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Original Research

Mammography examination among women aged 40 years or older in Ghana: evidence from wave 2 of the World Health Organization's study on global AGEing and adult health multicountry longitudinal study

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ABSTRACT

Objective: To determine the uptake of mammography among Ghanaian women aged 40 years or older and to examine critical risk factors that influence the uptake.
Study design: A cross-sectional survey.
Methods: A nationally representative sample of 2787 women and 1948 men aged ≥18 years were surveyed in the Wave 2 (2014-2015) of the World Health Organization's multicountry study on AGEing and adult health in Ghana. Of the 2787 women aged ≥18 years, data on a total of 2301 women aged ≥40 years were included in this study. Univariable and multivariable logistic regression models were applied to examine critical risk factors for mammogram examination.
Results: Of the 2301 women sampled, only 83 (3.61%) ever had mammogram. The odds of mammogram examination were lower for women aged ≥70 years (odds ratio [OR] 0.42, 95% confidence interval [CI]: 0.19, 0.93), being self-employed (OR = 0.21, 95% CI: 0.11, 0.42) and being informal sector employee (OR = 0.26, 95% CI: 0.12, 0.57) in the multivariable analyses. Belonging to the Ewe ethnic group (OR=3.41, 95% CI:1.88, 6.16) compared to the Akan group was associated with increased odds of mammogram examination in the multivariable analysis. Women aged ≥70 years, being self-employed, being an informal employee and belonging to the Ewe ethnic group were independently associated with mammography examination.
Conclusion: The prevalence of screening for breast cancer using mammography among Ghanaian women aged 40 years and older was 3.6%. Age, type of employer and ethnicity were associated with an older adult woman's likelihood to access mammography screening. Overall, our study provided critical data to encourage and promote good health-seeking behaviour in terms of breast cancer screening among older adult women. Further qualitative studies are warranted to explore why some of these factors influence mammography.

Introduction

Breast cancer is the most frequently diagnosed cancer in almost all regions of the world. It is also the most frequent cause of death in most regions of the world.[1] Global cancer statistics indicate a rising incidence of breast cancer worldwide. This increase is occurring at a relatively faster rate in developing countries.[2] Breast cancer is also the leading cause of cancer morbidity and mortality in Ghana and other developing countries.[3,4] Available evidence suggests that early detection and effective treatment are important to reduce morbidity and mortality associated with breast cancer.[5,6] Breast self-examination, clinical breast examination and mammography are believed to be appropriate and effective methods of ensuring early detection of breast cancer.[6]

It has been debated extensively whether breast cancer screening does more harm than good. The main questions are how large the benefit of screening is in terms of reduced breast cancer mortality

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and how substantial the harm is in terms of overdiagnosis, which is defined as cancers detected at screening that would not have otherwise become clinically apparent in the woman's lifetime.[7] Although there are controversies regarding the value of each of these screening tools, the weight of evidence favours screening by mammography in women who are 40 years or older.[8,9] Mammography screening is an effective tool for early detection and management of breast cancer.[10] Reported barriers to its uptake include 'being busy,' lack of perceived susceptibility to breast cancer,[10] ignorance of the availability of 'screening facility, financial constraints and lack of referrals from clinicians.[2] The belief that mammography can detect breast cancer before symptoms appear and the perceived benefit that early detection is important for its management are some motivating factors for its uptake.[10] Screen-detected tumours tend to be smaller, well differentiated and less likely to have regional lymph node involvement,[11,12] and these are factors that make treatment more effective and survival more likely.[13]

These benefits of screening and early detection notwithstanding, more than half of the patients with breast cancer in Ghana report with late stages (stage III and stage IV) of the disease[4,14] resulting in poorer outcomes.

With this background in mind, this analysis determined the uptake of mammography among Ghanaian women aged 40 years or older and the factors that influence the uptake.

