Scientific Research Publishing

Journal of Cancer Therapy, 2024, 15, 331-345
https://www.scirp.org/journal/jct
ISSN Online: 2151-1942
ISSN Print: 2151-1934

Awareness, Practice and Intention to Practice Testicular Self-Examination among Professional Working Males in Ghana

Ninon P. Amertil[1], Cecilia Amponsem-Boateng[1,2*], Elikem K. Ayitey[3], Doris Grace Kpongboe[1], Pamphil Igman[4]

[1]Department of Nursing and Midwifery, Valley View University, Accra, Ghana
[2]Center for Academic Research and Engaged Scholarship, Valley View University, Accra, Ghana
[3]Data and Evaluation Specialist, DPL Data Consult, Accra, Ghana
[4]School of Medicine, American University, Oranjestad, Aruba
Email: *amponsemboatc@vvu.edu.gh

How to cite this paper: Amertil, N.P., Amponsem-Boateng, C., Ayitey, E.K., Kpongboe, D.G. and Igman, P. (2024) Awareness, Practice and Intention to Practice Testicular Self-Examination among Professional Working Males in Ghana. *Journal of Cancer Therapy*, **15**, 331-345.
https://doi.org/10.4236/jct.2024.1510032

Received: September 22, 2024
Accepted: October 25, 2024
Published: October 28, 2024

Abstract

Background: The aetiology of Testicular Cancer (TC) is still unknown to researchers but many of the associated risk factors have been identified. These include family history, age, racial origin, cryptorchidism, urogenital malformations, testicular atrophy, and infertility. Given the lack of scientific data on the causes of the disease, it has been asserted in previous studies that the promotion of awareness and early detection are prerequisites to mitigating risks of metastasis as well as improving survival. This study is to assess the awareness, practice, and intention to practice testicular self-examination among professional working males in Accra. **Methods:** A quantitative cross-sectional design with a structured research instrument was used to collect data from respondants. The purposive and convenience sampling techniques were used to collect data from 300 men at Accra in Ghana. The study was conducted at two (2) Universities and a Senior High school at Accra in Ghana. The data was then analysed using descriptive statistics, logistic regression, multiple linear regression, and structural equation modeling. **Results**: From the study findings, 37% of male participants rated their knowledge of testicular self-examination and related symptoms as good, 28% of participants practised testicular self-examination monthly, while 65% of respondents expressed their intention to practice monthly testicular self-examination. The findings from logistic regression demonstrated that level of education, age, and marital status of participants had a significant influence on testicular self-examination. Additionally, the multiple linear regression results revealed knowledge and self-efficacy

significantly predict testicular self-examination intention. The path coefficient results from the structural equation model are consistent with results from the regression models. **Conclusion**: This research is the first to investigate testicular self-examination among men in Ghana. The findings revealed awareness and practice of TSE are low among participants. Therefore, the research findings would improve the expertise of physicians and nurses in providing counsel, intervention, and support for patients at risk of testicular cancer.

Keywords

Testicular Cancer, Testicular Self-Examination, Awareness and Practice, Health Promotion, Men's Health

1. Introduction

The incidence of Testicular Cancer (TC) has been rising in the developing world including countries in Sub-Saharan Africa, making it a growing malignancy in males in the at-risk 15 - 45 age group. [1] [2] Testicular Self-Examination (TSE) is simply a man examining himself to detect if any abnormalities exist in the testicles. It is generally a painless procedure and vital to the early detection of TC. The aetiology of TC is still unknown to researchers but many of the associated risk factors have been identified. There are evidence that proves that family history of Testicular Cancer coupled with the presence of Contralateral TC/Germ Cell Neoplasis in first degree relatives increases the risk of testicular tumors, making family history an associated risk factor. Other risk factors include Testicular dysgenesis syndrome (hypospadias, cryptorchidism, impaired spermatogenesis), age, racial origin, and infertility [3] [4]. In a case report on Primary Testicular Lymphoma by Nioka *et al.*, one of the most common type of Testicular Cancer occurring in the elderly, usual symptoms included a progressive increase in testicular volume over months, fever and weight loss. Some classical signs in the localized stage also included solid testicular mass of variable size, and such abnormalities can be detected earlier when regular TSE is practiced. [5] Other signs and symptoms that can easily be detected include palpable mass in the testicle, induration of the testicle, or scrotum enlargement, [6] Given the lack of scientific data on the causes of the disease, it has been asserted in previous studies that the promotion of awareness and early detection are prerequisites to mitigating risks of metastasis as well as improving survival. [7] For example, TC patients who are diagnosed early in the European Population have a 5 years survival rate higher than 90% [6].

