RESEARCH ARTICLE

Population Inquiry Regarding Mammography in Postmenopausal Women in Southern Brazil

Tiara Cristina Romeiro-Lopes[1], Cátia Millene Dell'Agnolo[2]*, Sheila Cristina Rocha-Brischiliari[1], Angela Andreia França Gravena[1], Maria Dalva de Barros Carvalho[1], Sandra Marisa Pelloso[1]

Abstract

   This study was conducted to analyze the prevalence of non-performance of mammography, and associated factors, among postmenopausal women. This analytical, exploratory, cross-sectional study, of a domicile population inquiry type, was performed in the municipality of Maringa, Parana, Brazil. A total of 456 women were interviewed, aged 45 to 69 years, who presented with natural menopause and cessation of menstruation for at least twelve months. Statistical associations were found between the non-performance of mammography and schooling of less than seven years, paid employment, sedentary lifestyle, smoking, the non-use of hormone replacement therapy, not having consulted a doctor in the previous year, not having consulted a gynecologist, lacking a family history of breast cancer, not having performed the Papanicolaou test, not having performed clinical breast examination, and not having difficult access to health services. After logistic regression analysis, not performing mammography was associated with reports of a fair or bad health status. The study data revealed factors "responsible" for the non-performance of mammography, and the results should contributing to improvement/enhancement of healthy behaviour of Brazilian women in the post-menopausal phase.

Keywords: Mammography - mass screening - post-menopause - breast neoplasms

Introduction

   The most frequent cancer among women not only in North American, but also in Brazilian is breast cancer (Jemal et al., 2009; Brasil, 2011). In the United States the breast cancer is the second cancer most frequently diagnosed in women, after skin cancer and also the second cause of cancer death. The estimative of breast cancer in the United States for 2013 is the 232.340 new cases and 39.620 deaths according of the American Cancer Society (American Cancer Society, 2013).

   In the United States the incidence rates for breast cancer in female was 122.3 per 100.000 and death rates were 23.0 per 100.000, of 2005 to 2009 years (American Cancer Society, 2013).

   Data from the International Agency for Research on Cancer showed that in 2008, breast cancer had a worldwide incidence of 1,384,155 cases, with an increase to 1,620,778 estimated for the year 2015. There were 458,503 deaths from breast cancer in 2008 and this could increase to 540,783 in 2015 (Iarc, 2008).

   In Brazil, according to estimates, about 52,680 women will have received a diagnosis of breast cancer in 2012, representing a gross rate of 52 cases per 100 000 women (Brasil, 2011).

   There are evidences that shows that the earlier breast cancer is detected, the greater the chance of survival (Elmore et al., 2005; Gotzsche and Nielsen, 2011). Screening and early detection of the disease resulted in a reduction in mortality for this type of cancer among North American women in the years 2001-2005 (Jemal et al., 2009).

   Conversely, in Brazil there has been an increase in mortality over the past three decades (Brasil, 2009). As far as it is known, the literature available to date does not show that screening for breast cancer control in Brazil is occurring in a structured way; even though there has been a recommendation from the National Cancer Institute (INCA) proposing various strategies for the early detection of breast cancer (Brasil, 2011).

   Estimates for this disease present an increasing tendency concerning both incidence and mortality (Brasil, 2009). This occurs due to the lack of early detection programs and the difficulty of access to specialized breast cancer treatment (Tiezzi, 2010). Studies have shown that mammography screening for women may reduce mortality (Elmore et al., 2005; Meissner et al., 2011; Gotzsche et al., 2012); with the greatest impact found in the age range of 50 years or more, with a reduction in mortality of approximately 25-45% in this group (Parvinen et al., 2006). Thus, the aim of this study was to identify the prevalence and the factors associated with the non-

*[1]Health Sciences, [2]Program in Nursing, Maringa State University, Brazil *For correspondence: catiaagnolo@gmail.com*

performance of mammography among women aged 45-69 years, living in the city of Maringa, Parana, Southern Brazil.

Materials and Methods

Design

This is a cross-sectional population-based descriptive study, conducted in the period from 2010-2011, with women 45-69 years of age, residents of the urban area of Maringa, Parana, Brazil. Women with cessation of menstruation for at least twelve months, who presented natural menopause, were included.

