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Research Article

Knowledge, Attitude and Practice of Testicular Self Examination among Male Undergraduate Students of University of Nigeria Enugu Campus

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Abstract

Background: Testicular cancer (TC) is the most common cancer in males between the age of 15 and 34 years with an incidence rates for new cases rising on an average of 0.8% each year over the last 10 years. Testicular self-examination (TSE) is the recommended preventive approach to reduce testicular Cancer (TC) mortality and morbidity.

Objectives: This study examines the knowledge, attitude and practice of TSE among male undergraduate students.

Methods: A descriptive research design with a sample of 343 students was recruited for the study. The students were stratified based on their faculties and convenient sampling was used to select the respondents. A self-structured questionnaire was used for data collection.

Result: The findings showed that more than average (57.7%) have heard about TSE, but the level of knowledge is poor, as only (35%) have good knowledge. Their attitude is poor as (83.8%) feels it is embarrassing to touch their scrotum. Due to the poor knowledge and attitude, the majority of the respondents 133 (69.43%) did not practice TSE. Of those 59 (30.7%) that practiced, only 20 (33.9%) respondents carried it out monthly as recommended. Chi-square analysis revealed a significant relationship between their knowledge of TSE and TSE practices (p = 0.006). **Conclusion**: This suggests that information should be provided to the public especially; young men through television, billboard, and other media on the need for regular TSE and TSE should be integrated into the secondary school curriculum.

Keywords: Testicular Self-Examination, Testicular Cancer, Nurses, Undergraduate, Enugu

INTRODUCTION

Testicular cancers are rare when compared with other types of cancer, accounting for 1% of malignancies in men, but it is the most common cancer in males between the age of 15 and 34 years[1]. The incidence rates for new testicular cancer cases have been rising on the average of 0.8% each year over the last 10 years. In 2019, it was estimated that there will be 9,560 new cases of testicular cancer and an estimated 410 people will die of this disease[1], while Siegel[2] estimates that there will be about 9,610 new cases of testicular cancer in the United States for 2020 and about 440 deaths as a result. Incidence varies considerably in different geographical areas and Africa is reported to have an age standardized incidence rate of <1/100,000 men[3]. This tends to diminish the size of the problem, but studies have consistently shown that this disease, which has excellent cure rates in the western world, is often attended in Africa, by late presentation, poor prognosis and significant mortality.

The risk factors for developing testicular cancer (TC) according to American cancer society[4] includes undescended testicles (cryptorchidism), family history of testicular cancer, and personal history of testicular cancer. Also, Caucasian American men have a five times greater risk than African American men and more than two to three times greater risk than Asian, Native American, and Hispanic American men. And the risk of developing TC is higher in HIV-positive men (p. 1533). TC is highly curable if detected early and appropriate treatment is given even before it is disseminated and the 5-year survival rate becomes 99.2% if the cancer has not spread outside the testicle while if it has spread into nearby lymph nodes, the rate become 96.1% and if it has spread to organs or lymph nodes away from the testicle, the five year survival rate will be 73.2%[1]. More than 90% of patients are cured with surgery, radiotherapy, and chemotherapy alone or combination of them[5]. The recommended preventive techniques to reduce Testicular Cancer (TC) mortality and morbidity include Testicular self-examination (TSE) and clinical testicular examination. But, clinical testicular examination requires hospital visit and expertise whereas TSE is an inexpensive tool that can be carried out by men themselves.

Testicular self-examination refers to the procedure by which a man checks the appearance as well as the consistency of his testicles. It is a simple, painless procedure, easy-to-learn and requiring about three minutes to complete. Miller et al.[6] recommended testicular self-examination as part of a routine cancer-related check-up, designed to facilitate early detection of testicular cancer and it should be performed monthly by males beginning at the age of 15 years. This recommendation is supported by the fact that most cases of TC is first discovered by the individual himself[7]. According to American cancer society[8], in some men, early testicular cancer causes no symptoms that will make them to seek medical attention. Most of the time, a lump on the testicles is the first symptom, other times, the testicles are swollen or larger than normal without a lump. Most men do not realize that something is wrong until cancer has grown quite larger and even spread[8].

