

Article

## A PRELIMINARY PSYCHOMETRIC ASSESSMENT OF THE ATTITUDE OF TERTIARY HEALTH TRAINEE UNDERGRADUATE STUDENTS TOWARDS BREAST - SELF EXAMINATION IN K.N.U.S.T, GHANA.

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### Abstract:

Breast self-Examination (BSE) is the cheapest most recommended Breast Cancer (BC) preventive tool for resource deprived settings. There is paucity in the Attitude research domain and comparative gender assessments of the BSE literature. The purpose of this study is to assess the combined and exclusive gender BSE attitude of undergraduate health trainees and to determine significant difference between scores of both genders. Online cross-sectional method was used to assess BSE attitude of 336 purposively sampled KNUST College of Health Sciences (CoHS) students. Compared to the construction groups' average norm of 101.17 (SD = 9.55), our Study Participants' BSE attitude is lower (92.51; SD = 11.80). However, using popular mid-point and 3 part scoring methods, our Study Participants' (SPs) attitude scores are comparable to sub-regional and national findings. Also contrary to the authors' expectation, the male participants scored generally high BSE attitude but significantly lower compared to their female compatriots ( $p < 0.5$ ). Implication, contextual challenges and recommendations for future research have been discussed. BSE KAP research and education must involve more males as important BSE stake holders and there is the need to adjust the curriculum of all health trainee students in developing nations to reflect relevant BC preventive measures.

**Keywords:** Psychometric Assessment, Attitude, Breast Self- Examination, Tertiary, Health Trainee, Undergraduate Students, Ghana

## 1.0 Introduction

Breast Cancer (BC) is a life-threatening malignant tumor that starts from the cells of the breast tissue [1,2] and spreads through the lymphatic system to invade important body parts and organs through metastasis [3]. This disease causes very high morbidity and mortality among many females and relatively fewer males. The World Health Organization's International Agency for Research on Cancer (IARC) is the official agency for all research into cancer and GLOBOCAN is its project that provide relevant cancer estimates globally. According to Globocan breast cancer (BC) incidences form 12.3% (i.e., 2 088 8490, out of 17 036 901) of all cancer cases in all ages globally and 6.6 % mortality (626 679 out of 9 489 872 deaths) of all ages as well as all sexes [Globocan (2020) *All cancers excl. non-melanoma skin cancer*. Available online: <https://gco.iarc.fr/today/data/factsheets/cancers/40-All-cancers-excluding-non-melanoma-skin-cancer-fact-sheet.pdf> (accessed on 6<sup>th</sup> March, 2021)].

The IARC's Globocan also predicts the future breast cancer incidence and mortality burden worldwide from the 2020 estimates of 2.26 Million and 685 000 to increase to 3.19 Million and 1.04 million in 2040, [GLOBOCAN (2020). *Estimated number of new cases from 2020 to 2040, Females, age [0-85+], Breast, World*. Available online: [https://gco.iarc.fr/tomorrow/en/dataviz/isotype?cancers=20&single\\_unit=100000](https://gco.iarc.fr/tomorrow/en/dataviz/isotype?cancers=20&single_unit=100000). (accessed on 6<sup>th</sup> March, 2021)]. Ghana's 5 year, 3 year and 1 year BC prevalence estimates are 99.5, 67.7 and 27.7 per 100 000 respectively. Also its Age-Standardized Incidence Rates (ASR) and mortality per 100 000 for age 0-74 years are 42.8 and 17.4 respectively according to [GLOBOCAN (2020). *Estimated number of prevalent cases (1-year) as a proportion in 2020, breast, females, ages 0-74, Ghana*, Available online: <https://gco.iarc.fr/today/online-analysis-map?projection=globe> (accessed on 28<sup>th</sup> July, 2020)]. According to research [e.g., 4,5,6] in the lifetime of every eight American women, one will acquire Breast cancer (BC) and one out of every thirty five will die, thus a 12.4% risk in their lifetime. There is evidence that male BC incidence is also on the rise globally [4,5,6,7] and on the African continent [8,6 quoting 9,10 & 11] to have reported over three decades ago that there was 5 to 15% increases male breast cancer incidence on the African continent even amid scarcity of data.