However, a limitation highlighted in past studies is the low awareness and efficacy of TSE performance. It was discovered, in several past studies, that men falling in the 18 - 45 age bracket lacked awareness of TC and did not practice TSE. [8] Though it is asserted that TSE may not generally improve longevity rates, it has the advantage of early detection and diagnosis, and can potentially reduce

morbidity associated with treatment. For instance, A study undertaken in Nigeria found that almost 99 percent of students surveyed never heard about TSE. [9] A similar study undertaken in Uganda found, though majority of the participants had heard of TC and TSE, about 80% of them felt they did not have the necessary skill to perform TSE and 84% were not examining their testicles regularly. [10] These findings from Africa are similar to the Polish study, where they found that not only are participants not aware of the various signs and symptoms, but they also did not perform TSE, their main reason being attributed to the lack of knowledge and practical skills [6]. A study conducted in Turkey also found that only about 6 percent of respondents ever had any information on TSE. [11] To a large degree, TSE behaviour is underscored by self-efficacy. Studies in the literature have found that the majority of males have suboptimal practices concerning TSE. It also implies that awareness alone is insufficient to promote regular TSE. Indeed, academic research pointed to low efficacy in men towards TSE as well as unfavourable attitude to TSE behaviour. It was found in a study in Nigeria that not only did the male respondents lack the competence for TSE but also found TSE as a practice embarrassing. [12] According to the International Agency for Research on Cancer (IARC), there is inadequate cohesive data on cancers in Ghana, such that estimates of cancer in the country are based on models that include a prevalence of risk factors and the use of data from other countries in Sub-Saharan Africa. [13]

There are social psychology models that explain human social behaviour and these include the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). This study partly applies the TPB which suggests that human behaviour in many ways is determined by behavioural intent. [14] [15] The components of behavioural intent include attitudes, norms, self-efficacy, and perceived control. Attitude relates to the degree to which an individual has a favourable or unfavourable evaluation of specific behaviour and its outcome. Subjective norm is the belief about whether most people approve or disapprove of the specific behaviour. Self-efficacy refers to the belief in one's ability to perform the behaviour while perceived control concerns the perception of control over the behavior. Since the level of knowledge and practice of TSE tend to be low statistically from the literature, we considered it relevant to investigate the intention to perform TSE after respondents are introduced to the topic.

The findings from the academic literature showed the need for more studies to educate men on TC risk and the ability to self-examine. Additionally, there are few studies investigating awareness, attitudes, and practice of TSE among males in Ghana. The authors have not found a single study on TC and TSE in Ghana. Thus, the overall purpose of the study was to assess the awareness, practice, and intention to practice TSE among professional working males in Accra. The specific objectives were the following: to examine the knowledge level and practice of TSE, to assess the intention to practice TSE, and to determine the interrelationships among demographics, awareness, practice, and intention to practice TSE

among career male professionals.

2. Methods

2.1. Design

A quantitative cross-sectional design with a structured research instrument was used for the study.

2.2. Participants

The study population consisted of professional males employed within universities and an elite high school in Accra. Preference was given to men having a minimum of tertiary level education, which in Ghana would imply a tertiary level diploma, university degree, and postgraduate degree. This was done to ensure a well-educated study population with adequate concern for personal health. Study respondents were men 20 to 55 years who consented to participate in the study. The respondents were selected mostly from two (2) universities and a Senior High School in Accra-Ghana.

2.3. Sample Size Determination

Employing the single proportion population formula considered on the following assumptions: (p)-prevalence of TSE among men in Ghana (p = 50); margin of error (5%) and a 95% CI ($z_{1/2}$ = 1.96).

$$N = z^2 \times p(1 - p)/m^2$$

n = required sample size

z = confidence level at 95% (standard value of 1.96)

m = margin of error at 5% (standard value of 0.05)

p = estimated population proportion (50%)

The computed value n = 300 individuals.

