

## RESEARCH ARTICLE

# Breast and Cervical Cancer Screening and Associated Factors among Older Adult Women in South Africa

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### Abstract

**Background:** Little is known about the cancer screening prevalence and correlates in older adults from different racial backgrounds. In the context of heightened efforts for prevention and early diagnosis, we collected information on screening for two major types of cancers: cervical and breast cancer in order to establish their prevalence estimates and correlates among older South African women who participated in the Study of Global Ageing and Adults Health (SAGE) in 2008. **Materials and Methods:** We conducted a national population-based cross-sectional study with a multi-stage stratified cluster sample of 3,840 individuals aged 50 years or older in South Africa in 2008. In this analysis, we only considered the female subsample of (n=2202). The measures used included socio-demographic characteristics, health variables, anthropometric and blood pressure measurements. Multivariable regression analysis was performed to assess the association of socio-demographic factors, health variables and cancer screening. **Results:** Overall, regarding cervical cancer screening, 24.3% ever had a Papanicolaou (PAP) smear test, and regarding breast cancer screening, 15.5% ever had a mammography. In multivariate logistic regression analysis, younger age, higher education, being from the White or Coloured population group, urban residence, greater wealth, and suffering from two or more chronic conditions were associated with cervical cancer screening, and higher education, being from the White or Indian/Asian population group, greater wealth, having a health insurance, and suffering from two or more chronic conditions were associated with breast cancer screening. **Conclusions:** Cancer screening coverage remains low among elderly women in South Africa in spite of the national guideline recommendations for regular screening in order to reduce the risk of dying from these cancers if not detected early. There is a need to improve accessibility and affordability of early cervical and breast cancer screening for all women to ensure effective prevention and management of cervical and breast cancer.

**Keywords:** Cancer - mammography - Papanicolaou smear test - chronic diseases - aged  $\geq 50$  - South Africa

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### Introduction

Cytology-based screening programmes have led to a significant decrease in cervical cancer in high-income countries (WHO, 2002). High-income countries have an average screening coverage of 63%, compared to 19% in low and middle income countries (Gakidou et al., 2008). The cervical cancer screening coverage (the proportion of women over the age of 30 years) in South Africa is 18-20% (Fonn et al., 2002; Hoque et al., 2008). In South African females, “cancer of the breast was the second leading cancer between 1986 and 1992 (cervical being the leading cancer), but between 1993 and 1995 it overtook cervical cancer, and is now the most common cancer in women (16.6%)” (Vorobiof et al., 2001). The etiological “link between human papilloma virus (HPV) infection and cervical cancer has been well established” (Tribius

and Hoffman, 2013), and there are several high-risk HPV genotypes. HPV infection is one of the most prevalent sexually transmitted infection (STI) globally – with approximately 80% of sexually active females being at risk of having HPV in their lifetime (Botha et al., 2010).

Regarding cervical cancer screening the South African guidelines (Department of Health, 1999) recommend “three (3) free smears per lifetime; Women aged 30 years or older will be screened three times in succession, utilising cervical cytological (Pap) smears. Women screened for the first time at age 55 or more will have only one smear if the first smear is normal”.

In a study involving urban residents in Latin America and the Caribbean, the prevalence of mammography use in the past 2 years was 9.8% in Havana and 34.4% in Sao Paulo (Reyes-Ortiz et al., 2006). In the USA, the prevalence of breast cancer screening and cervical cancer

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screening was 62% and 53% respectively among older adults aged 75 to 79 years. The rates of cervical cancer and breast cancer screening were 38% and 50% respectively for individuals aged 80 years or older (Bellizzi et al. 2011). Among older Chinese women (60 years or above) 3.7% had undergone breast cancer screening in the past two years (Leung et al., 2012).

Factors associated with breast cancer and/or cervical cancer screening among older adults included older age (Reyes-Ortiz et al., 2006), less older age (Caplan, 2001), higher education (Reyes-Ortiz et al., 2007; Bellizzi et al., 2011; Leung et al., 2012), a higher level of knowledge about the usefulness and benefit of mammography (Constanza, 1994; Farmer et al., 2007; Kissal and Beser, 2011), lower cognitive performance (Leung et al., 2012), higher household income (Coughlin et al., 2007), having a public health insurance (Reyes-Ortiz et al., 2008), and higher number of chronic conditions (Heflin et al., 2002).

Little is known about the cancer screening prevalence and correlates in older adults from different racial backgrounds. In the context of heightened efforts for prevention and early diagnosis, SAGE collected information on screening for two major types of cancers: cervical and breast cancer in order to establish their prevalence estimates and correlates. Female respondents aged 50 years or older were asked whether they were ever screened for cervical cancer by giving a pap smear, and whether they were ever screened for breast cancer using a mammogram.