Early BC detection through relevant screening methods will not only decrease mortality rates by 25– 30% [12], it can go a long way to enhance treatment by considerably reducing morbidity, mortality, and improving women's overall quality of life [13] (1). The American Cancer Society recommends clinical breast examination (CBE), mammography and Breast Self-Examination (BSE) as the most effective prevention against the high rising (BC) morbidity and mortality, [American Cancer Society (2016). *Breast Cancer Early Detection and Diagnosis – can Breast Cancer be found early?* Available online: <https://www.cancer.org/content/dam/CRC/PDF/Public/8579.00.pdf> accessed on 6<sup>th</sup> March, 2021].

Ideally, women between 20 and 30 years and above 40 years should undergo a thorough clinical breast examination by a qualified health care provider every three years [14,15]. However the high cost of that process makes it inaccessible for women in Low and Middle Income Countries (LMICs) such as Ghana. This plausibly explains why as high as 60% of BC cases are discovered at a later stage [16,17] which has become a hallmark of BC health seeking behaviour with poor treatment outcomes,[18]. For women in non-industrialized (LMICs)

countries, BSE is by far the cheapest/ inexpensive non-intrusive method most BC researchers, health professionals and promoters unequivocally recommend.

Although BSE Knowledge Attitude and Performance (KAP) has received a fair share of research effort around the globe, a perusal of the literature revealed the fact that generally in terms of gender, majority of the BSE research effort have justifiably concentrated on women because of their relatively higher BC incidence, morbidity and mortality. Of those that have exclusively focused on females, there is an overconcentration on Nursing trainee/ professional at the expense of other health professional trainees. Many of these BSE KAP researchers use mostly nurses and nursing trainee students because they consider them BC educators and/ or future educators whose BSE KAP scores by virtue of their exposure via curriculum, could be used as benchmark for comparing the scores of their non – nursing compatriots and the general populace. Even in most cases where there is mixed gender health professional trainees, some researchers [e.g., 19,20] limit their BSE KAP research participation to only the females. That state of affair must change because in this 21<sup>st</sup> century, a particular gender domination of certain health professions, e.g., of Medicine, Nursing, Laboratory Technology, Physician Assistants etc., is quickly becoming a thing of the past and every health professional; male or female, is duty bound to offer thr life saving BSE education to their clients. Thus, involvement of male and other health trainee students in BSE KAP research is long overdue, as there is evidence that compared to women who become cognizant of BSE from other sources, those that obtained personalized instructions from a health care professional exhibited superior knowledge and portrayed higher confidence and higher probability to practice BSE routinely [19]. This also suggests that many women look up to their health care professionals (males or females) for instructions as far as their breast health is concerned.

From the extant literature, Breast Cancer (BC) Breast Self-Examination (BSE) Knowledge Attitude and Performance (KAP) have received quiet an enormous research effort around the globe and the evidence suggests that much effort have generally genuinely concentrated on females and that males are underrepresented in BSE research participation. Also generally female knowledge of BC and BSE are quiet high but actual BSE performance is disappointingly low. There may be several reasons for the disappointing lack of translation of BC/ BSE knowledge into BSE practice. One such important reason might be that overt behaviour (e.g., BSE practice) does not just occur in a vacuum, it occurs within a physical, psychological and sociocultural environment with varying sets of motivations within each milieu. To be effective at the intensification of BSE education most BSE KAP researcher recommended, educators need more than BSE knowledge and performance. They need a comprehensive understanding of the BSE attitude and the predictors of the actual BSE behaviour through relevant attitudinal change conceptual frameworks. Of the 3 BSE Knowledge Attitude and Performance (KAP) concepts Social Psychologist perceive attitude as the biggest concept. It is defined as “...*a positive or negative evaluative reaction towards a stimulus such as a person, action, object, or concept...*” p. 639 of [21 quoting 22], *which predispose us (humans) to act and feel in a certain way*, [23]. It has 3 components, namely; cognitions, emotions or feelings and overt behaviour, [21,23]. Cognition embodies covert mental processes including knowledge, decision, insight, perception, judgement

etc. and emotions has to do with feeling. Any factor(s) whether psychological or sociocultural that affect these covert cognitive processes affects the overt behaviour (e.g., BSE performance).

