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RESEARCH ARTICLE

Breast cancer awareness and downstaging practices among adult women in Gulu City Main Market in Northern Uganda: A cross-sectional study

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ABSTRACT

Background: Breast Cancer is one of the most common cancers that occur universally among women. The disability-adjusted life years lost by women to breast cancer globally are more than any other cancer. Breast cancer occurs in women worldwide after puberty with increasing rates in later life. Improvements in breast cancer survival began in the 1980s in countries where early detection programs combined with different modes of treatment to eradicate the invasive form of the disease are practiced. Recent data show a higher prevalence of breast cancer among women in Northern Uganda compared to the rest of the country.
This study aimed to determine factors associated with breast cancer awareness, breast self-examination, clinical breast examination, and other modalities for screening and early breast cancer detection among adult women in Gulu Main Market.

Methods: We conducted a cross-sectional study in Gulu's Main Market in 2020. We recruited Ninety-eight adult women for the study using a random sampling method. The questionnaire had an internal validity of Cronbach's α=0.72, and a local IRB approved the study. We used SPSS version 26.0 for data analysis, and a p-value less than 0.05 was considered significant.
Results: Most participants were 20-29 years 41(41.8%), married 44(44.9%), monthly incomes of more than one million shillings 51(52.2%), Acholi 81(82.7%), Catholics 46(46.9%), vendors 75(76.5%), work duration in the Market (1-10 years) 64(65.4%), primary level of education 39(39.8%), and had 1-2 pregnancies 37(37.8%). The independent factors associated with breast cancer awareness, breast self-examination, and clinical breast examination were vendor (primary occupation) (β=-0.130, t=-2.979, p=0.004), work duration in the Main Market (1-10 years) (β=-0.186, t=-2.452, p=0.016), and the highest level of education (β=-0.091, t=-2.506, p=0.014).
Conclusions: Breast cancer awareness and downstaging practices among adult women in Gulu's Main Market are thought-provoking. Women with better socioeconomic status (higher education level, moderate work duration in the Market, and vendors) in Gulu Main Market were more likely aware and practiced breast cancer downstaging activities. There is a need to strengthen publicity on breast cancer-related knowledge for lower-income occupational groups and those with lower educational levels to understand better the importance of conducting early breast cancer detection activities.

Keywords: Breast cancer, awareness, breast self-examination, clinical breast examination, downstaging practices, Gulu, Northern Uganda.

Background: Breast Cancer (B.C.) is one of the most common cancers that occur universally among women [1]. In 2020, two million three hundred thousand women were diagnosed with breast cancer, and 685 000 deaths were globally recorded [2]. As of the end of 2020, there were 7.8 million women survivors of breast cancer in the last five years, making it the world's most prevalent cancer [2]. World-wide, the disability-adjusted life years (DALYs) lost by women to breast cancer is more than any other cancer and occurs in women globally after puberty with increasing rates in later life [2]. Breast cancer mortality rates have changed very little from the 1930s to the 1970s [2]. Improvements in survival began in the 1980s in countries where early detection programs combined with different modes of treatment to eradicate the invasive form of the disease were practiced [2].

According to a breast cancer statistic from 2012, 60% of breast cancer deaths occur in developing countries [2]. An estimated 249,260 new breast cancer cases are diagnosed annually in the United States [2]. Still, mortality from the disease in the USA is decreasing compared to statistics from developing countries which represented 50% of cancer cases and 62% of all cancer deaths [2].

According to the American Cancer Society (ACS) of 2012, breast cancer constitutes 25% of all new cancer diagnoses in women globally, and nearly 1.7 million new cases were diagnosed worldwide [3]. Regrettably, most new breast cancer diagnoses and deaths occur in developing countries [3].

Also, the CDC report of 2018 showed that breast cancer is the commonest cancer in women in the United States regardless of race or ethnicity [2]. It is also one of the most common causes of cancer deaths among hispanic women and the second most common cause of cancer deaths among white, black, Asian/pacific islanders, and American Indians [2].

In Africa, breast cancer is responsible for 28% of all cancers and 20% of all cancer deaths in women [4]. A publication on barriers to early presentation and diagnosis of breast cancer among African women living in sub-Saharan Africa showed that it is the leading cause of cancer deaths among women [4]. In addition, delayed appearances and late diagnosis at health facilities contribute to delayed breast cancer presentation and diagnosis among women in sub-Saharan Africa [4].

In Uganda, data from the Kampala Cancer Registry of 2014 showed that the incidence of breast cancer among women stood at 3.7% [5]. This finding implies that approximately four in every one hundred women are diagnosed with breast cancer in Uganda annually [5]. The fear of underreporting was confirmed in a New Vision newspaper publication in 2017, where an oncology specialist at Uganda Cancer Institute-Mulago Hospital said the incidence of breast cancer was much higher because only a few people, about 20% of people with cancer, seek treatment. The remaining 80% do not seek medical help because they lack funds to undertake early screening and treatment even after feeling a lump in their breasts and very often resort to herbal treatment as remedies for their ailments [6].

Authors and scholars have suggested that the most practical solution to early breast cancer detection and prevention lies in increasing the awareness of women about the disease (breast cancer education) so that women can judge their risks and take relevant measures [7]. The three-pronged approaches to early breast cancer detection suggest the following: A monthly Breast Self-Examination (BSE) which should begin as early as 18 years, Clinical Breast Examination (CBE) done annually beginning at 18 years, breast ultrasound and Mammography conducted routinely beginning at 40 years [7,8]. WHO also recommends these approaches for breast cancer screening and early detection [2].

In Uganda, the Uganda Cancer Institute (UCI) is the only institution responsible for the management of cancers. However, it is overwhelmed with treatment and palliative care for advanced cancer cases, with a minimal budget and mainly from donations [7,8,9]. To make matters worse, the routine health talks in health centers and hospitals in Uganda focus on infectious diseases such as HIV, T.B., and malaria, neglecting cancers and other non-infectious diseases [7,8,9]. Although October is the month dedicated to breast cancer campaigns, where intensive efforts to disseminate information on breast cancer awareness, prevention, and early detection are promoted in Uganda, these interventions do not achieve much [6-9]. Reports show that these activities are limited only to urban centers, especially Kampala (the capital of Uganda) [6-9]. The mode of communication (television, radio, and leaflets) for relaying health messages on breast cancer are not ideal for many Ugandan women due to low literacy levels and poverty issues. These programs do not reach most women found in Uganda's rural communities. Besides, the program runs for a brief duration because, when efforts against early breast cancer detection and prevention programs are completed in October; they disappear and only reappear a year later [6-9].