Although TSE is recommended at an early age, several studies show low awareness and practice of TSE[7, 9, & 10]. Out of the 540 secondary school boys studied in Benin City, nearly all (98.7%) of the students never heard of TSE[7]. Furthermore, Ingwu et al.[9] study of 172 male medical students of the University of Nigeria, Enugu campus, revealed that 110 (64.0%) had good knowledge of TSE, but their knowledge was not proportional to the level of their practice as 94(54.1%) had not performed TSE. According to Ugboma et al.[10], as cited by Ingwu et al.[9] the awareness of testicular cancer is poor among Nigerian men and is the main factor to lack of testicular self-examination as they were never taught or ever heard about it. The findings suggest that, even in high-risk setting, TSE practices were low and irregular. Muliira et al.[11] also confirmed that 80% of their respondents were not examining their testicles regularly. Public health campaigns, health education for TSE, accompanied with leaflets were among their recommendations. Alemu and Baih[12] and Ingwu et al.[9] reported a deficit in men's knowledge and need for change of attitude towards TSE practice, in particular among young populations such as university students. Poor public awareness of the disease and accurate knowledge of testicular self-examination may account for late presentation. Health education campaigns in developed and developing countries have dramatically increased awareness of breast and cervical cancers in women at risk, and have led to increased rates of early diagnosis and treatment, but the reverse has been the case for TC in men[10].

The unknown cause of TC and the well-known deleterious impact of diagnostic delay warrant attention to the value of prevention. Therefore, there is an urgent need for deliberately tailored health education by teachers and health care providers; with massive public awareness through various media, this can address the identified gaps. And to develop these effective interventions that stimulate young men to start practicing TSE, current data are needed. So it seemed highly relevant to gain insight into the knowledge, attitude, and barriers to effective practice that these young men experience concerning TSE. Also, undergraduate students demographic represent the age group where TC is most common and thus they may be representative of the habits of the larger population. It is for this reason that the researcher is prompted to determine the knowledge, attitude and practice of TSE among male undergraduate students of University of Nigeria, Enugu Campus, in preparation to increase TC awareness and prevention. The findings of this study will be needed to identify the gaps in the existing knowledge and guide in drawing out effective interventions that stimulate young men to start practicing TSE.

MATERIALS AND METHODS

Design and Participants

A descriptive cross-sectional survey design was employed for this study. It utilized the proportionate Stratified Random Sampling technique to select 343 undergraduates from the six faculties of University of Nigeria, Enugu Campus. According to their Student Affairs Department, the population of male students is 2386 students. Convenient sampling was subsequently used to select the respondents from each faculty. Using this technique, the sample size of each stratum was proportionate to the population size of the stratum when viewed against the entire population.The sample size was estimated to be appropriate using Taro Yamane's formula[13].

Instrument for Data Collection

A researcher-developed questionnaire was used for data collection. It sought information on the knowledge, attitude and practice of testicular self-examination among male undergraduate students. The structured questionnaire was designed in line with reviewed literature, taking into consideration the objectives of the study and the research questions. The questionnaire was in a close-ended format where the respondents were expected to tick the most appropriate answer from the list of options. It was made up of five sections A, B, C, D and E. Section A dealt with the personal data of the respondents, section B generates information on knowledge, Section C ascertained information on attitude, while section D and E elicit information on the practice level and factors affecting practice respectively. The knowledge aspects of the instrument have 7 questions. The attitude aspects of the instrument have 8 questions. The practice aspects of the instrument also have 8 questions while the factors aspects have 10 questions. Altogether, there were 38 items in the questionnaire.

The questionnaire was constructed by the researcher and submitted to two academic nurses and two oncologists who corrected and modified the questions to ensure their appropriateness, face and content validity. Ambiguous items were identified, clarified and reinstated. These experts approved the final drafts before it was distributed for reliability test.

A pilot survey was conducted using 10% of the sample size of male undergraduate students from the University of Nigeria, Nsukka. Online links of the questionnaires were distributed to various whatsapp groups of these students who have similar characteristics with the sample population under study. The result from cronbach's alpha was 0.83, which confirmed that the instrument was reliable to measure the constructs of interests.

Procedure for Data Collection

Prior to data collection, an introductory letter was obtained from the Head of Department of Nursing Sciences, UNEC. This letter was presented to the Dean, Department of Student Affairs who gave approval for data to be collected from the students. The students recruited for the study were required to grant consent after explanations were given, anonymity and confidentiality of the respondents were ensured and participation was voluntary. Also, ethical approval was gotten from the Health Research Ethical Committee (HREC) of University of Nigeria Teaching Hospital, Ituku-Ozalla Enugu.