Subjects and sample

The sample size was calculated using information from the Demographic Census, regarding the female population aged 45-69 years, reported by the Brazilian Institute of Geography and Statistics (IBGE) in 2000, for the municipality of Maringa, and from the estimated population projection for the year 2009, giving a total of 36.023 women (Brasil, 2007). The statistical program Epi Info 3.5.1, was employed with a confidence interval of 0.95 and margin of error of 0.05. With an increase of 20% for possible losses and/or refusals, the total sample size was 456 women.

For this study, the sample selection had, as a unit of reference, the census sectors of the municipality, having as the primary sampling unit the census sectors and the domiciles as the secondary sampling units, according to the IBGE. The strategy of systematic sampling was used with probability proportional to the size of the sector. The district of Maringa has 407 census sectors, however, 368 sectors were studied, due to these being characterized as urban areas. From the sketched map of the numbered blocks of each census sector, the starting point of the route as well as the initial corner of each section were picked, always walking in a clockwise direction. In each sector a simple random sample was selected proportional to the number of women living in each of these sectors (considering the sample size). Because the number of women to be surveyed in each sector was proportional to the size of it, and to provide better distribution of the neighborhoods, a domicile was picked and three were skipped. If the chosen house did not coincide with the presence of women, this was sought in the neighboring domicile, and the process was restarted at each interview. When there was more than one woman in the domicile, one of them was picked at random.

Procedures

The visit included a questionnaire constructed by the researchers, completed in person, after informed consent and conducting anthropometric measurements (weight and height) were obtained. To achieve standardization, training for all field research was conducted. After standardization training, we proceeded to pre-test the questionnaire with 30 women in the same age group in the survey area covered by a local health unit in the city. The pilot study was conducted with 30 people in a census tract, raffled among those not included in the study itself.

The primary outcome variable addressed in the study was not having performed a mammogram in the last two years, self-reported by the menopausal women. The secondary measures or independent variables evaluated were: age; schooling (according to the last level studied); marital status; color; occupation; religion; people in the household; physical activity (evaluated according to criteria established by the Brazilian Society of Cardiology (Sociedade Brasileira de Cardiologia, 2007) with all the woman who did not perform regular physical activity being classed as sedentary, i.e. with the minimum frequency of three times per week and the duration of not less than 30 minutes, regardless of the mode of exercise performed), smoking (daily smoking habit regardless of the frequency or the number of cigarettes); users of hormone replacement therapy (HRT) (HRT non-users, those that did not use HRT in the past six months and HRT users, those who made continuous use for at least 6 months); personal history of comorbidities (hypertension, type 2 diabetes, cardiovascular disease, osteoarticular diseases and urinary incontinence); number of comorbidities; self-reported health status; family history of breast cancer, report of medical consultation in the previous year, consultation with a gynecologist, difficult access to the healthcare system, performance of the Papanicolaou test and clinical breast examinations.

Measures

The body mass index (BMI) was calculated after weighing and measuring of height using a Plenna digital scale with a 150 kg capacity and a Sanny stadiometer with a 2 meter capacity; recording of the information (weight and height) in duplicate, and subsequent calculation using the formula developed by Quetelet, (1842) (Halls, 2009): $weight(kg)/height(m)^2$, in order to detect the current nutritional status through the classification of the World Health Organization (WHO) as overweight when the BMI ≥ 25.0 kg/m^2 (Who, 2006).

Statistical analyses

For the statistical analysis, a raw analysis was performed, using the chi-square, with the program Epi Info 3.5.1. In the next step the variables were selected in which the value of the descriptive level of significance of the test was less than 0.20, using multivariate logistic regression, the independent variables were studied in relation to overweight, performed using the program Statistica 7.1, with a significance level of 5%.

Ethical issues

The study was approved by the Human Research Ethics Committee of the Maringa State University (Protocol number 201/2010).

Results

A total of 456 women in the postmenopausal period were evaluated, who had a mean age of 58.7±5.7 years and a mean age of menopause onset of 48.0±5.0 years. The calculated prevalence of mammography performance in the preceding two years, based on the sample for the

Population Inquiry Regarding Mammography in Postmenopausal Women in Southern Brazil

studied municipality, and noting the number of women according to the IBGE, was 9.2/1000 women. The majority reported having up to 7 years of education (56.5%) and 63.2% had a partner; in relation to color 85.1% were white, and 53.1% performed paid work. The Catholic religion was the most prevalent (65.4%). Regarding the number of household members, 383 women (84.0%) reported having 1 to 4 residents in their domicile (Table 1).