Authors have suggested that early breast cancer screening and diagnosis are critical activities because survival after diagnosis and treatment are related to the cancer stage at diagnosis and treatment [9,10]. They authors argue that the earlier the cancer diagnosis, the better the possibility of survival and quality of life after that [9,10]. In this approach, there is considerable potential for reducing mortality from breast cancer in Uganda through screening and early detection, increased awareness, improved detection practices, and increased routine screening for cancer [9,10].
The current problem in Gulu is the high prevalence of breast cancer in Northern Uganda where, 41 cases were diagnosed in (2013-2014) representing 12.6% of all female cancers, which is higher than the national prevalence (2014) of breast cancer (3.7%) [10]. The level of awareness and risk factors for breast cancer in Northern Uganda, just like the rest of Uganda, is low, as shown by an awareness level of 9% in a study carried on nurses and midwives working in Mulago National Referral Hospital in 2009 [11].

Justification of the study: In Uganda, most breast cancer cases are diagnosed in advanced stages, translating to high mortality rates (over 80%) and low survival rates (20% is the 5-year survival rate in Uganda). This finding is mainly due to the lack of awareness of the highly preventable disease [12]. Therefore, increasing knowledge and understanding of the disease is the recommended primary prevention strategy [12]. Sadly, in routine healthcare service delivery, in both private and public, health talks and health education on breast cancer are limited and not routinely conducted [12]. Increasing the level of awareness through routine health talks and using cheap public communication systems such as radios, television, and brochures in the respective local languages could increase the disease's attention levels [12].
Authors have suggested that breast cancer awareness should focus on basic knowledge of early signs and symptoms of the disease, such as breast lumps, abnormal discharges from the breast, and others [12]. At the primary health care level, the role of breast self-examination and basic knowledge on conducting a routine breast self-examination for women 18 years and above can be the first emphasis [12]. Furthermore, women 18 years and above should have information on breast self-examination, clinical breast examination, breast ultrasound and mammography, and their appropriate timing for early breast cancer detection [12].

In the current study, we found the percentages of women with basic knowledge of early breast cancer detection were grossly lacking. The extent to which early detection methods have been utilized, especially in timing, was also deficient.
The objectives of this study were.
To assess the relationship between sociodemographic characteristics and awareness levels on breast cancer, breast self-examination, clinical breast examination, and other modalities for screening and detecting breast cancer among the study population.
To assess practices on early breast cancer detection modalities (breast self-examination, clinical breast examination, and mammogram) among the study population.
To determine the factors associated with breast cancer awareness, breast self-examination, clinical breast examination, and other modalities for screening and detecting breast cancer among the study population.

Methods

Study design: This was a cross-sectional study among adult women running businesses in the Main Market of Gulu City.
Study site: This study was at Gulu's Main Market, located at the center of Gulu City in Northern Uganda. Gulu City, described as the economic capital of Northern Uganda, is approximately 343 kilometers north of Kampala, the Capital City of Uganda, with a population of 152,276 as of the 2014 national population census. The city has four administrative divisions (Laroo, Bardege, Layibi, and Pece). Gulu's Main Market is in the Laroo division and has a population of about 4,000 registered and non-registered vendors. Approximately three-quarters of the vendors in the Main Market of Gulu City were women.

Study population: The study population was women aged 18 years and above conducting businesses in Gulu Main Market and met the inclusion criteria for this study.

Selection criteria

Inclusion criteria: (i) Women aged 18 years and above (ii) residents of Gulu City for at least six months before this study (iii) Informed consent to participate (iv) registered in the Main Market as a vendor.
Exclusion criteria: (i) Vendors with speech and hearing disabilities (ii) absence of informed consent.

Sample size determination: We determined the sample size using Kish Leslie's (1965)

$$N=\frac{Z^2pq}{d^2}$$

Where,

N= Sample size

Z= Confidence level at 95% (1.96)

p= prevalence of breast cancer awareness in Uganda (5.7%)

q=1-p

d=degree of freedom

Using the prevalence of breast cancer in Uganda at 5.7% (Tove Ekdahl Hjelm *et al.,* 2019).

$$N=\frac{Z^2pq}{d^2}$$

$$N=1.962*0.057*0.943/0.052$$

$$N=82.595$$

Considering a 10% non-response, we added 8.2596 to the estimated sample size: therefore, the total

sample size (N) = 91 participants

Sampling procedure: In this study, we used a simple random sampling method for recruiting participants. Gulu City Main Market has five compartments based on the architectural structure of the building. Twenty participants were randomly and consecutively selected in each section until we obtained the total sample population of 98 participants. We used a simple random sampling technique because it provides an equal probability for choosing each participant. Our intention for a simple random sampling was to ensure that an unbiased sampled population represents the total population which was necessary for drawing logical conclusions for the research questions.

Data collection: Data for this study was collected using a pretested questionnaire designed by the research team to obtain information on breast cancer awareness, the use of Breast Self-Examination (BSE), BSE practices, Clinical Breast Examination (CBE), CBE practices, and use of Mammography for breast cancer screening and early detection among adult women in the Main Market. We conducted a face-to-face questionnaire interview with participants (adult women).

The study instrument: We collected data for this study using a questionnaire ***(Additional file A1)***. The research team designed the questionnaire consisting of Structured Questions (SQs) and Unstructured Questions (UQs). There were questions on sociodemographic and personal characteristics of participants, for example, age, address, occupation, tribe, religion, marital status, number of pregnancies, monthly incomes, number of years of work in the Market, and the highest level of education attained; awareness on breast cancer, knowledge, awareness on and practices on Breast Self-Examination (BSE), Clinical Breast Examination (CBE) and use of Mammography for screening and early breast cancer detection among participants. The UQs allowed participants to express their views on BSE, CBE, Breast cancer, and other modalities for screening such as Mammography.

Pretest of the questionnaire: We pretested the questionnaire among adult women in a smaller market in the Pece division in Gulu City. The internal validity of the questionnaire was Cronbach's α=0.72.

After the pretest, we improved the questionnaire to help participants recall BSE, CBE, breast cancer awareness, and utilization of mammography services. We added spaces to consider other relevant information on services provided for participants' use. The questionnaire was written in simple English to avoid unnecessary semantics and misunderstanding and translated to Acholi, the leading regional language. The research team translated the English version to Acholi in conjunction with trained interviewers and interpreters from the department of language at Gulu University. As part of interviews, we asked participants open-ended questions to describe their knowledge, awareness, and practices on BSE, CBE, and utilization of Mammography for screening and early detection of breast cancer. In addition, we made participants to paraphrase the information to interviewers before entry into the questionnaire. We added extra spaces in the questionnaire for recording qualifying remarks from participants. These added spaces assisted interviewers considerably in providing additional information to fill and complete the questionnaire accurately.