The estimation approach is consistent with the statistical approach recommended by Kline for studies incorporating structural equation modeling (SEM). [16]

2.4. Measures

The survey instruments used for the study were designed by the study investigators, adapting them from validated instruments used in previous studies. [17] The questionnaire was divided into four main sections including demographic variables, items relating to knowledge/awareness of TSE, the practice of TSE, attitudes towards TSE, and intention to practice TSE. The instruments included Likert-scale-type items. The demographic characteristics had a total of 8 items, knowledge/awareness construct - 6 items, practices construct - 7 items, and constructs relating to intention to practice - 15 items.

2.5. Data Collection

The researchers sought permission from some departments in the selected

universities and collected data with the help of two research assistants. The subject matter was explained to potential respondents and informed that participation in the study was voluntary. All participants were required to sign a consent form before providing data. National Covid-19 safety guidelines were adhered to during data collection from August to December 2021. Both paper and digital questionnaires were used.

2.6. Validity, Reliability, and Rigour

The validity and reliability of instruments were ensured. Two scholars with expertise in the subject area analysed the research items for appropriateness. The questionnaire was also served to a total of 10 individuals for a pretest. The Cronbach alpha value was used to compute the reliability of the instruments. For the TSE intention scale, the alpha value was 0.757. The self-efficacy construct recorded 0.801, the subjective norm construct was 0.723, the behavioural control construct recorded 0.652, and the attitude scale was 0.644. For the other constructs used for analysis, the knowledge/awareness scale had 0.703, while the TSE practice construct registered 0.742. These results to a large degree conform to standard practice. [18]

2.7. Data Analysis

Data were analyzed using statistical software SPSS version 25 and Stata 15. The major TSE constructs are knowledge/awareness of TSE, the practice of TSE, attitudes towards TSE, and TSE intention to practice. The logistic regression model was used to determine the association between the demographic indicators and the TSE variables. The TSE variable practice served as a dependent variable against demographic indicators as predictors. TSE intention was also measured using the multiple linear regression model. Additionally, SEM was employed to evaluate the interrelationships among variables. In the structural model, TSE intention and TSE practice acted as endogenous variables.

2.8. Modeling Strategy

TSE connotes self-practice of testicular examination, implying TSE is an outcome variable. The practice of TSE was represented by a dichotomous variable guided by the item in the questionnaire: how often in the past year did you practice TSE with response options monthly denoted by 1 and the alternative denoted by 0. Practising TSE at least once monthly is considered regular while if not done monthly is considered not regular in this study. This is in agreement with the standard used in previous studies. Logistic regression was found suitable to this study, stemming from the fact that many previous studies on TC and TSE applied the model. [19]

2.9. Model Parameters

Practice of TSE: The numerical value 1 is assigned if practised monthly while 0

is ascribed for the alternative. TSE practice served as a response variable.

Demographic variables: Used as explanatory variables in the model.

The data used for analysis were verified to satisfy logistic regression assumptions. The assumptions include using a binary response variable (the practice of TSE), and the absence of multicollinearity which was checked using variance inflation factor (VIF) and tolerance statistics. The VIF statistics were all less than 2, while the tolerance statistics were more than 0.5. [20]

2.10. Multiple Linear Regression Model

The multiple linear regression was used to evaluate the association between TSE intention as the response variable and TPB constructs as predictor variables. Multiple linear regression assumptions were checked by computing the normality of data, multicollinearity, and homoscedasticity. Dataset normality was checked using the normal P-P plot, which showed the residual values conforming to the diagonal normality line. The VIF statistics were less than 3, and the tolerance statistics were more than 0.5. The homoscedasticity assumption was also satisfactory.

2.11. Structural Equation Model

The structural equation makes use of the TPB variables as aforementioned: intention to perform TSE, attitudes, norms, self-efficacy, and perceived control. Knowledge of TSE and demographics were also used in the model. TSE behaviour was an endogenous (outcome) variable, while TSE intention served as both an endogenous and mediating variable.

2.12. Ethical Approval

Ethical approval was received from Institutional Review Board (IRB) of Dodowa Health Research Centre, Ghana Health Service, Dodowa, Accra. The official ethics reference number was DHRCIRB/065/06/21. Research participants were assured that the data provided would remain anonymous and confidential.

3. Results

3.1. Respondents' Socio-Demographic Characteristics

A total of 300 men participated in the study. The findings on demographic characteristics are shown in Table 1. From the findings, the largest number of participants were in the 36 - 45 age category 119 (39.7%). The results also showed that the majority of men 165 (55%) were in marital union while 123 (41%) identified as single. The highest number of respondents were those having a bachelor's degree 150 (50%) followed by respondents with a master's degree 102 (34%). A high proportion of men, 288 (96%) responded they had no family history of TC while only 12 (4%) responded yes. Furthermore, 75 (25%) participants said they knew how to perform TSE, while 225 (75%) responded no.