## Materials and Methods

### Sample and procedure

A population-based cross-sectional study with a multi-stage stratified cluster sample of 3840 aged 50 years or older in South Africa in 2008 was conducted. A 77% individual response rate was achieved. In this analysis, we only considered the female subsample of (n=2202). A two-stage probability sample design was used to produce acceptable estimates at provincial level, by residence type (urban and rural), and by population group (including Black, Coloured (mixed race consisting of European and African descendents), Indian or Asian and White). SAGE was conducted in partnership with the World Health Organization (WHO), the National Department of Health (NDOH), and the Human Sciences Research Council (HSRC). The study was approved by the HSRC Ethics Committee (Protocol REC 5/13/04/06) and the NDOH (J1/14/45, 2007). The questionnaire was interview administered after informed formal consent was obtained.

### Measures

**Cancer screening questions included:** "When was the last time you had a pelvic examination, if ever? (By pelvic examination, I mean when a doctor or nurse examined your vagina and uterus?)". "The last time you had the pelvic examination, did you have a PAP smear test? (By PAP smear test, I mean, did a doctor or nurse use a swab or stick to wipe from inside your vagina, take a sample and send it to a laboratory?)". "When was the last time you had a mammography, if ever? (That is, an x-ray of your

breasts taken to detect breast cancer at an early stage)."

**Chronic conditions:** were assessed with a number of questions including asking the respondents if they had ever been told by a doctor or other healthcare provider that they had arthritis, diabetes mellitus, hypertension, heart disease, stroke or angina (yes=1, no=0). A summary score for medical conditions was constructed, from 0 to 6.

**Functional disability:** was measured by the 12-item WHO Disability Assessment Schedule, version 2 (WHODAS-II) (WHO, 2010), designed to measure disability from responses to questions on physical functioning in a range of Activities of Daily Living (ADLs) as well as Instrumental Activities of Daily Living (IADLs).

**Economic or wealth status:** wealth levels were generated through a multi-step process, where the asset ownership was converted to an asset ladder using Bayesian post-estimation method to generate raw continuous income estimates which were then transformed into Quintiles (Ferguson et al., 2003).

### Data analysis

The data were captured into CSPro and analysed using STATA Version 10. The data was weighted using post-stratified individual probability weights based on the selection probability at each stage of selection. Individual weights were post-stratified by province, sex and age-groups according to the 2009 Medium Mid Year population estimates from Statistics South Africa available at: <http://www.statssa.gov.za/publications/P0302/P03022009.pdf>. Weights were not normalised. Outliers were removed after examining the data using boxplot analyses. Computed estimates have been reported with 95% confidence intervals and a two-side p-value of 0.05 which was used as the cut-off point for statistical significance. Associations between key outcomes of cancer screening methods and socio-demographic and health variables were examined by calculating odds ratios (OR). Unconditional multivariable logistic regression was used for evaluation of the impact of explanatory variables for key outcome of cancer screening method (binary dependent variable). All variables statistically significant at the  $p < 0.05$  levels in bivariate analyses were included in the multivariable models. In the analysis, weighted percentages have been reported. The 95% confidence intervals and p values  $< 0.05$  were used to demonstrate statistical significance and these were adjusted for the multi-stage stratified cluster sample design of the study.

## Results

### Descriptive analysis

**Sample characteristics:** the total sample of women included 2202, almost half (48.1%) were between 50 to 59 years old and three quarters (74.2%) came from the African Black population group, more than two-thirds had some form of education and came from urban areas respectively, 62.8% had low and medium wealth index. About 40% had one or more chronic conditions. In terms of cervical cancer screening, 24.3% ever had a PAP smear test, and regarding breast cancer screening, 15.5% ever

**Table 1. Association Between Sociodemographics, Health Variables and Cancer Screening**

Variable		Cervical cancer screening		Breast cancer screening	
		Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Age	50-59	1	1	1	-
	60-69	0.67 (0.48-0.94)*	0.63 (0.43-0.92)**	1.25 (0.80-1.95)	
	70+	0.56 (0.34-0.91)**	0.44 (0.27-0.71)***	0.95 (0.54-1.67)	
Education	None	1	1	1	1
	Less than Primary	2.29 (1.35-3.89)**	1.54 (0.90-2.62)	1.84 (0.86-3.91)	2.03 (0.79-5.20)
	Primary	3.17 (1.99-5.06)***	1.74 (0.97-3.14)	2.86 (1.59-5.14)***	2.76 (2.31-5.85)**
	Secondary or more	7.49 (4.67-12.00)***	3.44 (0.98-5.96)***	6.36 (3.64-11.13)***	3.81 (1.88-7.74)***
Population group	African Black	1	1	1	1
	White	8.51 (5.02-14.43)***	3.66 (1.92-6.99)***	10.60 (5.39-20.87)***	3.33 (1.54-7.19)**
	Coloured	3.89 (2.47-6.12)***	2.48 (1.59-3.89)***	1.62 (0.77-3.44)	1.27 (0.62-2.60)
	Indian or Asian	3.66 (1.50-8.97)**	1.72 (0.82-3.66)	6.59 (2.39-18.22)***	4.08 (1.71-9.71)**
Residence	Rural	1	1	1	1
	Urban	4.87 (2.84-8.33)***	2.28 (1.28-4.07)**	4.08 (2.18-7.68)***	1.76 (0.88-3.53)
Wealth index	Low	1	1	1	1
	Medium	2.04 (1.26-3.30)**	1.70 (0.97-3.00)	1.42 (1.76-2.65)	1.20 (0.64-2.29)
	High	4.65 (2.97-7.27)***	1.88 (1.16-3.07)**	5.71 (2.85-11.30)***	2.18 (1.00-4.76)*
Health insurance		2.39 (1.55-3.48)***	1.37 (0.86-2.18)	3.99 (2.40-6.63)***	2.71 (1.57-4.66)***
Functional disability	Low	1	1	1	-
	Moderate	0.89 (0.55-1.40)	0.97 (0.86-2.01)	0.76 (0.45-1.28)	
	Severe/extreme	0.60 (0.39-0.92)*	0.86 (0.53-1.38)	0.82 (0.50-1.35)	
Chronic conditions	None	1	1	1	1
	One	1.38 (0.99-1.93)	1.43 (0.96-2.14)	0.93 (0.57-1.53)	0.91 (0.52-1.61)
	Two or more	2.85 (1.65-4.90)***	3.47 (1.93-6.25)***	2.68 (1.46-4.95)**	1.92 (1.01-3.63)*