Data collection procedures: Upon obtaining informed consent, we conducted face-to-face questionnaire interviews with participants within the Main Market ***(Additional file A1)***. The team trained the three researchers (Co-authors) in selecting, interviewing, and accurately recording participants' responses. The corresponding author, the academic supervisor for the research team, supervised data collection from the beginning to the end. Researchers (two males and one female) were medical students of Gulu University in their final

year of study in the medical school. They had gathered enough experience in breast cancer, BSE, CBE, and Mammography during their bachelor's medical degree training. The research team visited the Main Market for data collection between 8:30 am and 5:30 pm on weekdays and between 9:00 pm and 2:00 pm on Saturdays. These hours chosen were the most convenient period for participants to get interviewed. The average length of each interview was between 50-60 minutes. Ultimately, most interviews were conducted in English as most respondents could speak and understand English well. As guided by previous research experience and the additional workload of the research team, no more than three participant interviews took place daily. We achieved the total sample population by collecting data every weekday and Saturday.

Variables: The variables obtained for this study were the sociodemographic characteristics of participants (age, address, occupation, tribe, religion, marital status, number of pregnancies, monthly incomes, primary employment, duration of work in the Main Market, and the highest level of education attained), awareness on breast cancer, knowledge and awareness on Breast Self-Examination (BSE), Clinical Breast Examination (CBE) and use of Mammography for breast cancer screening and early detection among participants in Gulu market.

Data quality control and assurance: We trained all our researchers on data collection to obtain quality data. In addition, we guided them on how to select and conduct face-to-face questionnaire interviews with research participants. In addition, the questionnaire was pretested among adult women running vending businesses in a nearby market in the Pece division in Gulu City. However, we excluded the pretested results from this study's main findings. Nevertheless, we adjusted the questions after the pretest to modify questions in the questionnaire, ensuring the required chronology and spaces for participants' responses were available. Lastly, questions in the questionnaire were evaluated and determined to have an internal validity of Cronbach's α=0.72.

Data analysis: We analyzed the data using a computer program, Statistical Package for Social Sciences (SPSS), version 26.0. We presented descriptive statistics in frequencies, percentages, and tables. In this, the primary unit of analysis was the participants' sociodemographic characteristics, knowledge, awareness, and practices on breast cancer, breast self-examination (BSE), Clinical breast examination (CBE), and use of Mammography for breast cancer screening and early breast cancer detection among adult women in the Main Market.

Furthermore, we determined the relationships between the independent and dependent variables using bivariate analysis and analysis of Variance (ANOVA). In bivariate analysis, we used the Chi-square test (χ^2) to determine associations between independent and dependent variables at 95% Confidence Intervals (95% CI), where a p-value less than 0.05 was considered statistically significant.

All variables at bivariate analysis with p-values less or equal to 0.2 were entered into the ANOVA models to determine the independent factors associated with the dependent variable (awareness, knowledge, and practices on BSE, CBE, Mammography, and cancer of the breast) among participants. Confounding was checked by observing whether adding covariate(s) in the ANOVA models caused changes in adjusted R square and the standardized coefficient Beta (β) of the main exposure variables. Subsequent sensitivity tests on the ANOVA models were conducted by adding covariates and conducting backward and forward adjustments on the model until the adjusted R square and the standardized coefficient (β) remained stable. In the final model, values of the standardized Coefficients Beta (β), t-values, and p-values (at 95% Confidence Interval) were considered the independent factors associated with (awareness, knowledge, and practices on BSE, CBE, Mammography, and cancer of the breast) among adult women conducting businesses at the Main Market. A p-value less than 0.05 was considered statistically significant.

Ethical approval: We obtained ethical approval for the study from Gulu University, Faculty of Medicine Research and Ethics Committee (Gulu REC). Each research participant gave informed consent to participate in the study. In addition, the team accorded each participant confidentiality, respect, privacy, and high moral principles regarding their information during and after the study.

Results

The study achieved a questionnaire response rate of 98/91(107.7%). Most participants were 20-29 years 41(41.8%), Married 44(44.9%), monthly incomes of more than one million Uganda shillings 51(52.2%), Acholi 81(82.7%), Catholics

46(46.9%), vendors 75(76.5%), work duration in the Market (1-10 years) 64(65.4%), primary level of education 39(39.8%) and had 1-2 pregnancies 37(37.8%) (Table 1).

In the descriptive statistics on the downstaging practices on breast cancer among participants, 36(36.7%) and 29(29.6%) were aware of BSE and practiced BSE, respectively; 38(38.8%) participated in clinical breast examination, and only 14(14.3%) and 13(13.3%) knew about Mammography and the clinical importance of Mammography in early detection of breast cancer, respectively. Most participants had heard about breast cancer 90(91.8%). The commonest source of breast cancer information were the media (T.V.s, internet, social media) 110(42.6%), friends and relatives 104(40.3%), hospitals 37(14.3%), books 1(0.4%), lectures 2(0.8%) and others 4(1.6%) (Table 2).

In the bivariate analysis, factors associated with knowledge of breast self-examination (BSE) were the highest level of education attained (χ^2=21.461, p=0.010); duration of work at the Main Market (χ^2=20.079, p<0.000), vendor (Primary occupation) (χ^2=20.330, p=0.002), monthly incomes more than one million shillings (χ^2=8.140, p=0.02), and married (χ^2=11.643, p=0.020).

On awareness of breast self-examination, the significantly associated factors were work duration at the Main Market (χ^2=15.166, p=0.002), the highest level of education attained (χ^2=26.262, p<0.000), and vendor (as the primary occupation) (χ^2=17.577, p=0.007) (Table 3).

Table 4 shows the ANOVA tests on the usefulness of BSE in early breast cancer detection among participants. It showed that the independent determinants of BSE were vendor (as primary occupation) (β=-0.130, t=-2.979, p=0.004), work duration in the Main Market (1-10years) (β=-0.186, t=-2.452, p=0.016), and a higher level of education attained (β=-0.091, t=-2.506, p=0.014).

Table 5 shows the ANOVA tests on the BSE practices among participants. It showed that the independent determinants of BSE practices were vendor (as primary occupation) (β=-0.049, t=-1.989, p=0.050), duration of work in the Main Market (1-10 years) (β=-0.223, t=-3.149, p=0.002), and a higher level of education attained (β=0.089, t=2.638, p=0.010).

Table 6 shows the ANOVA tests on the awareness of participants on CBE. The test showed that the independent predictors of CBE awareness among participants were duration of work in the Main Market (β=-0.171, t=-2.166, p=0.03) and a higher level of education (β=0.070, t=1.835, p=0.070).