Methods

Data source

Data from wave 2 of the World Health Organization's (WHO) study on global AGEing and adult health (SAGE) conducted between 2014 and 2015 in Ghana was used in this analysis. The SAGE study is a nationally representative, multicountry longitudinal study conducted among six countries that collects data to complement existing ageing data sources to inform health policy and programmes. The WHO and the University of Ghana Medical School through the Department of Community Health collaborated to implement SAGE Wave 2. Detailed description of the methods used in the survey is published elsewhere.[15]

Study population

Individuals aged ≥50 years and a smaller sample of individuals aged 18–49 years were interviewed regarding their health care utilisation, preventive health behaviours, chronic health conditions and health services coverage, subjective wellbeing and quality of life, risk factors and perceived health status, sociodemographic and work history and social cohesion and household characteristics. Although the data source provided data on 4735 participants, 1948 male participants were excluded and further 486 female participants aged <40 years were also excluded, leaving 2301 participants. This study was based on women aged ≥40 years as is recommended.[9,16] Further details about SAGE, especially about wave 2 can be found through the WHO website[17].

Outcome variable

The main outcome variable in this study was whether a woman ever received a mammography examination (screening tool for breast cancer). This is a self-report based on the question, 'When was the last time you had a mammogram, if ever?' The response was then categorised as never (coded as 0) or ever had mammogram (coded as 1) for women aged ≥40 years. A secondary outcome of interest was whether a woman had a mammogram within the last 5 years or not. Women who had a mammogram within the last 5 years were categorised as yes (coded as 1) and those who had it more than 5 years ago were categorised as no (coded as 0).

Explanatory variables

The analysis considered factors such as age, ethnicity, marital status, income, employment status and type of employer, education, religion, health state report, satisfaction with health care, healthcare involvement and difficulty with self-care. Selection of these variables was based on factors that influence health outcomes and healthcare-seeking behaviours, especially in developing countries such as Ghana.[18–21]

Statistical analysis

Selected background characteristics of respondents were summarised using frequencies with their associated percentages for qualitative variables. Binary logistic regression analysis was applied to examine factors at the individual, household and community levels that might be associated with mammography examination status. First, a binary logistic regression model on 2223 individuals with complete measurements on mammography examination status and potential risk factors considered to obtain a final multivariable model was applied. In addition, a subgroup analysis was conducted on those who ever had mammography examination only. The group was categorised into those who had the examination within ≤5 years and those who had it >5 years ago.

Model parameters using maximum likelihood was obtained. The fit of the final multivariable binary logistic regression model was checked using Hosmer-Lemeshow[22] test while the variance inflation factor (VIF) was used to check multicollinearity. A VIF value less than 10 was considered acceptable.[23] All the analyses were performed using STATA, version 14.2.[24] A *P*-value less than 0.20 on a univariable logistic regression was used to select candidate set of covariates for multivariable logistic regression. A statistical significance was declared at P-value < 0.05.

Results

Background characteristics

Information on a total of 2301 Ghanaian women aged 40 years or older was included in this analysis. The analysis observed that 83 (3.61%) of the women ever had mammography examination with 58 (69.9%) of them having had it within the last 5 years. Majority of the study participants (35.61%) were aged 50–59 years, were currently married (42.16%), belonged to the Akan ethnic group (52.26%) and were Christians (77.83%) (Table 1).

In all, 60% of them rated their current health state as good/very good, 84% of them rated their satisfaction with health care as satisfied/very satisfied and 66% of them rated their healthcare involvement in the country as good/very good. In addition, 77% had no difficulty with self-care, 65% did not report any form of depression and 59% had no visual difficulties (Table 1).

Factors associated with mammography examination among all women aged ≥40 years

Factors significantly associated with mammography examination in the univariable analyses were age and ethnic group. Women aged ≥70 years had significantly lower odds (odds ratio [OR] = 0.34, 95% confidence interval [CI]: 0.16, 0.74) of having mammography examination compared with their counterparts aged 40–49 years. Those aged 50–59 and 60–69 years also had decreased odds of

Table 1
Summary of selected background characteristics of women aged ≥40 years in the study.