Table 1. Socio-Demographic information (N = 300).

Variable		Frequency (%)
Age		
	15 - 25	39 (13)
	26 - 35	88 (29.3)
	36 - 45	119 (39.7)
	46 - 55	54 (18)
Marital Status		
	Single	123 (41)
	Married	165 (55)
	Divorced	9 (3)
	Widowed	3 (1)
Education		
	HND/Diploma	33 (11)
	Bachelor	150 (50)
	Masters/Post Grad	102 (34)
	PHD	6 (2)
	Others	9 (3)
Ethnicity		
	Akan	135 (45)
	Ga	39 (13)
	Ewe	63 (21)
	Fante	18 (6)
	Dagomba/Hausa	9 (3)
	Non-Ghanaian	3 (1)
	Others	33 (11)
Family History of TC		
	Yes	12 (4)
	No	288 (96)
Personal History of TC		
	Yes	3 (1)
	No	297 (99)
Do you know how to perform TSE?		
	Yes	75 (25)
	No	225 (75)
Has a physician recommended TSE?		
	Yes	9 (3)
	No	291 (97)

Source: Field Survey, 2021.

3.2. Knowledge and Awareness of TSE

Concerning the findings for knowledge/awareness of TSE, 153 (51%) of respondents stated that they ever heard of TSE while 147 (49%) did not. As regards respondents knowledge level of TSE, 189 (63%) rated it as poor, but 111 (37%) said it was good. A total of 144 (48%) participants received TSE information from the media, followed by 78 (26%) who received it from health professionals, 57 (19%) from friends, and 21 (7%) from school. Concerning the importance of doing TSE, only 93 (31%) of study participants correctly selected diagnosis, while the remaining 207 (69%) failed. As regards the age group of men at risk of TC, only 39 (13%) of respondents were correct in selecting the 15 - 45 age bracket. Thus, a high number of respondents 261 (87%) failed.

3.3. Practices of TSE

In relation to TSE practice, 61% of respondents said they ever examined their testis while 39% did not. The findings on TSE practice are presented in Table 2. The results showed that only 28% of respondents correctly practised TSE once monthly in the previous year. The majority 72% followed different schedules. Only 22% correctly selected inspection and palpation as the correct technique for performing TSE. Moreover, as low as 7% correctly identified after showering as the right time to perform TSE. A minority of 26% of the respondents rightly identified in front of the mirror as the place to perform TSE. Furthermore, 22 percent of respondents taught themselves how to perform TSE while 15% were taught by health practitioners.

Table 2. Practices of TSE (N = 300).

Variable		Frequency (%)
Ever examined your testis?		
	Yes	183 (61)
	No	117 (39)
Age of starting TSE		
	<15	27 (9)
	≥15	102 (34)
	Not sure	171 (57)
How often did you practice TSE last year?		
	Once monthly	84 (28)
	Once in 3 months	51 (17)
	Once in 6 months	45 (15)
	Once in a year	120 (40)
	Don't know	0 (0)
Techniques of doing TSE		
	Inspection and palpation	66 (22)
	Only inspection	69 (23)
	Not sure	165 (55)

Continued

Time to perform TSE		
	Before showering	117 (39)
	After showering	21 (7)
	Any time	162 (54)
Place to perform TSE		
	In front of mirror	78 (26)
	In the bathroom	129 (43)
	Lying on bed	93 (31)
Were you taught how to perform TSE		
	Yes, by an expert	45 (15)
	Yes, by self	66 (22)
	No	189 (63)

Source: Field survey, 2021.

3.4. Multiple Regression Analyses

3.4.1. Logistic Regression Using TSE Practice as the Outcome Variable

These are age, marital status, education, family history, and personal history. The forward stepwise binary logistic method was applied. The stepwise method is preferred in studies with scanty information on variables. [21] Since a precedent study on the topic in Ghana has not been found by the authors, the stepwise technique is justified. From the results in Table 3, the overall model was statistically significant relative to the null hypothesis (X^2 (4) = 51.893), accounts for 26% of the variation in TSE practice using Nalgelkerke R-Square, and correctly predicted 75% of cases. The predictors showed that age (OR= 1.45, 95% CI: 1.07 - 1.96, P = 0.017), marital status (OR = 0.216, 95% CI: 0.11 - 0.44, P = 0.000), and education (OR = 3.07, 95% CI: 1.85 - 5.10, P = 0.000) significantly predicted the odds of practicing TSE.