Data were collected through the use of structured questionnaires, uploaded unto the online google form

platform. The link was sent to the various WhatsApp group chats of the respondents. Research assistants were mobilized from the different faculties to help motivate students to fill the questionnaires. The link was disabled when the required numbers of forms have been submitted. The purpose of the study was explained and anonymity guaranteed to the respondents.

Data Analysis

Data for the study was collected, organized and analysed using Statistical Package for Social Science (SPSS) version 25. Data was subjected to simple descriptive statistical method of proportion which includes frequency and percentages and they were presented in tables in line with the study objectives. To further address the objectives of the study, answers (using descriptive statistics such as mean and standard deviations) were provided for the research questions. Also, Chi-square test was used to establish the relationship between knowledge and practice of TSE among the male undergraduate

RESULTS

Table 1 revealed the demographic characteristics of the respondents. Findings show that more than average the respondents were at the age range of 22 – 28 years (58.3%), most of the respondents were single (80.2%), majority of the respondents were Christians (89.8%), more of the respondents were from faculty of Health Sciences and Technology while majority were of 200 level (30.0%).

Table 1: Socio-demographic Characteristics of the Respondents (n = 333)

Variables	Options	Frequency (N)	Percentage (%)
Age	15 – 21 years	52	15.6
	22 – 28 years	194	58.3
	29 – 35 years	78	23.4
	36 – 40 years	7	2.1
	41 years and above	2	0.6
What is your marital status	Single	267	80.2
	Married	64	19.2
	Divorced	2	0.6
	Widowed	0	0.0
Religion	Christianity	299	89.8
	Islam	32	9.6
	Traditionalist	2	0.6
	Others specify	0	0.0
Faculty of study	Health sciences and technology	80	24.0
	Business administration	69	20.7
	Law	39	11.7
	Medicine	52	15.6
	Environmental sciences	45	13.5
	Basic medical sciences	48	14.4
Level of study	100	42	12.6
	200	100	30.0
	300	84	25.2
	400	61	18.3
	500	46	13.8
	600	0	0.0

Level of knowledge of TSE and TC among the male undergraduate students

In table 2, the knowledge about testicular self-examination (TSE) of the respondents is presented. Findings show that more than average the respondents affirmed that they have heard about TSE (57.7%) of which most of them had their source of information from teacher (38.5%). Most of the respondents affirmed that TSE is best described as palpating the testicles to detect any lump or abnormality (32.8%), majority of the respondents affirmed that they don't know the age group to be at risk of testicular cancer (TC) (43.8%), more of the respondents affirmed that alcohol causes testicular cancer (31.6%), most of the respondents affirmed that lump/testicular swelling is a sign and symptom of testicular cancer (41.8%) while majority of the respondents affirmed that TSE should be done once a week (38.5%). The overall knowledge level indicates that the level of knowledge

about TSE possessed by the students was 35%. This finding indicates that the students' level of knowledge about testicular self-examination is very poor.

Table 2: Knowledge about Testicular self-examination (TSE) (n = 333)

Variables	Options	Frequency (N)	Percentage (%)
Have you ever heard about TSE?	Yes	192	57.7
	No	141	42.3
If yes, what is the source of the information?	Health/Medical professionals	62	32.3
	Media	18	9.4
	Teacher	74	38.5
	Family members and friends	38	19.8
Which of these best describe TSE	Washing the testicles	28	15.1
	Looking at the testicles in the mirror	59	30.7
	Checking the size and shape of the testes	42	21.9
	Palpating the testicles to detect any lump or abnormality	63	32.8
Which age group is at risk of TC?	Below 15 years	9	4.7
	15-35 years	51	26.6
	Above 35 years	48	25.0
	Don't know	84	43.8
Which of the following do you think are the causes of testicular cancer?	Alcohol	162	31.6
	Smoking	122	23.8
	Sexual promiscuity	89	17.4
	Spiritual	28	5.5
	Blow in the scrotum	112	21.8
Which of the following do you think are signs and symptoms of testicular cancers?	Lump/testicular swelling	248	41.8
	Testicular pains	182	30.6
	Lower abdominal pains	62	10.4
	Scrotal heaviness	102	17.2
How often should TSE be done?	Everyday	29	15.1
	Once a week	74	38.5
	Once a month	68	35.4
	Once in 6 months	16	8.3
	Once in a year	5	2.6
Overall knowledge	Poor	173	52
	Moderate	43	13
	Good	117	35