A recent very comprehensive systematic review Udoh et al., [24] of most BSE researches done in the SSA concluded among others that there is “limited literature on women’s attitudes towards BSE” (p.6). Thus, even among the extant predominantly female literature, there is paucity in the Attitude domain of the whole BSE research area as a lot of the research effort into BSE in Sub-Saharan Africa (SSA) have focused on the knowledge and practice areas at the expense of attitude. They recommended identification of, and evidence-based solutions to BSE contextual challenges when they wrote “...*this study recommends further studies on knowledge, practice, and attitude of BSE, to identify contextual challenges and provide evidence-based solutions to improve women’s knowledge, practice, and attitude of BSE in SSA...*”[24] (p.1).

In the view of the current authors, the contextual challenges are not limited to the individual KAP but the entire BSE KAP research areas. Some of these BSE KAP Contextual challenges include but not limited to (1) BSE KAP psychometric (measurement) challenge (2) under representation of other non-nursing professional health trainees in BSE research participation (3) gender imbalance in the KAP research participation, and related to that, (4) an important male gender related socio-cultural factor as important BC BSE Stake holders and their potential role in the fight against BC. We deliberate a bit on challenges 1 and 4 as aspects of 2 and 3 have been discussed above.

1.1 BSE KAP psychometric (measurement) challenge. The authors have identifies a lack of uniformity in KAP concepts measurements and scoring perhaps related to scarcity of BSE KAP standardized reliable and valid psychometric measures [19]. Due to this lack, most researchers have resorted to self-constructed questionnaire to measure KAP concepts often from literature review. Even though self-construction per say is not bad in itself and has its own advantages (e.g., ability to cover many grounds); one of its limitations is its lack of uniformity in the number, types of specific questions and relevant areas to elicit KAP knowledge. A quick perusal of the literature suggests a great variation in the number of questions used and the domain assessed. For example, while some used 6 questions, others used 4 and yet others used 10 to measure attitude. Related to this measurement challenge is a variation in scoring whereby some attitude researchers use arbitrary mid-point cut – offs [26,27,28,29], while others use a 3 part cut – off points scoring method [e.g.,30,31]. Thus, to be able to compare one’s study results to extant research evidence therefore, one has to use similar scoring methods used in that research. These psychometric challenge are not only limited to the attitude domain but the entire BSE KAP research areas. The solution is to use reliable and valid psychometric measures in combination with self-constructed questionnaire to complement each other to limit this observed BSE KAP psychometric contextual challenge.

#### 1.1 Gender imbalance in the BSE KAP research participation

A perusal of the BSE literature revealed the fact that generally in terms of gender, majority of the BSE research effort have justifiably concentrated on women because of their relatively higher BC incidence, morbidity and mortality. As mentioned above, there is evidence that male BC incidence is also on the increase globally [4,5,6,7] and on the African continent [8,6 quoting 9 & 32] to have reported over three decades ago that there

was 5 to 15% increases male breast cancer incidence on the African continent even amid scarcity of data. Male BC incidence in the developed world is also on the rise. For example in 2017, [33] estimated 252,710 and 2,470 incidences of breast cancer respectively among women and men and that nearly 40,610 and 460 were expected mortality of women and men respectively in the United States of America in 2017 alone. Just as female BC was initially not a 3<sup>rd</sup> world problem but has now become a public health concern for many LMIC, it will serve the global community, African continent, the sub region and Ghana better to pre-emptively involve males in BC BSE KAP research and education. This is because whether we like it or not, males are becoming important stake holders in the BC BSE fight.