Table 3. Binary logistic regression of TSE practice.

Variables	Coefficient	S.E	Wald	DF	P-value	Odds Ratio (OR)	95% C.I.
Age	0.369	0.155	5.648	1	0.017	1.45	**1.07 - 1.96**
Marital	−1.533	0.365	17.648	1	0.000	0.216	**0.11 - 0.44**
Education	1.121	0.259	18.696	1	0.000	3.07	**1.85 - 5.10**
Family history	22.313	1.965	0.000	1	0.648	4.904	**2.20 - 4.50**
Constant	−2.319	0.567	16.727	1	0.000	0.098	-

Source: Field Data, August-December, 2021. Significant value was computed at P < 0.05.

3.4.2. Multiple Linear Regression Using TSE Intention as the Outcome Variable

To assess the TSE intention of respondents, multiple linear regression was applied. The findings are shown in Table 4. TSE intention construct was the outcome variable while knowledge of TSE and (TPB) constructs, namely behavioural control, subjective norms, self-efficacy, and attitudes served as explanatory variables. The model explained 73% of the variance in the dependent variable (TSE intention)

and was statistically significant (R-square = 0.730; F (5, 294) = 159.28, P < 0.001). Among the predictors, knowledge/awareness (P = 0.000) and self-efficacy (P = 0.000) significantly predicted TSE intention.

Table 4. Multivariate linear regression of TSE intention.

Variables	Coefficients	Standard Error	Beta (SB)	T-Statistic	P-Value
Knowledge	0.133	0.031	0.134	4.249	0.000
Self-efficacy	0.820	0.048	0.816	17.145	0.000
Subjective norms	0.100	0.072	0.065	1.383	0.168
Behavioural control	0.028	0.072	0.012	0.382	0.703
Attitudes	−0.308	0.043	−0.038	−0.890	374
Constant	4.385	0.896	-	4.893	0.000

R = 0.792; R-square = 0.730; F (5, 294) = 159.28; P < 0.001; Significant value at P < 0.05. Source: Field Data, August-December, 2021.

3.5. Structural Equation Model

Figure 1 shows that the TPB constructs and knowledge of TSE operated as exogenous variables with TSE intention as an endogenous variable. The model demonstrates that the coefficient between knowledge and intention is 0.13, the coefficient between self-efficacy and intention is 0.82 and the others. Additionally, demographic variables age, education, and marital status acted as exogenous variables with TSE behaviour as an endogenous variable for the other model. The SEM model showed that TSE intention was not only an endogenous variable but also a mediating variable for TSE behaviour. Figure 1 illustrates that the structural equation model path coefficients confirmed results from the regression models. Overall the path analysis results indicated that TSE intention as an endogenous and mediating variable had a significant positive influence on TSE behaviour.

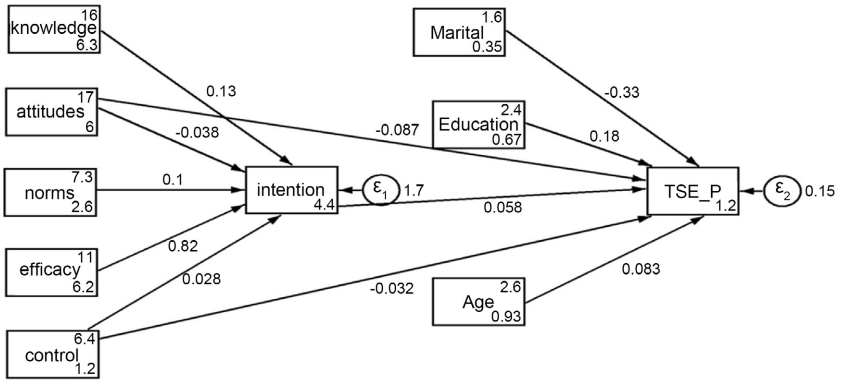

Figure 1. Path analysis from the model with modified fit indices. Source: Field Data, August-December, 2021.