Characteristics	Frequency	Percentage
Mammography examination status		
Never	2218	96.39
Ever had mammogram	83	3.61
Age in years		
40-49	250	10.62
50-59	838	35.61
60-69	610	25.92
70 or more	655	27.84
Marital status		
Never married	80	3.40
Currently married	992	42.16
Cohabiting	16	0.68
Separated/divorced	342	14.53
Widowed	923	39.23
Ethnicity		
Akan	1226	52.26
Ewe	152	6.48
Ga-adangbe	315	13.43
Guan	78	3.32
Northern dialect	575	24.51
Religion		
No religion	55	2.34
Christianity	1826	77.83
Islam	370	15.77
African traditional	81	3.45
Others[a]	14	0.60
Health state today		
Good/very good	1410	60.46
Moderate	687	29.46
Bad/very bad	235	10.08
Satisfaction with health care		
Satisfied/very satisfied	1915	83.66
Indifferent	273	11.93
Dissatisfied/very dissatisfied	101	4.41
Rate healthcare involvement		
Good/very good	1507	65.92
Moderate	437	19.12
Bad/very bad	342	14.96
Difficulty with self-care		
None	1804	77.26
Mild	374	16.02
Moderate	119	5.10
Severe/extreme	38	1.63
Depression		
None	1503	64.51
Mild	578	24.77
Moderate	193	8.27
Severe/extreme	57	2.44
Visual difficulty		
None	1374	59.05
Mild	486	20.89
Moderate	365	15.69
Severe/extreme	102	4.38

[a] Buddhism, Chinese traditional religion, Hinduism.

having a mammogram, but this was not statistically significant. Women belonging to the Ewe ethnic group had increased odds (OR = 3.76, 95% CI: 2.11, 6.71) of having mammography examination compared with women belonging to the Akan ethnic group. Marital status, current health state, satisfaction with health care, healthcare involvement and difficulty with self-care were not significantly associated with mammography examination (Table 2).

In the multivariable analyses, only age and ethnic group were independently associated with mammography examination. Women aged ≥70 years had lower odds (OR = 0.42, 95% CI: 0.19, 0.93) of having mammography examination compared with their counterparts aged 40–49 years, and women belonging to the Ewe ethnic group had increased odds (OR = 3.41, 95% CI: 1.88, 6.16) of having mammography examination compared with women belonging to the Akan ethnic group (Table 2).

The Hosmer-Lemeshow goodness of fit test revealed a chi-squared value of 2.59 and a corresponding *P*-value of 0.957, suggesting that the model is correctly specified. The VIF analysis revealed no problem with multicollinearity as all VIFs are less than 1.02.

Subgroup analysis

Additional subgroup analysis on the association between other potential predictors such as income and employment status, type of employer and mammogram examination was conducted while adjusting for age and ethnic group as confounders. This is necessary because there were missing data in these potential predictors but are critical in this study. Including them in the main result presented in Table 2 will reduce the sample size and power of the study. Results presented in Table 3 showed that only the type of employer is significantly associated with mammogram examination in both the univariable and multivariable logistic regression models. The odds of mammogram examination were lower for self-employed (OR = 0.21, 95% CI: 0.11, 0.42) and informal sector employees (OR = 0.26, 95% CI: 0.12, 0.57) compared with public sector employees in the multivariable model.

Factors associated with mammography examination within the last 5 years among women aged ≥40 years

Among the 83 women who ever had mammography examination, 58 (69.9%) have had an examination performed within the last 5 years. Using the same factors considered in this study, none of the factors met the inclusion criteria (*P*-value<0.2) for the multivariable logistic regression. Thus, there is no significant factor associated with having mammography examination within ≤5 years or >5 years (Table 4).

Discussion

The prevalence of screening for breast cancer using mammography among the 2301 Ghanaian women aged 40 years and older was 3.6%. This prevalence, though very low, is almost double that reported two to three years earlier in Ghana (2%).[2] This is probably an indication of an improvement in the uptake of mammography since 2012. It is unclear what the main drivers behind this improvement in uptake are, but this may be because of the combined effect of on-going public education and the increase in the number of available centres where one could have a mammogram performed.