Table 7 describes the ANOVA test on practices of participants on Clinical Breast Examination (CBE). It found that the independent determinants of CBE practices were primary occupation (vendor) (β=-0.122, t=-2.747, p=0.007), duration of work in the Main Market (1-10 years) (β=-0.180, t=-2.347, p=0.021), and a higher level of education (University Graduates) (β=-0.087, t=-2.347, p=0.021).

Table 8 shows the ANOVA tests on the usefulness of CBE in early breast cancer detection among participants. It showed that the independent determinants of CBE usefulness were primary occupation (β=-0.122, t=-2.747, p=0.007), duration of work in the Main Market (β=-0.180, t=-2.347, p=0.021), and a higher level of education (β=-0.087, t=-2.347, p=0.021).

There were no factors associated significantly with knowledge and awareness of the usefulness of Mammography in early cancer detection among participants.

Table 1: Socio-demographic characteristics of participants in the Main Market at Gulu City.

Variables	Frequency (N=98)	Percent (%)	Cumulative %
Ages (years)			
<20	6	6.1	6.1
20-29	41	41.8	47.9
30-39	29	29.6	77.5
40-49	9	9.2	86.7
≥50	13	13.3	100.0
Marital status			
Co-habiting	2	2.0	2.0
Married	44	44.9	46.9
Divorced/Separated	12	12.2	59.1
Single/Never married	23	23.5	82.6
Widowed	17	17.3	100.0

Monthly Incomes (UGX)			
<200,000	33	33.7	33.7
200,000-500,000	2	2.0	35.7
500,001-1,000,000	12	12.2	48.0
>1,000,000	51	52.0	100.0
Tribes			
Acholi	81	82.7	82.7
Alur	3	3.1	85.8
Baganda	1	1.0	86.8
Banyankole	2	2.0	88.8
Banyoro	2	2.0	90.9
Lugbara	4	4.1	94.9
Bagishu	4	4.1	99.0
Sabini	1	1.0	100.0
Religion			
Protestant	26	26.5	26.5
Catholic	46	46.9	73.4
Muslims	2	2.0	75.5
Pentecostals	24	24.5	100.0
Primary Occupation			
Business	3	3.1	3.1
Students	4	4.1	7.2
Tailors	4	4.1	11.3
Teachers	4	4.1	15.3
Vendors	75	76.5	91.9
Others	8	8.2	100.0
Work duration in the Main Market (years)			
<1 year	15	15.3	15.3
1-10 years	64	65.3	80.6
11-20 years	11	11.2	91.8
21-40 years	8	8.2	100.0
The highest level of education attained			
No formal education	3	3.1	3.1
Primary	39	39.8	42.9
O-level	27	27.6	70.4
A-level	7	7.1	77.6
Other tertiary institutions	14	14.3	91.9
University	8	8.2	100.0
Number of pregnancies			
0	18	18.4	18.4
1 to 2	37	37.8	56.2
3 to 4	20	20.4	76.6
5 to 6	15	15.3	91.9
≥ 7	8	8.2	100.0

In Table 1, most participants were in the age group of 20-29 years 41(41.8%), married 44(44.9%), with monthly income more than one million shillings 51(52.0%), Acholi 81(82.7%), Catholics 46(46.9%), vendors 75(76.5%), work duration in the main market (1-10 years) 64(65.3%), primary level of education 39(39.8%), and had 1-2 pregnancies 37(37.8%).

Table 2: Downgrading activities on Breast Cancer (BSE, CBE, and Mammography) among participants.

Variables	Yes (%)	No (%)
Knowledge of Breast Self-Examinations (BSE)		
Have you heard about Breast Self-Examination (BSE)?	36(36.7)	62(63.3)
Do you know that BSE is useful for the early detection of cancer of the breast?	36(36.7)	62(63.3)
Have you been taught how BSE is conducted?	22(22.4)	76(77.6)
Who taught you the BSE?		
Teacher	7(7.1)	
Health worker	10(10.1)	

Friend	2(2.0)	
Others	22(22.4)	
At what age should BSE be started?		
≥20 years	3(3.1)	
≥30 years	1(1.0)	
From Puberty	16(16.3)	
No idea	78(79.6)	
How often should BSE be conducted?		
Daily	4(4.1)	
Weekly	6(6.1)	
Monthly	9(9.2)	
No idea	79(80.6)	
When is the best period for conducting BSE?		
A week after the menstrual period	3(3.1)	
During Breastfeeding	2(2.1)	
During Menstrual flow	1(1.0)	
During Pregnancy	2(2.1)	
No idea	90(91.7)	
Who should conduct the BSE for you?		
Health worker	11(11.2)	
The individual	20(20.4)	
No idea	67(68.4)	
Do you practice Breast Self-Examination (BSE)?	**29(29.6)**	**69(70.4)**
How often do you practice BSE?		
Weekly	11(11.2)	
Monthly	4(4.1)	
Occasionally	7(7.1)	
Rarely	7(7.1)	
If you do not practice BSE, why not?		
I do not know how to perform it	29(29.6)	
I am too busy to perform it	39(39.8)	
I think it is unnecessary	30(30.6)	
When you did the BSE, did you find any abnormality in your breasts?	69(70.4)	29(29.6)
Do you think BSE is a good practice?	31(31.6)	67(68.4)
Knowledge of Clinical Breast Examinations (CBE)		
Have you heard about Clinical Breast Examinations (CBE)?	**38(38.8)**	**60(61.2)**
Do you know that CBE is a useful tool for the early detection of breast cancer?	38(38.8)	60(61.2)
Who do you think should conduct the CBE?		
Health Practitioner	36(36.7)	
The Individual	1(1.0)	
Others	1(1.0)	
What tool should we use for conducting CBE?		
Ultrasound Machine (USS)	59(60.2)	
Mammography	21(21.4)	
The hand	2(2.0)	
Others	16(16.3)	
How often should CBE be conducted?		
Daily	60(61.2)	
Weekly	6(6.1)	
Monthly	9(9.2)	
Yearly	2(2.0)	
When an abnormality is detected on BSE	12(12.2)	
I have no idea	9(9.2)	
Knowledge of the use of Mammography		
Have you ever heard about mammography?	14(14.3)	84(85.7)
Is Mammography a useful tool in the early detection of cancer of the breast?	13(13.3)	85(86.8)
At what age should Mammography be started on a person?		
After menopause	1(1.0)	
From 20 years	2(2.0)	
From 40 years	1(1.0)	
From Puberty	2(2.0)	
No idea	92(93.9)	