The attitudes regarding carrying out TSE among the male undergraduate students

Table 3 revealed the attitude of students towards TSE where mean score ≥ 3.0 is regarded positive and those score ≤ 3.0 is regarded negative. Findings revealed the following attitudes: It is embarrassing for me to touch my scrotum (4.18 ± 1.29) followed by TSE can be strenuous and painful to carry out (3.83 ± 1.42) and TSE can help to find lumps in the testicles (3.81 ± 1.37). The practice of TSE should be encouraged (3.71 ± 1.27); Monthly TSE can help in early detection of testicular cancer (3.55 ± 1.47); TSE is time consuming for me to carry out (3.49 ± 1.58) and TSE is against my cultural belief and practice (3.38 ± 1.52) were also identified though fairly.

Table 3: Attitude towards Testicular self-examination (TSE) (n = 192)

Attitude	SA	A	NO	D	SD	Mean	S.D.
TSE can help to find lumps in the testicles.	83	54	9	28	18	3.81	1.37
Monthly TSE can help in early detection of testicular cancer.	70	51	11	34	26	3.55	1.47
TSE can be strenuous and painful to carry out.	90	48	5	29	20	3.83	1.42
TSE is time consuming for me to carry out.	76	42	12	24	38	3.49	1.58
It is embarrassing for me to touch my scrotum.	112	49	3	9	19	4.18	1.29
Chances of getting TC in the future are increased if I fail to perform TSE.	24	38	18	40	72	2.49*	1.47
TSE is against my cultural belief and practice.	62	51	8	39	32	3.38	1.52
The practice of TSE should be encouraged.	67	60	15	42	8	3.71	1.27

Decision rule: (i) mean score ≥ 3.0 means that the item should be accepted
(ii) mean score ≤ 3.0 means that the item should not be accepted

Frequency of practice of TSE among male undergraduate students

Table 4 revealed the practice of testicular self-examination (TSE). Findings show that less than average the respondents affirmed that they have examined their testis (30.7%) of which most of them had their first testicular self-examination after 15 years (69.5%). More than half of the respondents perform testicular self-examination anytime they remember (50.8%). Most of the respondents affirmed that they perform TSE at any time (40.7%). More of the respondents perform TSE in the bathroom (35.6%), greater proportion of the respondents perform TSE by examining one testicle at a time. Majority of the respondents affirmed that they look for lump during TSE while more than half of the respondents affirmed that they performed their last TSE on last month (55.9%). The overall practice of TSE among students showed a poor practice about TSE (64.4%).

Table 4: Practice of Testicular self-examination (TSE) (n = 192)

Variables	Options	Frequency (N)	Percentage (%)
Have you ever examined your testis?	Yes	59	30.7
	No	133	69.3
If yes, when did you have your first testicular self-examination?	Before 15 years	8	13.6
	At 15 years	10	16.9
	After 15 years	41	69.5
How often do you perform testicular self-examination?	Weekly	5	8.5
	Once a month	20	33.9
	Once in 6 month	2	3.4
	Once a year	2	3.4
	Anytime I remember	30	50.8
When do you perform testicular self-examination?	Before sleeping	12	20.3
	Early in the morning	4	6.8
	At any time	24	40.7
	Immediately after a hot bath	19	32.2
Where do you perform testicular self-examination?	Standing in front of a mirror	20	33.9
	In the bath room	21	35.6
	Lying on the bed	18	30.5
How do you perform testicular self-examination?	Stand in front of a mirror, and observe the general appearance of the scrotum	31	15.7
(Tick as many as it applies to you)	If any lump or abnormality is found, it should be reported to a physician	35	17.7
	Use both hands to gently roll each testicle between the fingers	47	23.7
	Examine one testicle at a time	45	22.7
	Feel for any lump or bumps	40	20.2
What do you look out for during testicular self-examination?	Lump	41	69.5
	Discharges	9	15.3
	Discoloration	4	6.8
	Enlarged testicles	5	8.5
When was the last time you performed testicular self-examination?	Last month	33	55.9
	Six months ago	16	27.1
	A year ago	6	10.2
	Three years and more	4	6.8
Overall practice			
	Good practice	68	35.6
	Poor practice	124	64.4