4. Discussion

The findings from this study revealed that respondents' knowledge level of TSE is weak. When respondents were asked to rate their knowledge level of TSE and

related symptoms, only 37% rated it as good. Generally, the responses to the questions assessing respondents' knowledge level of TSE were unsatisfactory. Additionally, concerning the question of how frequently TSE should be conducted, just 28% men participants selected the correct response which is once monthly. Data published by Zeleke, Argaw, & Kefale showed that 31.8% of participants in that study from Ethiopia rated their knowledge of TSE as good. [25] In the study by Cronholm *et al.* 36.5% men participants correctly identified TSE should be performed monthly. [19] In this study, 13% of respondents correctly identified the age group at risk of TC, compared to 39% of participants who correctly did so in the study by Roy and Carson. A past study observed that men globally have basic knowledge about TC whereas their general knowledge level of TSE tends to be poor.

The results from this study indicate that 28% of participants correctly practised TSE once monthly in the previous year. The analysis of data revealed that the performance of TSE is low among respondents in agreement with the trend in the literature. In the study by Zeleke, Argaw, &Kefale, the number of participants who reported practising TSE regularly monthly was 11.8%. [25] In another study, TSE performance was reported at 17.5% among male university students in South Africa. [23] Besides the low number of participants practicing TSE in this study, it was also found that TSE know-how was generally poor. Also, only 7% of participants correctly identified after showering as the right time to perform TSE.

TSE intention is differentiated from TSE practice in the literature. Though TSE practice tends to be low among men, whenever men are introduced to or educated on the topic, they show a greater interest in doing TSE. Lechner, Oenema, & de Noojier in their study reported only 2% of male respondents regularly performed TSE. By introducing respondents to the subject, 41% of participants indicated they intended to practice TSE. A past study noted that men with better knowledge of TC are more likely to conduct regular self-exams. [24]

The findings from the binary logistic regression demonstrated that among the variables used in the model, education, age, and marital status predicted the likelihood of TSE performance. Concerning education and TSE practice, it is plausible that higher educated men in this study may be more aware of their risk for testicular cancer, and therefore adopt TSE as a preventive measure for testicular health. The finding on age shows that TSE practice is higher among older men than younger men, perhaps due to the misconception among younger men that cancer is an "old age" disease. Marital status predicted the odds of TSE practice but with a negative coefficient. This result on marriage shows that marital relationships decrease the odds of practising TSE. Thus, it can be hypothesized that TSE performance is lower in married men than in unmarried men in this study.

The multiple linear regression model was used to analyse TSE intention as the response variable and TSE knowledge, as well as the TPB constructs, namely behavioural control, subjective norms, self-efficacy, and attitudes as predictors. From the results, knowledge/awareness and self-efficacy significantly predicted

TSE intention. This finding is supported by several precedent studies. Cronholm *et al.* found that adolescent male respondents who had little knowledge of TSE were more likely to delay performing TSE. [19] Also, some precedent studies noted that increased knowledge of TSE increases the likelihood of greater self-exams. Self-efficacy connotes know-how or the ability to perform a task. Cronholm *et al.* reported in their study that respondents who were taught how to perform self-exam by a professional were associated with higher TSE performance. Largely, the path coefficient results from the structural equation model are consistent with results from the regression models. The results from SEM demonstrated that TSE intention ultimately predicts TSE behaviour. In other words, intention to conduct TSE and associated TPB constructs as well as knowledge of TSE ultimately influence TSE performance.

The findings from this study provide important implications for health professionals and the public. Knowledge and efficacy of TSE are low among research participants. These suggest the need for increased health education interventions for men on TC and TSE using various media platforms. Healthcare institutions must encourage clinicians to improve the delivery of preventive TC and TSE messages to at-risk men. Increased TSE awareness can also be achieved by using educational tools such as brochures (both print and online), PowerPoint Presentation, motivational videos, and other visual aids. Currently, there are no known wellness clinics for TC screening in Ghana. From the findings, better education and knowledge had a positive influence on TSE behaviour, so the outlined measures can change attitudes toward TSE and improve health vitality for men in Ghana. One other inference from the findings is that as increased knowledge and awareness of TSE positively impact TSE practice, this would likely influence men healthcare seeking behaviour for an early medical treatment should they discover a lump in their testicles. Hence, through TSE practice, should any of the signs and symptoms (palpable mass in the testicle, induration of the testicle, or scrotum enlargement) be observed, the individual must seek medical attention immediately. There is no need to panic as the disease is curable, even in later stages. [25]

A limitation of this study relates to the choice of study design. The use of only quantitative techniques prevented the collection of qualitative information that could help to understand the specific reasons why respondents who perform TSE regularly in this study do so. Generally, as deduced from the extant literature, the reason men do TSE is to help detect TC early. However, there could be other medical and cultural factors responsible for doing TSE. It is suggested that future studies can incorporate this theme.