The participants with inadequate physical activity (sedentary) occupied a prominent position with 71.7%, also the majority 87.9% were nonsmokers. The use of HRT was mentioned by 20.8%. The BMI of 72.6% of the women showed them to be overweight. Comorbidities were present in 76.1% of the women (Table 2).

Data related to the presence of breast cancer in the family indicated that 86.4% of the women reported having no cases; 85.1% of the women had performed a medical consultation within the previous year and 432 (94.7%) had consulted with the gynecologist. Regarding access to the healthcare system, 74.6% of the respondents reported not having access difficulties. The Papanicolaou test and clinical breast examination were performed by the majority of the women (86% and 70.8%, respectively) (Table 3).

After logistic regression analysis, the variables associated with non-performance of mammography were, to have no comorbidities (p=0.04) and fair and poor states of health (p<0.01) (Table 4).

Limitations

Only the examinations performed in the previous two years were evaluated, the periodicity and monitoring in a certain period of time not being verified. Even the limitations inherent in using data obtained from interviews should be considered, which can distort the interpretation of the coverage achieved by the opportunistic screening programs, as well as the possibility of memory bias, since the information collected was on facts which occurred in the past.

Discussion

Several authors have described reduced mortality from breast cancer among the women undergoing mammographic screening (Duffy et al., 2002; Coughlin and Ekwueme, 2009). The INCA describes a reduction of

Table 1. Prevalence of Non-Performance of Mammography According to Socioeconomic and Demographic Variables, Maringa, Parana, Brazil, 2012

Variables	n (%)	%[**]	Prevalence ratios (CI[***] 95%)	p value
Age (years)				
45-59	245 (53.7)	24.9	1.0	
60-69	211 (46.3)	29.9	1.28 (0.83-1.98)	0.23
Schooling				
≤7 years	258 (56.6)	31.4	1.65 (1.05-2.59)	0.02*
≥8 years	198 (43.4)	21.7	1.0	
Marital status				
With a partner	288 (63.2)	24.3	1.0	
Without a partner	168 (36.8)	32.1	1.48 (0.95-2.30)	0.06
Color				
White	388 (85.1)	26	1.0	
Non-white	68 (14.9)	33.8	1.45 (0.81-2.61)	0.18
Occupation				
Paid	242 (53.1)	22.7	0.62 (0.40-0.96)	0.02*
Unpaid	214 (46.9)	32.2	1.0	

*statistically significant; **Non-performance of Mammography; ***confidence interval

Table 2. Prevalence of Non-Performance of Mammography According to Health and Morbidity Related Behavior. Maringa, Parana, Brazil, 2012

Variables	n (%)	%[***]	Prevalence ratios (CI[**] 95%)	p value
Physical activity				
Sedentary	327 (71.7)	31.5	2.3 (1.3-4.1)	<0.01*
Active	129 (28.3)	16.3	1.0	
Smoker				
Yes	55 (12.1)	75.6	42.0 (22.5-78.9)	0.01*
No	401 (87.9)	6.9	1.0	
HRT users[a]				
Yes	95 (20.8)	8.4	1.0	
No	361 (79.2)	32.1	5.1 (2.3-11.8)	0.01*
BMI[c] Normal	125 (27.4)	25.6	1.0	
Overweight	331 (72.6)	27.8	1.1 (0.6-1.8)	0.63
Comorbidities				
Yes	347 (76.1)	25.1	1.0	
No	109 (23.9)	34.0	1.5 (0.9-2.5)	0.06
General Health status				
Excellent	60 (13.1)	20.0	1.0	
Good	204 (44.7)	26.5	1.4 (0.6-3.1)	0.30
Reasonable	166 (36.4)	29.5	1.6 (0.7-3.6)	0.15
Bad	26 (5.7)	34.6	2.1 (0.6-6.6)	0.14

*statistically significant; **confidence interval; ***Non-performance of Mammography

Table 3. Prevalence of Non-Performance of Mammography According to Family History, and Access to Health Services. Maringa, Parana, Brazil, 2012