How often should Mammography be conducted?		
Weekly	1(1.0)	
Monthly	2(2.0)	
Yearly	90(91.8)	
Every three years	3(3.1)	
When a lump is found on BSE	2(2.0)	
Have you ever conducted a Mammography for your breasts?	0(0.0)	98(100.0)
What are the reasons why you have not done Mammography?		
I am not old enough	82(83.7)	
Because of Financial constraints	6(6.1)	
The Mammography machines are not available.	2(2.0)	
Others	8(8.2)	
Knowledge of breast cancer		
Have you ever heard about Breast Cancer?	90(91.8)	8(8.2)
Has any member of your family had Breast Cancer?	15(15.3)	83(84.7)
Has any of your relatives suffered from breast cancer?		
Mother	3(3.1)	
Aunt	3(3.1)	
Sister	3(3.1)	
Cousin	2(2.0)	
Others	4(4.1)	
What is your source of information on breast cancer?		
Media (TV, internet, and social media)	110(42.6)	
Friends and Relatives	104(40.3)	
Hospitals	37(14.3)	
Books	1(0.4)	
Lectures	2(0.8)	
Others	4(1.6)	

Table 2 shows the breast cancer downgrading activities in Gulu Market.

Table 3: Sociodemographic characteristics with dependent variables (BSE, CBE, Mammography, and Breast Cancer).

Variables	Chi-Square	df	p-value
Knowledge of Breast Self-Examinations (BSE)			
The highest level of education attained	21.461	5	0.010
Work duration at the main market (years)	20.079	3	0.000
Religion	1.1060	3	0.776
Primary occupation (vendor)	20.330	6	0.002
Monthly incomes (In Uganda shillings)	8.140	3	0.020
Marital status	11.643	4	0.020
Age groups (years)	5.258	4	0.262
Awareness on BSE			
Monthly incomes	1.922	3	0.589
Work duration in the main market (years)	15.166	3	0.002
The highest level of education attained	26.262	5	0.000
Primary occupation	17.577	6	0.007
Knowledge on CBE			
Primary occupation	14.912	6	0.021
Work duration in the main market (years)	6.903	3	0.075
Number of pregnancies	1.610	4	0.807
The highest level of education attained	8.238	5	0.144
Awareness on CBE			
Work duration in the main Market (years)	6.903	3	0.075
Monthly incomes	4.564	3	0.207
Knowledge on the usefulness of mammography			
Age groups (years)	2.941	4	0.568
Marital status	5.790	4	0.215
Monthly incomes	5.790	4	0.215
Primary occupation (vendor)	3.959	6	0.682
Work duration in the main market (years)	3.091	4	0.543
Highest level of education attained	4.974	5	0.419

Knowledge of Breast Cancer			
Primary occupation (vendor)	11.030	6	0.087
The highest level of education attained	5.578	5	0.349

Table 3 is a bivariate analysis that shows variables associated with breast cancer downstaging activities (on knowledge of BSE), higher level of education χ^2=21.461;p=0.010, duration of work in the Main Market (1-10 years) χ^2=20.079;p<0.000, primary occupation(vendor) χ^2=20.330;p=0.002; monthly incomes more than one million shillings χ^2=8.140;p=0.020, and marital status (married) χ^2=11.643;p=0.020.

The awareness of BSE was significantly associated with a higher level of education χ^2=26.262; p<0.000; primary occupation (vendor) χ^2=17.577; p=0.007 and duration of work in the Main Market (1-10 years) χ^2=15.166; p=0.002. On knowledge of CBE, it was statistically and significantly associated with primary occupation (vendor) χ^2=14.192; p=0.021. As for the knowledge of CBE, knowledge of the usefulness of Mammography and knowledge of breast cancer were not significantly associated with any sociodemographic characteristics.

Table 4: The ANOVA tests on the usefulness of BSE for early Breast Cancer detection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.440[a]	0.193	0.131	0.457	
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.497	7	0.642	3.081	0.006
Residual	18.768	90	0.209		
Total	23.265	97			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model 1	B	Std. Error	Beta		
(Constant)	2.739	0.327		8.370	0.000
Age-group (years)	0.004	0.075	0.009	0.052	0.959
Monthly income	-0.013	0.026	-0.047	-0.478	0.634
Religion	-0.003	0.045	-0.006	-0.063	0.950
Primary occupation (vendor)	-0.130	0.044	-0.300	-2.979	**0.004**
How long have you worked in the main market (years)	-0.186	0.076	-0.299	-2.452	**0.016**
How many pregnancies have you had?	0.059	0.065	0.145	0.914	0.363
The highest level of education	-0.091	0.036	-0.246	-2.506	**0.014**

Table 4 shows the independent determinants of knowledge on the usefulness of BSE in the early detection of breast cancer as a primary occupation (β=-0.130, t=-2.979, p=0.004), work duration in the Main Market (β=-0.186, t=-2.452, p=0.016), and the highest level of education attained (β=-0.091, t=-2.506, p=0.014).

Table 5: The ANOVA tests on the BSE practices among participants.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.479[a]	0.23	0.17	0.426	
Model 1	Sum of squares	df	Mean Square	F	Sig.
Regression	4.872	7	0.696	3.838	0.001
Residual	16.322	90	0.181		
Total	21.194	97			
Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.564	0.305		5.126	0.000
Age-group (years)	0.085	0.07	0.204	1.212	0.229
Monthly incomes	-0.049	0.024	-0.191	-1.989	**0.050**
Religion	-0.015	0.042	-0.037	-0.367	0.714
Primary occupation	0.008	0.041	0.019	0.195	0.846
How long have you worked in the Main Market (years)	-0.223	0.071	-0.375	-3.149	**0.002**
How many pregnancies have you had?	-0.071	0.061	-0.182	-1.178	0.242

The highest level of education attained	0.089	0.034	0.253	2.638	**0.010**

Table 5 shows the independent determinants of BSE practices; primary occupation (vendor) (β=-0.049, t=-1.989, p=0.050), duration of work in the main market (1-10 years) (β=-0.223, t=-3.149, p=0.002), and a higher level of education attained (university graduates) (β=0.089, t=2.638, p=0.010).