### 1.2 Males as important BC BSE Stake holders and their potential role in the fight against BC

Quiet apart from gradually becoming BC victims themselves, and as suggested by a 37 year old female research participant in p.115 of Kudzawu et al.,[2], male partners could serve to remind their cherished significant others (mothers, wives, sisters, girlfriends, female colleagues etc.,) to engage in this life saving BSE as many women cite forgetfulness[26,34, 2,29,] as one of the numerous reasons for non BSE performance. By the way, quiet apart from forgetfulness, several other reasons such as time constraints, lack of skills to correctly perform BSE, embarrassment for self-breast manipulation and anxiety related to discovering a lump have been advanced for non-performance of BSE[35]. Also, an important socio-cultural factor bedeviling the fight against BC is that there is evidence that BC victims unduly delay in their BC orthodox health seeking behaviour partly due to lack of support, the dread of divorce and rejection by their husbands once they undergo radical treatment such as mastectomy [18]. More so, the under-represented, and in some cases, excluded males may be the majority at the helm of affairs of organizations and boards taking relevant decisions impacting BC prevention, treatment, BSE education and advocacy. Involving men at all levels of BC BSE activities – research, education and interventions would go a long way to reduce some of the afore mentioned sociocultural impediments and contextual challenges. There is therefore the urgent need to understand men's perspectives, attitudes and predictors of BSE and exclusive focus on female gender for BC BSE research, education and advocacy is not sustainable and working against its own agenda.

As far as the authors are concerned no study has assessed mixed and exclusive gender attitude towards BSE among health Professional trainees in Ghana and none using a BSE psychometric measure. Also none has attempted to determine if there is significant differences in the average gender BSE Attitude in undergraduate health professional trainees. This study therefore aims among others to;

- (i) determine the attitude of mixed gender health trainee undergraduate students towards BSE
- (ii) determine the attitude of the exclusive male and female health trainee undergraduate students towards BSE and
- (iii) determine if there is a significant difference between average BSE attitude scores of female and male health trainee undergraduate students. For this objective we hypothesize that; **H<sub>0</sub>**: There is no significant difference between the mean score for breast self-examination of both genders, and **H<sub>1</sub>**: There is a significant difference between the mean score for breast self-examination of both genders.

## 2.0 Materials & Methods

Being a preliminary study and focusing on undergraduate health trainee students, a purposive sampling method was used to select participants from 6 undergraduate classes from 3 different faculties in the CoHS, KNUST. To qualify to participate in this research, participant had to be a student in KNUST, must be an undergraduate, must be a health trainee student in CoHS, 18 years and above. Exclusion criteria were participants aged below 18 years and post graduate students. Online cross – sectional method was used in this study to ascertain the attitude toward BSE among 336 voluntary participants. For the entire research the questionnaire was developed into a 5 section google form link which were respectively demographic characteristics consisting of 8 questions, BSE attitude measure consisting of 24 items, 18 item Multidimensional Health Locus of Control scale (MHLC), 5 item Satisfaction with Life Scale (SWL), and 5 self-constructed questions assessing actual BSE performance. The google link was forwarded to participants for voluntary participation after going through the participants' information sheet which included more information about the study and guarantees of confidentiality. The first voluntary 20 participants were used to pretest all three measures used and their Cronbach's Alpha values reported with the description of each of the measures used for achieving the objectives above.

### 2.1 Measures Used

The measure used for this manuscript was Breast Self-Examination (BSE) obtained from [36] (pp. 131 – 133). This BSE attitude psychometric measure was developed by [37] consists of 24 items and measures attitude towards BSE. Drawing from attitude category of previous research based on an adapted versions of the Health Belief Model [38,39]. Race and Silverberg [37] developed this BSE to cover perceived seriousness, BC susceptibility, health motivation, breast abnormality activities, performance issues (i.e., time availability, difficulty, self-touch etc.) and concern for others. Each item is a 6 – point Likert scale from strongly disagree (1) to strongly agree (6) with 6 representing the most positive. The scoring is done by simply summing participants' score on each item to obtain a score between 24 and 144 with the highest reflecting a more positive attitude towards BSE. The sourcebook reported a reliability coefficient of 0.83 as a single scale. Pretesting for this measure before data collection yielded a Cronbach's alpha for this BSE of 0.709 (70.9%). The sourcebook reported a good concurrent validity. It must be mentioned that the rest of the psychological measures (i.e., Multidimensional Health Locus of Control scale (MHLC) and Satisfaction with Life Scale (SWL) used to measure other objectives will be described under material and measures in the follow-up article to be written later.