Factors that influence effective practice of TSE among the male undergraduate students

Table 5 revealed the factors influencing TSE practice where mean score ≥ 3.0 is regarded positive and those score ≤ 3.0 is regarded negative. Findings revealed the following factors: TSE is awkward and embarrassing (4.14 ± 1.26) followed by TSE results in unease/anxiety (3.74 ± 1.45) and I cannot suffer from cancer (3.63 ± 1.54). TSE is immoral and against my religious belief (3.42 ± 1.85); Fear of locating a lump (3.36 ± 1.62); TSE is time-consuming (3.35 ± 1.53) and I do not have the knowledge and skills needed to perform TSE (3.07 ± 1.77) were also identified though fairly.

Table 5: Factors Influencing Testicular self-examination (TSE) practice (n = 198)

Factors Influencing TSE practice	SA	A	NO	D	SD	Mean	S.D.
TSE is immoral and against my religious belief	184	10	5	30	104	3.42	1.85
TSE is time consuming	111	82	3	87	50	3.35	1.53
TSE is painful	58	52	14	75	134	2.47*	1.56
TSE is awkward and embarrassing	192	74	8	39	20	4.14	1.26
Fear of locating a lump	113	94	11	31	84	3.36	1.62
TSE results in unease/anxiety	144	92	5	51	41	3.74	1.45
I do not have the knowledge and skills needed to perform TSE	118	52	20	20	123	3.07	1.77
I do not think it is important	91	36	13	82	111	2.74*	1.65
I cannot suffer from cancer	143	82	3	52	53	3.63	1.54
I don't have the required material e.g. a mirror	25	22	8	84	194	1.80*	1.23

Decision rule: (i) mean score ≥ 3.0 means that the item should be accepted

(ii) mean score ≤ 3.0 means that the item should not be accepted

The relationship between knowledge & practice of TSE among the male undergraduate students

Findings in Table 6 show significant relationship between knowledge and practice of TSE among the male undergraduate students of UNEC (p = 0.006). Their levels of knowledge have influence on their practice of TSE.

Table 6: The relationship between knowledge and practice of TSE among the male undergraduate students (n = 59)

		Practice		Total	Chi-square	p-value
		Good practice	Poor practice			
Knowledge	Good knowledge	6	5	11	10.392[a]	0.006
	Moderate knowledge	7	3	10		
	Poor knowledge	8	30	38		

Key: P value < 0.05 will be considered significant

DISCUSSION

The purpose of the study was to assess the level of knowledge, attitude towards, and practice of Testicular self-examination (TSE) among male undergraduate students of University of Nigeria, Enugu Campus (UNEC). The study revealed that majority of the students have heard about TSE but had poor knowledge about it. Most of the respondents affirmed that TSE is best described as palpating the testicles to detect any lump or abnormality, majority of the respondents affirmed that they don't know the age group to be at risk of testicular cancer (TC), more of the respondents affirmed that alcohol causes testicular cancer, most of the respondents affirmed that lump/testicular swelling is a sign and symptom of testicular cancer while majority of the respondents affirmed that TSE should be done once a week. Impliedly, these finding proofs that students are aware of TSE. Similar assertion was made in the study of Ugwumba et al.[14] where results revealed that In the TC domain, there was a high level of awareness of testicular cancer, but poor knowledge of the age group most affected. It is also in line with the study of Atuhaire et al.[15] where result revealed that of the male students, 41.8% reported to have knowledge about TSE. Most students rated their knowledge of TSE to be below 5 (from 1-10) and it was concluded that the knowledge and practice of TSE were low among adolescent secondary school boys in Ntare School in Mbarara District, South western Uganda. It is also in agreement with the study of Zeleke et al.[16] where result revealed that the major reason (62.0%) why students do not perform testicular self-examination was lack of knowledge about testicular self-examination.

Improving information dissemination about TSE and TC may help to reduce the presentation of patients at advanced stages of TC and may reduce costs incurred in their

management. University lecturers should create awareness and organize seminars about TSE for students. Teachers, health workers and significant others should encourage and supervise young men to perform TSE.