Table 6: The ANOVA tests on awareness of participants on CBE in early breast cancer detection.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.367[a]	0.134	0.046	0.473	
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.061	9	0.34	1.518	.154[b]
Residual	19.714	88	0.224		
Total	22.776	97			
Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.665	0.364		4.579	0.000
Age-group (years)	0.074	0.087	0.172	0.854	0.395
Marital status	0.002	0.047	0.005	0.047	0.963
Monthly income	-0.037	0.028	-0.141	-1.348	0.181
Tribe	-0.01	0.025	-0.042	-0.41	0.683
Religion	-0.008	0.047	-0.019	-0.176	0.860
Primary occupation	-0.017	0.046	-0.039	-0.364	0.717
How long have you worked in the main market (years)	-0.171	0.079	-0.278	-2.166	**0.033**
How many pregnancies have you had?	-0.057	0.073	-0.141	-0.789	0.432
The highest level of education attained	0.070	0.038	0.191	1.835	**0.007**

Table 6 shows the independent determinants of CBE awareness as work duration in the Main Market (β=-0.171, t=-2.166, p=0.033) and the highest level of education attained (β=0.070, t=1.835, p=0.007).

Table 7: ANOVA test on practices of participants on Clinical Breast Examination (CBE).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.451[a]	0.204	0.122	0.459	
ANOVA					
Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.738	9	0.526	2.5	0.014[b]
Residual	18.528	88	0.211		
Total	23.265	97			
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.676	0.353		7.59	0.000
Age-group (years)	-0.026	0.084	-0.059	-0.304	0.762
Marital status	0.021	0.046	0.052	0.459	0.647
Monthly income	-0.014	0.027	-0.051	-0.51	0.611
Tribe	-0.022	0.025	-0.09	-0.903	0.369
Religion	-0.003	0.046	-0.007	-0.071	0.943
Primary occupation	-0.122	0.044	-0.282	-2.747	**0.007**

How long have you worked in the Main Market (years)	-0.180	0.077	-0.288	-2.347	**0.021**
How many pregnancies have you had?	0.079	0.070	0.193	1.125	0.264
The highest level of education attained	-0.087	0.037	-0.234	-2.347	**0.021**

Table 7 shows that the independent determinants of CBE practices were primary occupation (β=-0.122, t=-2.747, p=0.007), work duration in the Main Market (β=-0.180, t=-2.347, p=0.021), and the highest level of education attained (β=-0.087, t=-2.347, p=0.021).

Table 8: ANOVA on the usefulness of CBE in the early detection of Breast Cancer.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.451[a]	0.204	0.122	0.459	
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.738	9	0.526	2.5	.014[b]
Residual	18.528	88	0.211		
Total	23.265	97			

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.676	0.353		7.590	0.000
Age groups (years)	-0.026	0.084	-0.059	-0.304	0.762
Marital status	0.021	0.046	0.052	0.459	0.647
Monthly income	-0.014	0.027	-0.051	-0.510	0.611
Tribe	-0.022	0.025	-0.090	-0.903	0.369
Religion	-0.003	0.046	-0.007	-0.071	0.943
Primary occupation	-0.122	0.044	-0.282	-2.747	**0.007**
How long have you worked in the Main market (years)	-0.180	0.077	-0.288	-2.347	**0.021**
How many pregnancies have you had?	0.079	0.070	0.193	1.125	0.264
The highest level of education attained	-0.087	0.037	-0.234	-2.347	**0.021**

Table 8 shows the independent determinants of CBE usefulness in early cancer detection were vendor (primary occupation) (β=-0.122, t=-2.747, p=0.007), duration of work in the Gulu Main market (1-10 years) (β=-0.180, t=-2.347, p=0.021), and the highest level of education attained (University graduates) (β=-0.087, t=-2.347, p=0.021).

Discussion: The most significant findings from this study are that the independent factors associated with breast cancer awareness and downstaging practices among participants in Gulu Main Market are the highest level of education attained, work duration at the Main Market (1-10 years), and primary occupation (vendor) (Table 1, Table 2, Table 3). Participants with the highest education qualifications who had worked in the Main Market for 1-10 years and vendors were more likely aware and practiced Breast Self-Examination (BSE) and Clinical Breast Examination (CBE) for screening and early breast cancer detection (Table 4, Table 5, Table 6, Table 7, Table 8).

Several studies showed that breast cancer is a growing problem in sub-Saharan Africa and can potentially overwhelm the limited health care resources [13,14,15,16,17]. In Uganda, breast cancer treatment is conducted at the Ugandan Cancer Institute (UCI) gratis. Still, these efforts for treating cancer patients are frustrated by the late presentation of cases, as 75% to 90% of women

receive a diagnosis of locally advanced (stage III) or metastatic (stage IV) disease [18,19]. For many reasons, the World Health Organization has been leading efforts to reduce this avoidable late disease burden in many African countries so that by 2025, the situation will be better [20]. Because of these realities experienced in Uganda, authors have recommended actions that focus on detecting breast cancer at an early stage (downstaging) by encouraging BSE, CBE, and Mammography for screening and early breast cancer detection [21,22,23].

We designed a survey among adult women in the Gulu Main Market to assess baseline downstaging practices and determine variations in sociodemographic characteristics concerning Breast Self-Examination (BSE), Clinical Breast Examination (CBE), and use of Mammography for breast cancer screening and early cancer detection. Gulu's Main Market was chosen as the study site because it was a single unit where adult women congregated in sizeable numbers (over 4,000 vendors), were organized, and registered with women movements in Northern Uganda. Organized women groups in Uganda most often tend to support their members with appropriate health messages. Thus, they are expected to have many pieces of training on health matters, including breast cancer screening and early detection.

Disappointingly, we were stunned by the low level and lack of awareness of BSE, CBE, and the use of Mammography as screening tools and early breast cancer detection among participants. Authors have questioned whether these participants were trained or were too busy to participate in pieces of training organized by women movements in Northern Uganda but deliberately chose to ignore the downstaging training advice. If they missed these pieces of training scheduled regularly by women movements in Northern Uganda, it would be a point of concern that had to be addressed by health authorities concerned. This observation is vital because resistance to health information will likely have dire consequences on the breast cancer situation among women in Northern Uganda in the years to come.

Sociodemographic characteristics and awareness of breast cancer downstaging practices: Authors found that although there is a high prevalence of breast cancer in Northern Uganda compared to the rest of the country [24,25], the level of awareness and practices on the downstaging activities is low or limited. Most participants with highest qualifications (University degrees) had worked in the Main Market for 1-10 years, and primarily vendors had statistically significant associations with breast cancer downstaging awareness and practices (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6, Table 7, Table 8). Another study supports the current finding on breast cancer screening, awareness, knowledge, and practices among women in the United Arab Emirates, where there is a lack of knowledge on breast cancer screening, with 44.8% of participants who had not done CBE, 44.1% not done Mammography and expressed a lack of knowledge about the existence of these screening techniques [26].