### 2.2 Procedure

The researchers solicited voluntary participation from purposively sampled CoHS undergraduate health trainee students. Ethical consent process was undertaken in 2 ways; either online or in hard copy through the class representatives. After giving them information including objectives of the study and assurances of confidentiality, the investigators appealed for their voluntary participation. Those that accepted to participate through direct contact through their class representatives were required to fill a hard copy consent form. After

consent, the link to the google form was distributed to participants to logon to complete. Ethical clearance (ref number CHRPE/AP/066/21) was obtained from Committee on Human Research, Publication and Ethics (CHRPE) in KNUST, Kumasi, Ghana. Data collected took place from 4<sup>th</sup> to 18<sup>th</sup> February, 2021. On the whole 336 students responded excluding 20 of the early participants used for pretesting to determine if the questionnaire and instructions of measures were comprehensible and suitable. The data was analyzed using SPSS version 20.

### 2.3 Data Analysis

A descriptive analysis was used to determine the overall attitude, and that of exclusive male and female health trainee undergraduate students towards BSE. For the 3<sup>rd</sup> objective an independent sample T-test was used to determine if there was a significant difference between average attitude scores of both genders.

### 3.0 Results

As mentioned above, this study received 336 voluntary participation and out of that majority (59.8%) of them were females while the male respondents were 40.2%. The participants' age range was between 17 and 38 years, and their mean age was 21 (SD=2.9) years. Table 1 summarizes the demographic characteristics of the Study Participants (SPs).

**Table 1: Demographic Characteristics of Study Participants (SPs)**

<b>Variables</b>	<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age</b>	16-18	38	11.50
	19-20	156	47.10
	21-30	114	47.10
	24-26	06	01.80
	>26	17	05.20
<b>Gender</b>	Male	135	40.20
	Female	201	59.80
<b>Prog. of Study</b>	Human Biology	213	63.40
	Physician Assistant	19	05.70
	Nursing & Midwifery	101	30.06
	Missing	03	00.90
<b>Level of Study</b>	1 <sup>st</sup> Year	63	18.70
	2 <sup>nd</sup> Year	108	32.30
	3 <sup>rd</sup> Year	163	48.70
	4 <sup>th</sup> Year	01	00.30
<b>Religion</b>	Christianity	314	93.50

	Islam	22	06.50
<b>Occupation</b>	Student	327	97.60
	Health Professional	08	02.40

### 3.1 Objective 1

As discussed in the introduction, one of the contextual challenges facing the BSE research area is the issue of measurement of the core concepts of KAP and the varying scoring methods being used by researchers. With Attitude in particular and because most use their own self constructed questionnaire, they use varying scoring methods. While some researchers score their SPs' attitude using their own methods and based their attitude judgement on arbitrary mid-point cut- off, others use a 3 range (low, moderate and high) criteria. Since this study uses a psychometric measure we score our SPs' attitude using the instructions for scoring described under measure above. Thus for objective 1, 3 methods namely; the BSE test constructors' scoring instruction and judge the SPs' scores using the popular BSE researcher's mid-point cut- off and the 3 range criterion for easy comparison and discussion with extant BSE attitude research evidence.

#### 3.1.1 Using the Psychometric Test Instruction

Per the test constructor's instruction, all 24 BSE test items were summed up. The overall average mixed gender score of the current Study participants' (SPs) on the Breast Self-Examination measure (BSE) is 92.51 (SD = 11.80).

#### 3.1.2 Using Mid -Point Cut - Off

To use the popular mid-point cut off reference point for BSE Attitude scores a score of 72.00 was chosen since the score ranged from 1- 144. An average score below and above this point indicate low and high attitude toward BSE respectively. The results for an overall mixed gender combined SPs and exclusive male and exclusive female SPs' average Attitude scores are as summarized in table 2 below.