Although there is paucity of data in sub-Saharan Africa regarding the uptake of mammography, this low prevalence of 3.6% is higher than the reported prevalence among the general population[25] and among health professionals[26] in the subregion. It is however lower than the 15.5% observed among women aged 50 years and older in South Africa[27] and is in sharp contrast to what pertains among women living in the United States where the reported uptake was nearly 80%.[28] The low patronage of mammography among Ghanaian women could probably be attributed to poor accessibility, limited financial access or fear of being diagnosed with breast cancer as indicated in other studies.[2,29]

In this analysis, age, ethnicity and type of employer were significantly associated with having mammography performed in both the univariable and multivariable analyses. Thus, age, ethnicity and type of employer were independently associated with mammogram uptake. Older women (aged 70 years and more) were found to be significantly less likely to have mammography performed which may reflect a general apathy about health care in this

Table 2
Factors associated with mammography examination status among women aged ≥40 years from binary logistic regression ($n = 2208$).

Characteristics	Unadjusted model		Adjusted model	
	UOR (95% CI)	*P*-value	AOR (95% CI)	*P*-value
Age of respondent (years)		0.043*		
40–49	ref		Ref	
50–59	0.63 (0.33, 1.21)	0.168	0.75 (0.39, 1.47)	0.406
60–69	0.75 (0.39, 1.46)	0.4	0.85 (0.43, 1.68)	0.646
70 or more	0.34 (0.16, 0.74)	0.007**	0.42 (0.19, 0.93)	0.031*
Ethnic group		<0.001***		
Akan	ref		Ref	
Ewe	3.76 (2.11, 6.71)	<0.001***	3.41 (1.88, 6.16)	<0.001***
Ga-Adangbe	0.89 (0.44, 1.79)	0.821	0.92 (0.46, 1.86)	0.816
Northern dialect	0.59 (0.31, 1.13)	0.109	0.66 (0.34, 1.27)	0.213
Marital status		0.521		
Never married	ref		–	–
Currently married	1.49 (0.35, 6.29)	0.590		
Separated/divorced	1.87 (0.42, 8.33)	0.409		
Widowed	1.20 (0.28, 5.14)	0.806		
Religion		0.375	–	–
No religion	ref			
Christian	1.10 (0.26, 4.59)	0.900		
Islam	0.67 (0.14, 4.59)	0.620		
African traditional	0.33 (0.03, 3.75)	0.372		
Rate your health today		0.575	–	–
Good/very good	ref			
Moderate	0.78 (0.47, 1.30)	0.342		
Bad/very bad	0.78 (0.35, 1.73)	0.539		
Satisfaction with health care		0.677	–	–
Satisfied/very satisfied	ref			
Indifferent	0.99 (0.50, 1.94)	0.976		
Dissatisfied/very dissatisfied	0.53 (0.13, 2.18)	0.377		
Rate healthcare involvement		0.547	–	–
Good/very good	ref			
Moderate	0.71 (0.38, 1.33)	0.279		
Bad/very bad	1.00 (0.54, 1.84)	0.996		
Difficulty with self-care		0.738	–	–
None	ref			
Mild	0.78 (0.41, 1.48)	0.441		
Moderate	0.91 (0.32, 2.53)	0.852		

UOR: unadjusted odds ratio, AOR: adjusted odds ratio, CI: confidence interval, ref: reference category, *: *P*-value<0.05, **: *P*-value<0.01, ***: *P*-value<0.001.

Table 3
Association between employment status, type of employer, education, income and mammogram examination among women aged ≥40 years from binary logistic regression.

Characteristics	Unadjusted model		Adjusted model ($n = 2125$)[a]	
	UOR (95% CI)	*P*-value	AOR (95% CI)	*P*-value
Currently working ($n = 2251$)		0.175		
Yes	ref		Ref	
No	1.37 (0.87, 2.15)	0.175	1.65 (0.97, 2.80)	0.062
Type of employer ($n = 2207$)		<0.000***		
Public	ref		ref	
Private	0.60 (0.16, 2.25)	0.446	0.59 (0.15, 2.25)	0.436
Self-employed	0.16 (0.09, 0.32)	<0.000***	0.21 (0.11, 0.42)	<0.000***
Informal	0.21 (0.10, 0.45)	<0.000***	0.26 (0.12, 0.57)	0.001**
Years of education ($n = 1009$)	1.03 (0.98, 1.07)	0.225		
Income (cedi) ($n = 1489$)	1.00 (1.00, 1.00)	0.863		

UOR: unadjusted odds ratio, AOR: adjusted odds ratio, CI: confidence interval, ref: reference category, **: *P*-value<0.01, ***: *P*-value<0.001.
[a] adjusted for age and ethnic group as confounders from Table 2.

age group that has already surpassed the life expectancy of 64 years. However, previous studies in Ghana that explored reasons for non-participation in mammography screening observed that ignorance of the availability of screening facility, financial constraints, lack of referrals from clinicians[2] and fear of the outcome (being diagnosed with breast cancer)[29] were the major reasons why Ghanaian women shy away from mammography.