On mammography screening for early breast cancer detection, the current study found that 100% of participants had never conducted Mammography despite some being in the age group for breast cancer screening using Mammography (Table 3). Reasons cited for not undertaking Mammography indicate a lack of knowledge on its importance in breast cancer screening and early detection among participants. In addition, participants cited the unavailability of the mammography machine and the feeling that they were not old enough to undertake this investigation (Table 3). Many African communities have reported responses like our findings from the current study, where there is a higher prevalence of breast cancer. This finding agrees with the ABC-DO (Cohort Africa breast cancer-disparities in outcomes) study in Zambia and Namibia, which found that approximately 15% of participants had not previously heard of breast cancer and 25-40% did not know it was curable [27] like another in Uganda [28].

There were concerns about successful early breast cancer screening in Ugandan communities, mainly where awareness was low. For example, 1 in 4 women had no breast cancer awareness, and 2 in 3 did not know its cure potential [29]. This current study observed that only a third of women in the study population knew breast cancer downstaging practices (Table 2). The low knowledge level of breast cancer downstaging practices has consequences on how the Ugandan Ministry of health could use this information to scale-up breast cancer awareness by engaging, sensitizing, and mobilizing women in different age groups on screening for early breast cancer detection.

Educational level and awareness of breast cancer downstaging practices: Our current study found that participants in the Gulu Main Market with the highest academic level practiced more breast cancer screening activities than those with lower educational levels. This similar observation was in other studies [30,31]. In addition, many studies showed that higher education levels positively

influenced practices on breast self-examination (BSE) in women [30,31,32]. These current findings encouraged authors to suggest that BSE should be taught to all women, regardless of their educational levels. In addition, the authors proposed that when teaching women about Breast Cancer (B.C.) and BSE, hospitals, physicians, and primary health care clinics should impart this information bearing in mind the education level of women [32]. Besides, the authors proposed a special consideration for participants when teaching women of lower educational standards and encouraged university graduate women to allocate time for breast health despite their specific workloads [32].

Studies have shown substantial evidence demonstrating that the socioeconomic status (SES) of patients with breast cancer significantly wedged the prognosis because of its associated influence on the cancer stage at diagnosis [33,34,35]. Previous findings suggest that people with lower incomes present with late cancer stage at the point of diagnosis and had a worse prognosis overall [33,34,35]. Socioeconomic status is equally and significantly associated with educational level and occupation, which greatly influence patients' perception of breast cancer, thereby affecting the successes of early breast cancer detection, diagnosis, and treatment [36,37].

Authors have found that several studies show that the occurrence and development of breast cancer are closely related to a person's economic income level [33,34,35,38]. Higher-income groups have a higher incidence of early breast cancer diagnosis and better prognosis [38]. In addition, the income levels of a person are related closely to the occupation and educational levels [33,38], which we observed in the current study.

These findings suggest that governments could focus on the characteristics of lower income, occupation, and lower educational achievement groups to develop more accurate, effective prevention and treatment strategies for breast cancer [39]. In an ABC-DO (Cohort Africa breast cancer-disparities in outcomes) study, lower educational level, unskilled employment, low social-economic position, rural residence, being unmarried, and in some settings, HIV positivity were factors associated with lower breast cancer awareness [27], similarly observed in the current study (Table 4, Table 5, Table 6, Table 7, and Table 8).

Furthermore, studies showed that unskilled employment is associated with not having heard of breast cancer (OR=3.37; 93% (C.I.) 2.17-5.23), believing that it was incurable (OR=2.43; 1.81-3.26) and not recognizing a breast lump symptom (OR=1.85; 1.41-2.43). These findings provide evidence of the level and differences in breast cancer awareness and beliefs across different settings, highlighting the urgent need for context-specific education programs among women in the sub-Saharan African region [29].

Sources of information on breast cancer and how participants receive them in the current study are like a survey of the effect of knowledge on the uptake of breast cancer prevention modalities among women in Kyadondo county-Uganda [40]. An empirical relationship between uptake of breast cancer prevention modalities and sources of information, such as television, awareness of breast cancer, what reduced breast cancer acquisition, how to check for signs of breast cancer, primarily through breast self-examination and other methods of breast cancer diagnosis in healthcare set-up was wanting [40]. Because of this inadequate breast cancer screening information in Uganda, these authors suggest a need for a boost in breast cancer information dissemination through community health education [40]. The use of village health teams (VHTs) for community engagement in early breast cancer detection is the most reasonable action to be taken by this community.

In summary, this study showed that occupation, duration of work in the Market, and highest educational level significantly influenced breast cancer downstaging practices among participants. This finding can be better addressed by increasing regular breast cancer screening programs among individuals with lower-income occupations or lower academic levels and improving the coverage and penetration of screening to improve early breast cancer detection rates, especially among rural women. Second, there is a need to strengthen publicity on breast cancer-related knowledge for lower-income occupational groups or those with lower educational levels to understand better the importance of conducting BSE, CBE, and Mammography.

This study also suggests that changes regarding funding policy is necessary to waive off or reimburse women in lower-income occupations or lower education levels to ensure they will not encounter financial barriers that stop them from participating in early breast cancer screening and detection in their communities.

Strengths and Limitations of this study.

The study was cross-sectional and conducted among women in Gulu's Main Market. Its limitations are design in nature. A prospective cohort study would have produced much more powered results for our reported observations and outcomes. Secondly, monthly incomes recorded by participants were

reported as average incomes and were not verified nor confirmed by bank statements. These reported monthly incomes may not necessarily reflect the actual financial status of each vendor in the Gulu Market but were used in calculations to determine the effects on the dependent variable (breast cancer downstaging activities). We mitigated the income uncertainties among study participants by getting corroborative information from leaders of sectors in the Market who knew what each registered member earned daily. We found that the information presented by vendors was consistent, comparable, and reliable.

Generalizability of these results: The information presented can be generalized to women in Uganda's cosmopolitan urban centers and rural communities. There is inadequate information on breast cancer downstaging practices among participants in this study population.

Conclusions: The most significant findings from this study are that downstaging activities among women in the Gulu Main Market are statistically associated with the highest educational levels (university graduates), duration of work in the Market (1-10 years) and vending as a primary occupation. Participants with highest academic qualifications who had worked in the Main Market for 1-10 years and are vendors by occupation were more likely to be aware and practiced breast self-examination (BSE) and clinical breast examination (CBE) for early screening detection of cancer of the breast than others.

The authors suggest the need for women to be taught BSE regardless of their educational and income levels. In addition, when teaching women about breast cancer, CBE, and BSE, hospitals, physicians, and primary healthcare clinics should impart this information bearing in mind that the educational level of the women they are dealing with is essential. Attention should be on teaching and encouraging university-level educated women to allocate time for breast health despite their intensive workloads. Furthermore, health education of women without university-level education should focus on teaching the correct perception of breast cancer risks among women in communities.