**TABLE 2:** A table of combined, exclusive male and female gender average BSE attitude scores.

Study Participants	Average BSE Attitude Score	Standard Deviation
Combined Study Participants	92.51	11.80
Exclusive Male gender	89.42	12.29
Exclusive female gender	94.59	11.02

### 3.2 Objective 2: Exclusive gender averages above and below the 72 mid-point cut - off

For a better picture, exclusive gender averages above and below the 72 mid-point average were computed and tabulated in table 3 below. The exclusive male gender BSE average score was 89.42 (SD = 12.285). Thus, 3.7% and 96.3% of the male participants had BSE average scores below and above the cutoff point with average scores of 48.40 (SD= 17.60) and 91.00 (STD= 8.91) respectively. Similarly, the exclusive female gender BSE average score was 94.59 (STD = 11.02), and 1.5% and 98.5% of the female participants had BSE average score below and above the cutoff point with average scores of 43.67 (SD = 20.13) and 95.36 (SD= 8.91) respectively.

**TABLE 3:** A distribution of gender BSE average scores above and below the 72 midpoint.

Gender	Overall Average	% above midpoint (72.00)	% below midpoint (72.00)
Male	89.42 (SD = 12.285)	96.3 %; w 91.00 (SD = 8.91)	3.7%; w 48.40 (SD = 17.60)
Female	94.59 (SD = 11.02)	98.5%; w 95.36 (SD = 8.91)	1.5%; w 43.67 (SD = 20.13)

w = \*with

### 3.2.1 Using the 3 Range Criterion comparison method

Using the 3 range criterion, BSE scores were categorized into 3, namely; low, moderate and high attitude ranging from BSE attitude scores from 1-48, 49-96, and 97-144 respectively. The table 4 below shows the overall mixed gender level of attitude towards BSE. Thus, 61.9% of the study participants had an average attitude to breast self- examination, 36.9% and 1.2% of the participants had respectively high and low attitude towards BSE.

**TABLE 4:** Attitude towards BSE

Attitude towards Breast Self-Examination	Frequency	Percentage (%)
Low Attitude (1-48)	4	1.2
Average Attitude (49-96)	208	61.9
High Attitude (97-144)	124	36.9
Total	336	100.00

A cross tabulation was also performed on gender and results reported in Table 5 below.

Table 5: Cross tabulation between Gender and Breast Self-Examination						
Gender			1-48= LOW	49-96=	97-144=	Total
			ATTITUDE	AVERAGE	HIGH	
Gender	Males	Count	2	99	34	135
		% within Gender	1.5%	73.3%	25.2%	100.0%
	Females	Count	2	109	90	201
		% within Gender	1.0%	54.2%	44.8%	100.0%
Total		Count	4	208	124	336
		% within Gender	1.2%	61.9%	36.9%	100.0%

It was deduced that 1.5% of the male participants had a low attitude, 73.3% had average attitude while 25.2% had high attitude towards BSE. Similarly, majority (54.2%) of the female participants had an average attitude, 44.8% had high attitude while 1% had low attitude to BSE.

### 3.3 Objective 3: Test of Variance.

The study again sought to determine significant difference between the mean score of both genders. Independent sample T-test was used to determine any significance difference among both genders and results reported in table 6 below

**Table 6:** Independent Sample T-Test

Breast Self-Examination	Levene's Test for Equality of Variances				
	F	Sig	t	df	Sig
Equal Variance Assumed	0.823	0.365	-4.024	334	0.000
Equal Variance not Assumed			-3.939	265.947	0.000

The Levene's test of equality of variances was used to determine if equal variance existed or otherwise using  
 $H_0$ : Equal Variance assumed,

$H_1$ : Equal Variance not assumed,

From the hypothesis above, the p-value (0.365) was greater than the significance level of 0.05, hence we fail to reject the null hypothesis and conclude equal variance assumed at 95% level of confidence. Having established the above, we proceed to set our hypothesis for the main objective as follows;

$H_0$ : There is no significant difference between the mean score of attitude towards BSE for both genders.