5. Conclusion

Evidence from the literature demonstrates that this study is one of the first to deal with TSE in Ghana. Thus, the findings shed light on awareness and practice of TSE in Accra and provided baseline data for further research. This study revealed that awareness and practice of TSE are low among men, with only 28% of

participants practising TSE once monthly in the previous year. The intention to practise monthly TSE was found to be high similar to other previous studies. The findings from logistic regression demonstrated that level of education, age, and marital status significantly impacted TSE behaviour. Additionally, knowledge and self-efficacy were found to significantly predict TSE intention using the multiple linear regression. It is anticipated the findings from this study would improve the expertise of physicians and nurses in providing care for patients at risk of TC and the necessity for monthly TSE performance. As TSE is a cancer prevention measure, its increased adoption could plummet the development of testicular-related malignancies and associated morbidity, psychosocial stress, and financial costs to patients.

Acknowledgements

We appreciate the contributions of these two scholars for reviewing the manuscript: Dr. Frederick Vuvor, Senior Lecturer, University of Ghana, and Dr Yaw Akosa of Department of Molecular Pathobiology, New York University, United States.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Etita, E.R., Olaide, E.B., Mombel, O.M. and Edeyo, U.A. (2017) Knowledge, Attitude and Practice of Testicular Self-Examination among Male Undergraduate Students in a Tertiary Institution in Calabar, Cross River State Nigeria. *IOSR Journal of Nursing and Health Science*, **6**, 48-54. https://doi.org/10.9790/1959-0603024854

[2] Gutema, H., Debela, Y., Walle, B., Reba, K. and Wondiye, H. (2018) Testicular Self Examination among Bahir Dar University Students: Application of Integrated Behavioral Model. *BMC Cancer*, **18**, Article No. 21. https://doi.org/10.1186/s12885-017-3935-8

[3] Vadaparampil, S.T., Moser, R.P., Loud, J., Peters, J.A., Greene, M.H. and Korde, L. (2009) Factors Associated with Testicular Self-Examination among Unaffected Men from Multiple-Case Testicular Cancer Families. *Hereditary Cancer in Clinical Practice*, **7**, Article No. 11. https://doi.org/10.1186/1897-4287-7-11

[4] Cassell, A., Jalloh, M., Ndoye, M., Yunusa, B., Mbodji, M., Diallo, A., *et al.* (2020) Review of Testicular Tumor: Diagnostic Approach and Management Outcome in Africa. *Research and Reports in Urology*, **12**, 35-42. https://doi.org/10.2147/rru.s242398

[5] Çiftçi, H. and Savaş, M. (2008) Primary Testicular Lymphoma: A Case Report and Review of the Literature. *Turkiye Klinikleri Journal of Medical Sciences*, **28**, 984-987.

[6] Pietrzyk, Ł., Denisow-Pietrzyk, M., Czeczelewski, M., Ślizień-Kuczapski, K. and Torres, K. (2020) Cancer Education Matters: A Report on Testicular Cancer Knowledge, Awareness, and Self-Examination Practice among Young Polish Men. *Scientific Reports*, **10**, Article No. 20684. https://doi.org/10.1038/s41598-020-77734-3

[7] Roy, R.K. and Casson, K. (2016) Attitudes toward Testicular Cancer and Self-Examination among Northern Irish Males. *American Journal of Men's Health*, **11**, 253-261. https://doi.org/10.1177/1557988316668131

[8] Umeh, K. and Chadwick, R. (2010) Early Detection of Testicular Cancer: Revisiting the Role of Self-Efficacy in Testicular Self-Examination among Young Asymptomatic Males. *Journal of Behavioral Medicine*, **39**, 151-160. https://doi.org/10.1007/s10865-010-9262-z

[9] Onyiriuka, A.N. and Imoebe, F.E. (2013) Testicular-Self Examination among Nigerian Adolescent Secondary School Boys: Knowledge, Attitudes and Practices. *Journal of Preventive Medicine and Hygiene*, **54**, 163-166.