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

had a mammography.

#### *Inferential statistics*

**Association between sociodemographics, health variables and cancer screening:** bivariate analyses found that younger age, higher education, being from the White, Coloured or Indian/Asian population group, urban residence, greater wealth, having a health insurance, lower functional disability and suffering from two or more chronic conditions were associated with cervical cancer screening. Similarly, in multivariate logistic regression analysis, younger age, higher education, being from the White or Coloured population group, urban residence, greater wealth, and suffering from two or more chronic conditions were associated with cervical cancer screening.

Further, bivariate analyses found that higher education, being from the White or Indian/Asian population group, urban residence, greater wealth, having a health insurance, and suffering from two or more chronic conditions were associated with breast cancer screening. Similarly, in multivariate logistic regression analysis higher education, being from the White or Indian/Asian population group, greater wealth, having a health insurance, and suffering from two or more chronic conditions were associated with breast cancer screening see (Table 1).

## **Discussion**

The study found a low prevalence of cervical and breast cancer screening similar to a study in China (WHO, 2012a) but higher than a study in another African country (Ghana) (WHO, 2012b) and lower than in a national American sample of older adults (Bellizzi et al., 2011) and Chinese older women (Leung et al., 2012). This evidence is disturbing given the fact that cervical and breast cancers are leading cancers among women,

especially in low income countries (Gakidou et al., 2008). The evidence points to the need for prioritization of cancer screening promotion efforts among elderly South African women given the fact that the low prevalence of cancer screening suggests that elderly South African women are at risk of dying from cancers as these may not be detected and treated early. Urgent efforts are needed to increase elderly women's knowledge of the importance of screening and to empower elderly women with the skills to make informed healthy lifestyle choices. In addition, a supportive environment that is conducive for women to make proper lifestyle choices is needed.

Higher educational level was associated with increased mammography and Pap smear among South African older adults. The association between higher education and increased screening methods was found in other studies (Reyes-Ortiz et al., 2007; Bellizzi et al., 2011). Coupled with higher education, greater wealth and having a health insurance were found in this study to be associated with cancer screening, as also found in some other studies (Coughlin et al., 2007; Reyes-Ortiz et al., 2008; Leung et al., 2012). It is possible that older adults with lower education have less economic resources which can explain the disparities (Reyes-Ortiz et al., 2007). Further, it can be argued, in line with Reyes-Ortiz et al. (2007) that education can influence health through the acquisition of knowledge, attitudes and practice of preventive health exams. There is a need to improve accessibility and affordability of early cervical and breast cancer screening for all women to ensure effective prevention and management of these preventable and curable diseases. Context specific interventions addressing the socio-economic factors that serve as barriers for undertaking cancer screening are urgently needed.

Further, in agreement with a study by Heflin et al. (2002), this study also found that presence of a higher

number of chronic conditions were associated with a higher rate of receipt of cancer screening. This finding may be due to an increase in the frequency of health care visits increasing the opportunity for cancer screening (Heflin et al., 2012).

Study limitation, this study had several limitations. Our reliance on cross-sectional survey data precludes establishing a causal order between certain variables and screening methods use. Data on screening methods use were self-reported, which might affect the accuracy of our measures and consequently our results (Reyes-Ortiz et al., 2007). However, concordance between self-reported data and medical record documentation has been reported (Gorden et al., 1993) as greater for procedures that generated a test report (e.g., mammogram, Pap smear) (Gorden et al., 1993; Reyes-Ortiz et al., 2007). Other limitations include that breast self-examination or clinical breast examination and health care provider recommendations for a specific test were not assessed (Bellizzi et al., 2011) and may be included in future studies.

In conclusion, the results of this study indicate a need to develop health promotion programmes directed at the female population so as to increase periodic health exams and improving access for disadvantaged communities to preventive health exams.

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