$H_1$ : There is a significant difference between the mean score of attitude towards BSE for both genders. Since the p-value (0.000) obtained was less than the significance level of 0.05, we reject the null hypothesis at 95% confidence interval and therefore conclude that there is a significant difference between the mean score of attitude towards BSE for both genders.

#### 4.0 Discussion

The objectives of the current study were to psychometrically determine the overall attitude of Study participants (SPs), determine the exclusive male and female health trainee undergraduate students' attitude towards BSE and determine if there was a significant difference between scores of both genders. The female participants in the current study out-numbered their male compatriots by a 3:2 ratio. The SPs' age range was between 17 and 38 years and their mean age was 21 years ( $SD \pm 2.9$ ) – well within prescribed age of practice of BSE. Per the preamble under results objective 1, the Study Participants' (SPs) score are discussed based on 3 different approaches of attitude measurement namely; the psychometric test instruction, popular mid-point cut- offs and the 3 - range criterion of attitude assessment.

The overall average score on the Breast self-Examination (BSE) measure obtained by the combined mixed gender SPs is 92.51 (Table 2). This figure is lower compared with Race and Silverberg's [37] Construction Groups' (CGs) mean BSE score of 101.17 [( $SD=9.55$ ), [36] (p.131). This finding may be explained by the cultural, demographic and gender differences between the CG and the current SPs. More so, mixed gender participation in this current study may have lowered our SPs' overall average score on this BSE psychometric measure. Future research is needed to validate the psychometric properties and to standardize this BSE measure to develop culturally relevant norms for easy interpretation of local test scores, to guide research and enhance BSE research.

Another significant finding is that based on the mid-point criterion, 98.5% of the females SPs' scored high attitude with an average score of 94.54 above the cut-off (Table 3). This finding agrees with research evidence by [40] who had 98.2% medical students and 96.4% of the non-medical students having a high attitude so as to endorse BSE as a necessity in Saudi Arabia. In the Sub - Saharan Africa this finding is in line but higher than 73.6% of Nigerian secondary students who had positive attitudes, [27]. It is also similar but higher than findings by [29] and [26] who found "majority" and 97.1 % respectively having "good attitude" in female university undergraduates students in the Presbyterian University College of Ghana, Asante Akyem Campus

and combined undergraduate and Senior Secondary School (SSS) female students in KNUST, Kumasi, Ghana respectively. This finding however contradicts findings by [28] who found 68% of Indian Information Technology (IT) professionals to have poor attitude which may be attributable to cultural and religious factors such as social stigma and norms. From (table 3), a female minority (1.5%) of our SPs maintain very low attitude towards BSE and future research should not only be intensified to identifying them and their reasons for such a low BSE attitude, but also urgently educate them. Who knows, they may soon graduate and become important BC BSE stakeholders.

Similarly, even though it is a well-known fact that male hardly engage in BSE for obvious reasons - low incidence of BC, the current study results revealed a surprising high average attitude score of 91.00 (SD=8.91) for the overwhelming majority of 96.3% of males who scored above the 72 mid-point cutoff. This is a welcoming result for BC interventions, education and research since more males control funding and breast health delivery systems. Also as husbands and family heads, this high male attitude, if replicated in the general population, will go a long way to minimize the fear of divorce, reduce stigma, enhance quick interventions and reduce the male gender negative socio-cultural factor contributing to undue delays in BC orthodox health seeking behaviour observed by [18] and described in the introduction above. This finding supports the objectives of the current study and the call for the involvement of many more males in BC research, education, interventions and advocacy. It must be added though that 3.7% of males have a low attitude (table 3) and there is therefore an urgent need for replication of this study to find the percentage of the general male population for urgent BC BSE education.