[10] Muliira, J.K., Nalwanga, P.B., Muliira, R.S. and Nankinga, Z. (2012) Knowledge, Perceived Risk and Barriers to Testicular Self-Examination among Male University Students in Uganda. *Journal of Men's Health*, **9**, 36-44. https://doi.org/10.1016/j.jomh.2011.11.004

[11] Ugurlu, Z., Akkuzu, G., Karahan, A., Beder, A., Dogan, N., Okdem, S., *et al.* (2011) Testicular Cancer Awareness and Testicular Self-Examination among University Students. *Asian Pacific Journal of Cancer Prevention*, **12**, 695-698.

[12] Ingwu, J.A. Shaeri, B. and Ezeude, A.G. (2016) Awareness and Practice of Testicular Self-Examination among Male Medical Students of University of Nigeria Enugu Campus, South-East Nigeria. *IOSR Journal of Nursing and Health Science*, **5**, 19-24.

[13] Ferlay, J., Soerjomataram, I., Dikshit, R., Eser, S., Mathers, C., Rebelo, M., *et al.* (2014) Cancer Incidence and Mortality Worldwide: Sources, Methods and Major Patterns in GLOBOCAN 2012. *International Journal of Cancer*, **136**, E359-E386. https://doi.org/10.1002/ijc.29210

[14] Lechner, L. (2002) Testicular Self-Examination (TSE) among Dutch Young Men Aged 15-19: Determinants of the Intention to Practice TSE. *Health Education Research*, **17**, 73-84. https://doi.org/10.1093/her/17.1.73

[15] McClenahan, C., Shevlin, M., Adamson, G., Bennett, C. and O'Neill, B. (2006) Testicular Self-Examination: A Test of the Health Belief Model and the Theory of Planned Behaviour. *Health Education Research*, **22**, 272-284. https://doi.org/10.1093/her/cyl076

[16] Kline, R.B. (2015) Principles and Practice of Structural Equation Modeling. Guilford Publications.

[17] Zeleke, S., Argaw, Z. and Kefale, D. (2019) Knowledge, Attitude and Practice towards Testicular Self-Examination among Regular Undergraduate Non-Health Sciences University Students, Debre Tabor, Amhara Regional State, North West Ethiopia. *Journal of Cancer Prevention & Current Research*, **10**, 35-41. https://doi.org/10.15406/jcpcr.2019.10.00388

[18] Tavakol, M. and Dennick, R. (2011) Making Sense of Cronbach's Alpha. *International Journal of Medical Education*, **2**, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

[19] Gutema, H., Debela, Y., Walle, B., Reba, K. and Wondiye, H. (2018) Testicular Self Examination among Bahir Dar University Students: Application of Integrated Behavioral Model. *BMC Cancer*, **18**, Article No. 21. https://doi.org/10.1186/s12885-017-3935-8

[20] Amertil, N.P., Ayitey, E.K., Kpongboe, D.G. and Attafuah, P.Y.A. (2020) Exploring Self-Management in Adult Sickle Cell Disease Patients' at a Teaching Hospital in Ghana. *Nursing Open*, **8**, 1336-1344. https://doi.org/10.1002/nop2.750

[21] Field, A. (2017) Discovering Statistics Using IBM SPSS Statistics. Sage Publications.

[22] Acock, A.C. (2013) Discovering Structural Equation Modeling Using Stata. Revised Edition, Stata Press.

[23] Peltzer, K. and Pengpid, S. (2015) Knowledge, Attitudes and Practice of Testicular

Self-Examination among Male University Students from Bangladesh, Madagascar, Singapore, South Africa and Turkey. *Asian Pacific Journal of Cancer Prevention*, **16**, 4741-4743. https://doi.org/10.7314/apjcp.2015.16.11.4741

[24] Brewer, G., Roy, M. and Watters, J. (2010) Testicular Self-Examination in an Adult Community Sample. *American Journal of Men's Health*, **5**, 57-64. https://doi.org/10.1177/1557988310361520

[25] Rovito, M.J., Leone, J.E. and Cavayero, C.T. (2015) "Off-Label" Usage of Testicular Self-Examination (TSE): Benefits Beyond Cancer Detection. *American Journal of Men's Health*, **12**, 505-513. https://doi.org/10.1177/1557988315584942