The relatively lower uptake of mammogram among those who were self-employed and informal sector employees warrant further studies to identify the pathways through which this association can manifest.

The observation on the ethnic differences in the use of mammography screening among older adult women in Ghana is really difficult to explain. The WHO survey did indicate only the 'what' and not the 'how' of such observations. In Ghana, the major ethnic groups (such as the Akans and Ewes in this case) are not strictly confined to particular geographic locations but are generally mixed and scattered across the country. Overall, improved awareness and education could be beneficial in addressing this issue. However, this interesting observation may require further ethnographic and anthropological studies to explain.

Table 4
Factors associated with mammography examination in 5 years or less status among women aged ≥40 years from binary logistic regression ($n = 83$).

Characteristics	Unadjusted model	
	UOR (95% CI)	*P*-value
Age of respondent (years)		0.819
40–49	Ref	
50–59	1.53 (0.39, 5.95)	0.541
60–69	1.51 (0.37, 6.08)	0.564
70 or more	0.89 (0.19, 4.24)	0..883
Ethnic group		0.851
Akan	Ref	
Ewe	0.77 (0.24, 2.53)	0.672
Ga-Adangbe	0.58 (0.14, 2.43)	0.456
Northern dialect	1.16 (0.27, 5.03)	0.842
Rate your health today		0.204
Good/very good	Ref	
Moderate	0.41 (0.14, 1.20)	0.103
Bad/very bad	0.41 (0.08, 2.09)	0.285
Rate healthcare involvement		0.825
Good/very good	Ref	
Moderate	0.90 (0.24, 3.38)	0.876
Bad/very bad	1.50 (0.37, 6.11)	0.572
Difficulty with self-care		0.875
None	Ref	
Mild	0.73 (0.19, 2.77)	0.643
Moderate	1.25 (0.12, 12.75)	0.851

UOR: unadjusted odds ratio; CI: confidence interval; ref: reference category.

Limitations

The main limitation of this study is the cross-sectional nature of the survey and as a result one cannot draw causation effect between the outcomes and the risk factors. In addition, the study used only self-reporting by the older adult women, a combination of other methods of ascertainment could probably have yielded additional information.

Conclusion

The prevalence of screening for breast cancer using mammography among the 2301 Ghanaian women aged 40 years and older was 3.6% from data collected in 2015. This is an improvement over the 2% recorded in a study in Ghana in 2012. Age, ethnicity and type of employer were associated with an older adult woman's likelihood to access mammography screening. Overall, our study provided critical data to encourage and promote good health-seeking behaviour in terms of breast cancer screening among older adult women. Further qualitative studies may be required to explore why some of these factors influence mammography screening in Ghana.

Author statements

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Ethical approval

The SAGE survey was approved by the World Health Organization's Ethical Review Board (reference number RPC149) and the University of Ghana College of Health Sciences, Ethical and Protocol Review Committee. Written informed consent was obtained from all study respondents.

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Competing interest

The authors declare no competing interests.

Author contributions

B.N.L.C-.T. and J.M.K.A. developed the concept. J.M.K.A. analysed the data. J.M.K.A. and B.N.L.C-.T. wrote the first draft manuscript, and J.M.K.A., B.N.L.C-.T., G.M., R.B.B. and A.E.Y. contributed to the writing and reviewing of the various sections of the manuscript. All the authors reviewed the final version of the manuscript before submission. All authors read and approved the final manuscript.

Data availability

Data is freely available upon making official request to WHO-SAGE Team through the WHO website at http://www.who.int/healthinfo/sage/cohorts/en/.

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