Lists of abbreviations: BSE: Breast Self-Examination; CBE: Clinical Breast Examination; BC: Breast Cancer; WHO: World Health Organization; ABC-DO: Africa breast cancer-disparities in outcomes; ANOVA: Analysis of Variance

Ethical approval and consent to participate: Gulu University Review and Ethics Committee (GU REC) approved this study. Each research participant for this study gave informed consent to participate.

Consent for publication: All participants consented to the publication of this information.

Availability of data and materials: The minimal data that supports this manuscript are available in the manuscript. Data is available upon reasonable request to the corresponding author.

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SUPPLEMENTARY MATERIAL

Supplementary file 1: Questionnaire

This is academic research to assess knowledge and practices of breast self-examination, clinical breast examination and mammography among the women above 18 years in Gulu Main Market. Your responses will be kept confidential. Your honest answer will be appreciated. Participation is voluntary. Please use a tick to answer the questions. Thank you for your responds and time.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age at last birthday (years): _____
2. Marital status: (1) Single/never married (2) Married (3) Separated (4) Divorced (5) Widowed (6) Cohabiting
3. Monthly income (1) <UGX200,000 (2) UGX200,000-500000 (3) UGX500,001-1000,000 (4) >UGX1,000,000
4. Tribe_____
5. Religion_____
6. Primary occupation_____
7. How long have you been working in Gulu Main Market? _____
8. How many pregnancies have you had? _____
9. Highest level of education (1) No formal education (2) Primary school (3) Secondary school O' level (4) Secondary school A' level (5) University (6) Other tertiary institutes (specify)_____

SECTION B: AWARENESS (KNOWLEDGE OF BREAST CANCER AND BREAST CANCER PREVENTION).

5. Have you heard of breast cancer? (1) Yes (2) No

6. What are your source (s) of information? Tick all that apply. I. Books yes/No ii. Media (TV, Radio, Internet, etc.) Yes/No iii. Hospital Yes/No iv. Lecture Yes/No v. Friends and Relatives Yes/No vi. Others (pls. specify) _____

7. Has any member of your family been diagnosed of breast cancer**?** (1) Yes (2) No

8. If answer to the question above is yes, what is her relationship to you**?** (1) Mother (2) Aunt (3) Sister (4) Cousin (5) Others (specify)_____

9. Which of the following are true risk factors for acquiring breast cancer (1). Being a female sex, Yes/No (2). Family history, Yes/No (3). Oestrogen exposure in contraceptive pills, other; estrogens, Yes/No (4). Idiopathic (no identifiable risks) Yes/NO (5). Nulliparity, Yes/No (6). Early menarche and late menopause, Yes/No

SECTION C: KNOWLEDGE AND PRACTICE OF BREAST SELF EXAMINATION (BSE)

9. Have you heard of Breast Self-Examination (BSE)? (1) Yes (2) No

10. Do you know that BSE is a useful tool for early detection of breast cancer**?** (1) Yes (2) No

11. Have you been taught how to do BSE? (1) Yes (2) No

12. If answer to the question above is yes, who taught you? i. Parents Yes/No ii. Teacher Yes/No iii. Health worker Yes/No iv Friend Yes/No v. Others (pls. specify) _____

13. At what age should BSE be started? (1) From birth (2) From puberty (3) From 20 years (3) From 30years (5) After menopause (6) No idea

14. How often should BSE be done? (1) Daily (2) Weekly (3) Monthly (4) Yearly (5) No idea

15. What is the best time to do BSE? (1) During menstrual flow (2) A week after period (3) During pregnancy (4) During breast feeding (5) No idea

16. BSE should be done by: (1) Health worker (2) The individual (3) Others (Pls. specify) _____

17. BSE is done by? (Tick all that apply).

i. Inspect the breast in the mirror
ii. Feeling the breast with the hand
iii. Feeling the armpit with the hand
iv. Doing Ultrasound of the breast
v. Mammography
vi. Others (Pls. specify) _____

18. If you discover any abnormality during BSE, what will you do? (Tick al that apply)

(1) Pray over it
(2) Do some lab. tests

(3) See a doctor
(4) Do nothing
(5) Others (specify)_____
19. What are the benefits of BSE? (Tick all that apply)
i. To be familiar with the breast texture
ii. Early detection of breast cancer
iii. Detection of any abnormal changes in the breast
iv. A good breast exercise
20. Do you practice BSE? (1) Yes (2) No
21. If answer to the question above is yes, how often? (1) Weekly (2) Monthly (3) Occasionally (4) Rarely
22. If answer is no, why not? (Tick all that apply)
1.Does not know how to perform
2.Too busy to perform
3.Think it's unnecessary
4.Embarrassed
5, Afraid to find lump
5.Others (specify)
23. If you have been practicing BSE, have you ever discovered any abnormality in your breast**?** (1) Yes (2) No (3) I have not done BSE before
24. If answer to question above is yes, what did you do**?** (1) Prayed over it (2) Did some lab. tests (3) Saw a doctor (4) Did nothing (5) Others (specify)_____
25. Do you think BSE is a good practice? (1) Yes (2) No

SECTION D: KNOWLEDGE AND PRACTICE OF CLINICAL BREAST EXAMINATION (CBE)

26. Have you heard of Clinical Breast Examination (CBE)? (1) Yes (2) No
27. Do you know that CBE is a useful tool for detection of breast cancer**?** (1) Yes (2) No
28. CBE should be done by (1) Health practitioner (3) The individual (4) Others (Pals specify) _____
29. CBE is done using: (1) Ultrasound (2) Mammography (3) Hand (4) Others (specify)_____
30. How often should CBE be done? (1) Daily (2) Weekly (3) Monthly (4) Yearly (5) When abnormality is found on BSE (6) No idea

SECTION E: KNOWLEDGE AND USE OF MAMMOGRAPHY

31. Have you heard of mammography? (1) Yes (2) No
32. Is mammography a useful tool for the early detection of breast cancer? (1) Yes (2) No (3) Don't know
33. At what age should mammography be started? (1) From birth (2) From puberty (3) From 20 years (4) From 40 years (5) After menopause (6) No idea
34. How often should mammography be done? (1) Weekly (2) Monthly (3) Yearly (4) Every three years (5) When a lump is found on BSE or CBE (6) No idea
37. Have you ever done a mammography? (1) Yes (2) No
38. If no to question above, why not? (1) Not old enough (2) Financial constraint (3) Mammography not available (4) Others (please specify) _____