Also, findings from the study revealed that the highest attitude was on it is embarrassing for me to touch my scrotum followed by TSE can be strenuous and painful to carry out and TSE can help to find lumps in the testicles. The practice of TSE should be encouraged, Monthly TSE can help in early detection of testicular cancer, TSE is time consuming for me to carry out and TSE is against my cultural belief and practice were also identified though fairly. Impliedly, these findings suggest that the students have moderate attitude towards TSE. Similar findings were observed in the study of Ramim et al.[17] where Less than 5% of the students reported they had knowledge regarding TSE and only 10% were performing it. Just 2% of them were found to have good knowledge about TC and 17% had good awareness about TSE. Under 10 % of the participants had good attitude about performing TSE and over 81 % also showed poor self-efficacy. In agreement was on the study conducted by Zeleke et al.[16] where the finding revealed that almost half (51.3%) of respondents had favourable attitude.

Furthermore, the findings in this present study suggest that less than average the respondents affirmed that they have examined their testis of which most of them had their first testicular self-examination after 15 years. More than half of the respondents perform testicular self-examination anytime they remember. Most of the respondents affirmed that they perform TSE at any time. More of the respondents perform TSE in the bathroom, greater proportion of the respondents perform TSE by examining one testicle at a time. Majority of the respondents affirmed that they look for lump during TSE while more than half of the respondents affirmed that they performed their last TSE on last month. This finding indicates that the students have poor practice about TSE. This is in agreement with the study conducted by Peltzer and Pengpid[18] where the findings revealed that TSE practices were found to be inadequate and efforts should be made to develop programs that can increase knowledge related to testicular cancer as well as the practice of testicular self-examination.

More so, these study findings revealed the following factors: TSE awkwardness and embarrassing followed by TSE results in unease/anxiety and individual believes that they cannot suffer from cancer, morality and religious belief, and fear of locating a lump. Also, lack of time to conduct TSE and the necessary knowledge and skills needed to perform TSE were also identified though fairly. This is in line with the study conducted by Muliira et al.[11] where the result revealed that Most participants (80%) reported a lack of skill for performing TSE as well as perceiving TSE as embarrassing (87%) and time consuming (79%). Increased awareness campaign about testicular cancer to young men especially in higher institutions of learning.

A further analysis in this study showed that there is significant relationship between knowledge and practice of TSE among the male undergraduate students of UNEC ($p = 0.006$). In other words, their level of knowledge have influence on their practice of TSE. This is because the level of knowledge of TSE translates to its level of practices. This is in line with the study conducted by Ahmed et al. where the result revealed that a statistically significant difference was found in knowledge scores between performers and non-performers of TSE.

These Findings are of practical implication for the nurses and other health workers as it will enable them to utilize every opportunity they have to educate young men and the entire public on the need for effective practice of TSE and how to perform it. This can be achieved through organizing health teaching, school visitation, and health outreach, use of handbills, magazines, media and posters in the hospital. It could as well help to promote the practice of TSE and help in early diagnosis and detection of TC.

However, this study is not without limitations. Especially as the data were collected through an online platform, it is possible that a characteristic sample of the male undergraduate different from those accessible by the researcher might have been omitted making the generalizability of these findings to warrant cautions. Further research is recommended in other populations and culture to establish better application on the society.

CONCLUSION

The students' level of knowledge about testicular self-examination is very poor and the students have poor practice about TSE. There was a significant relationship between knowledge and practice of TSE among the male undergraduate students of UNEC, which suggest that the students are unaware of the value of this personal health promotion tool. Knowledge about testicular self-examination should be increased for younger men through providing information to them and if done, young males would be willing to participate in taking preventive measures.

What is already know on this topic

- Testicular cancer (TC) is the most common cancer in males between the age of 15 and 34
- Testicular self-examination (TSE) is the recommended preventive approach to reduce testicular Cancer (TC) mortality and morbidity
- Yet previous studies have reported low awareness and practice of TSE

What this study adds

- This study finding adds to the few evidence in the literature focusing on the Nigerian context regarding the knowledge, attitude and practice of TSE among male undergraduate students.
- It shows that due to the poor knowledge and attitude, the majority of the respondents did not practice TSE.

Competing interests

There is no competing interest to declare.

Authors' contributions

Ilo IJ, and Omeye OB were involved in the conceptualization, and data curation. Ede SS and Chijioke V. involved in the formal analysis of the data. Ede SS, Okoh CF, and Ilo IJ carried out the original manuscript drafting and review editing. All authors read and approved the final draft.

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