Using the 3 levels (Low, Moderate and High) of attitude, the current finding of 1.2%, 61.9% and 36.9% of our SPs having low, moderate and high overall attitude towards BSE (table 4) respectively replicates findings by [31], who realized an overall, 2.4% low, 63.3% moderate and 34.3% high attitude in Cameroonian female undergraduates students. A similar study found a reverse trend of 9% low, 29% neutral (moderate) and 62% positive attitude among 183 female Malaysian Pharmacy Students towards BSE which may be explained by cultural differences since they had nearly 82% Chinese among their SPs [30] Again, a cross tabulation figures in (table 5) confirmed the general perception that females maintained a relatively higher attitude towards BSE. Thus, their percentages of (1.5% versus 1 % low; 73.3% versus 54.2% moderate and 25.2% versus 44.8% high attitude for males and females respectively reflect the trend discussed above. Even though most males perceived BSE as not necessary citing low incidence of breast Cancer among males, they maintained a surprising 98.5% moderate to high BSE attitude compared with 99% for females overall score.

Another significant finding is that there was a gender-based significant difference on their BSE attitude scores in favor of female gender with a p -value of (0.000) at 95% confidence interval (Table 6). Even though there are no studies comparing attitude of both genders, this finding is in line with qualitative research evidence by [6] in Malaysia that suggest that males maintain a lower attitude towards BSE because of lower cancer incidences among the male gender. Specifically, [6] noted that the majority of their male participants *“considered that BSE is not important for men because they have a low probability of getting breast cancer”* p.243, but their respondents that notwithstanding, they encourage their family members to practise BSE. The fact that majority of their male participants encourage their family members to perform BSE is an attestation to the point being made in this research to include and encourage males participation in BSE KAP research and education as they are becoming important stakeholders.

### 4.3 Summary of Findings

Using psychometric norm and compared to the USA based test Construction groups' average, the current SP's had a lower BSE attitude possibly attributable to mixed gender participation, sociocultural and demographic differences in this study. However, using popular midpoint and the 3 part cut-offs, the current SPs' BSE attitude scores are comparable to research findings from the sub region and from Ghana. Another significant finding was that Males scored significantly lower BSE attitude compared to the scores of their female compatriots which probably reflects the general attitude found in men around the globe. This notwithstanding, most of the males even though perceived BSE as not necessary and cited low incidence of breast Cancer among the male gender as their reasons for relatively lower or non BSE performance, they maintained a surprisingly moderate to high BSE attitude.

### 4.4 Limitations

The outcomes of the current research must be carefully interpreted because it is not without limitations. In the first place, the evidence so adduced were obtained from only 336 purposely sampled undergraduate health trainee student participants, which may not be very generalizable to the entire KNUST and Ghanaian population. That notwithstanding, this has provided a basis for a much bigger BSE attitude study in Ghana to involve different health trainees and mixed gender at a time and the general populace as a whole. This will also hopefully encourage the use of psychometric tests in the assessment all KAP areas of BSE and spur much more interdisciplinary collaborations research efforts. This research has made meaningful contribution to the BSE attitude research area by providing useful areas for attitude measurement and assessment and may also encourage the construction of reliable and valid psychometric measures for not only BSE attitude, but also Knowledge and Performance.

### 5.0 Conclusion and Recommendations

BSE KAP research has previously justifiably focused on female but it is time to involves males as they are fast becoming important stakeholders as male BC incidence increase, as more males take on previously female dominated professions that require them to educate their clients on BC and BSE, as heads of families and possibly majority decision makers of organizations and boards on issues affecting BC BSE research and education, potential for males to remind their significant others of life saving BSE, to mention a few. Also, healthcare professionals and trainees have reseived enough research attention, more effort must be focused on the non-health professional population. More so, we reiterate the call by [19] for the need to adjust the curricullum used for taining not only Nurses but all health trainee students in developing nations around the globe to reflect relevant BC preventive measures. Moreover, from the evidence adduced in the current study, researchers, advocates and activists must involve males at all levels of in BC BSE KAP research, intervention and education for reasons given above. Finally, a larger and an expanded investigation with randomly sampled participants is highly recommended to achieve a better evidenced-based knowledge on the real BSE practice not only in tertiary students, but also in the general population of Ghana as a whole.

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**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data presented in this study are available in the supplementary material here.

**Conflicts of Interest:** The authors will like to make a disclosure that they are yet to write up another article they seek to publish using part of the source data reporting different study objectives.

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