 25, reflecting the age group most at risk for testicular cancer (11). However, the low frequency of TSE practice among these individuals, coupled with limited knowledge about the procedure, underscores the urgency of addressing barriers to TSE adoption (12). Factors such as marital status, ethnicity, and educational background may also play a role in shaping attitudes towards TSE, suggesting the importance of tailored interventions that account for diverse sociodemographic characteristics (13).

The significant association between age and the frequency of TSE practice underscores the need for targeted interventions tailored to different age groups. Younger participants may benefit from educational initiatives aimed at increasing TSE awareness and fostering self-efficacy, while older individuals may require support in overcoming barriers to regular TSE practice (14). Additionally, the findings suggest potential avenues for future research, such as exploring the impact of educational interventions or examining the role of social norms and cultural factors in shaping attitudes towards TSE among young men (13).

Improved TSE knowledge and practice can lead to significant positive public health outcomes, such as the early detection of testicular cancer and improved survival rates (15). Early detection of testicular cancer through regular TSE can result in timely medical intervention, reducing the severity of the disease and increasing the likelihood of successful treatment (16). Consequently,

integrating TSE education into university health programs and broader public health campaigns can promote proactive health behaviors among young men (17). Healthcare policies should emphasize the importance of TSE and support the development and implementation of educational initiatives aimed at increasing awareness and practice of TSE (17). Interventions could include mandatory TSE training in university curriculums, public health campaigns utilizing social media and peer education, and collaborations with healthcare providers to disseminate information about TSE during routine check-ups (18).

Despite the valuable insights gained from this study, several limitations should be acknowledged. Firstly, the reliance on self-reported data may introduce response biases or inaccuracies, particularly regarding participants' knowledge and practice of TSE (19). Additionally, the study's cross-sectional design limits our ability to establish causal relationships between sociodemographic factors and TSE awareness or uptake (20). Longitudinal studies tracking participants' TSE behaviours over time would provide a more robust understanding of these relationships (21).

Furthermore, the use of online surveys due to the COVID-19 pandemic may have introduced selection biases, as individuals without internet access or technological proficiency were excluded (22). This could affect the generalisability of the findings, particularly to populations with limited digital literacy. Additionally, the study's focus on male university students from a single institution may limit the generalisability of the results to broader populations of young men. Future research should aim to include more diverse samples to better capture the variability in TSE knowledge and practice across different demographic groups.

Building on the findings of this study, several avenues for future research and practice emerge. There is a need for targeted educational interventions aimed at increasing TSE awareness and promoting regular practice, particularly among young men (15). These interventions should employ diverse communication channels, including social media, peer-led initiatives, and educational campaigns in educational institutions and community settings.

While this study highlights the importance of TSE education and practice among young men, future research could explore more specific educational strategies to improve awareness and adoption of TSE. For example, further studies could examine the impact of digital health campaigns (e.g., social media, mobile apps) on promoting TSE, particularly among university students who are frequent users of these platforms. Additionally, peer-led initiatives, where students educate their peers about TSE, could be evaluated through randomized controlled trials (RCTs) to determine their

effectiveness compared to traditional health education methods.

Research questions that could guide these future studies include:

1. How effective are digital platforms in raising TSE awareness and encouraging regular practice among university students?
2. What role do peer-led educational programs play in fostering greater TSE engagement compared to conventional health interventions?
3. What are the key cultural and social barriers to TSE adoption in various demographic groups, and how can these barriers be addressed through targeted educational campaigns?

Moreover, qualitative research can provide deeper insights into the social and cultural attitudes that influence TSE practice, particularly in populations where discussing testicular health may be sensitive. Combining these research approaches can offer a comprehensive understanding of how to enhance TSE education and improve public health outcomes.

Healthcare policymakers should consider integrating TSE education into existing health promotion frameworks (17). Policies that support routine TSE education in schools, universities, and community centers can help normalize the practice and reduce the stigma associated with discussing testicular health. Additionally, funding should be allocated to develop and distribute educational materials and resources that are culturally sensitive and accessible to all segments of the population.

Overall, addressing the limitations of this study and implementing targeted interventions informed by its findings can contribute to improving testicular health awareness and reducing the burden of testicular cancer among young men (23). By fostering a culture of proactive self-care and regular health monitoring, we can empower individuals to take control of their health and detect potential abnormalities early, leading to better health outcomes and improved quality of life.

CONCLUSION

In conclusion, this study underscores the urgent need for comprehensive strategies to enhance testicular health awareness and promote regular TSE among young men, particularly university students. Despite the importance of TSE in detecting testicular abnormalities and preventing testicular cancer, the findings reveal significant gaps in knowledge and practice among participants. Addressing these gaps requires multifaceted approaches, including targeted educational interventions, training for healthcare providers, and the development of supportive environments that facilitate

open discussions about testicular health. By equipping young men with the knowledge and skills to monitor their testicular health effectively, we can empower them to take proactive steps towards early detection and intervention, ultimately leading to improved health outcomes and reduced mortality rates associated with testicular cancer.

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