Variables		n (%)	Non-performance of Mammography (%)	Prevalence ratios (CI[**] 95%)	p value
Family history of breast cancer	Yes	62 (13.6)	16.1	0.4 (0.2-1.0)	
	No	394 (86.4)	29	1.0	0.03*
Report of medical consultation within the previous year	Yes	388 (85.1)	23.2	1.0	
	No	68 (14.9)	50	3.3 (1.8-5.8)	<0.01*
Report of consultation with a gynecologist	Yes	432 (94.7)	24.3	1.0	
	No	24 (5.3)	79.2	11.8 (4.0-37.1)	<0.01*
Difficulties of access to the healthcare system	Yes	116 (25.4)	34.5	1.6 (0.9-2.8)	
	No	340 (74.6)	24.8	1.0	0.04*
Performance of the Papanicolaou test	Yes	392 (86.0)	18.1	1.0	
	No	64 (14.0)	82.8	21.7 (10.3-46.7)	<0.01*
Performance of clinical breast examination	Yes	323 (70.8)	5	1.0	
	No	133 (29.2)	81.2	82.8 (40.7-31.4)	<0.01*

*statistically significant; **confidence interval

Table 4. Logistic Regression of the Variables Included in the Model. Maringa, Parana, Brazil, 2012

Variables	Adj. OR	CI (95%)	p value
Up to 7 years of study	1.04	0.66-1.65	0.84
Without a partner	0.99	0.63-1.56	0.97
Color non-white	0.87	0.47-1.59	0.65
Paid employment	0.86	0.55-1.34	0.51
Sedentary	1.23	0.75-2.01	0.39
Smoker	1.02	0.53-1.97	0.94
HRT non-user	1.51	0.85-2.70	0.15
Fair and bad health status	0.51	0.31-0.82	<0.01*
To have no comorbidities	0.55	0.31-0.97	0.04*
Breast cancer in the family	0.93	0.49-1.78	0.83
Not had a consultation in the previous year			
	0.90	0.48-1.71	0.76
Not having gone to the gynecologist	1.00	0.35-2.81	0.99
Difficulties of access to the healthcare system			
	1.63	0.99-2.67	0.05
Failure to carry out Papanicolaou test	1.69	0.81-3.55	0.15
Non-performance of clinical breast examination			
	0.90	0.52-1.56	0.71

*statistically significant

breast cancer by one third among the women 50-69 years, due to the performance of mammography, with or without clinical examination (Brasil, 2009).

The Ministry of Health (Brasil, 2002) sets the parameter of 1 mammography equipment for every 240 thousand inhabitants, Parana has 159 mammography equipment today (1/63,000 inhabitants), and the city of Maringa has a number of mammography large enough to serve the population and ensure an organized screening program in both the public and private domains. Currently, there are 16 devices in Maringa, 1 for every 22.137 inhabitants. For this reason, this study is justified to detect the factors associated with non-performance of this examination by the women in the municipality studied.

Schooling and socioeconomic situation are among the factors that have been most strongly associated with the performance of mammography (Sclowiz et al., 2005; Lima-Costa and Matos, 2007). In this study, schooling up to seven years and paid employment were statistically associated with the non-performance of the mammography in the municipality studied.

In relation to behavioral attitudes and family history, sedentary lifestyle (p≤0.01), smoking (p=0.01), women who were non-users of HRT (p=0.01) and had no family history of breast cancer (p=0.03), were also associated with the non-performance of the examination.

Among the smokers women (12.1%) the majority (75.6%) non-performance of mammography. Recent studies suggest increases the risk of breast cancer with the smoking (Cui, Miller and Rohan, 2006; Luo et al., 2011a; Xue et al., 2011). Although limited, there is evidence that long-term that heavy smoking increases the risk of breast cancer, especially when the beginning of smoking was early (American Cancer Society, 2013). In a study of 79,990 women between 50 and 79 years of age, observed an increase of 20-50% in the risk of developing this type of cancer with the use of cigarettes in high quantity, over an extended period, with a low age at the initiation of consumption (Luo et al., 2011b).

Both, obesity (Callee et al., 2003; Chlebowski et al., 2004; American Cancer Society, 2012; 2013) and physical

activity (Chlebowski et al., 2004; Leitzmann et al., 2008; Irwin et al., 2011; American Cancer Society, 2012; 2013) has been associated with increased breast cancer risk in postmenopausal women.

Although the statistical association between weight and the non-performance of the mammography has not been studied, the percentage of overweight women found in this study was 72.6%, highlighting not only that they are considered at risk for breast cancer, but also for several other pathologies, principally the cardiovascular diseases (Colditz et al., 2000). Among obese women (72.6%) in this study, 27.8% non-performance of mammography. Overweight and obese for postmenopausal are potentially modifiable risk factors for breast cancer as physical inactivity (American Cancer Society, 2012; 2013).

In the Health supplement of the National Survey of Sample Household (PNAD) of the IBGE regarding performance of mammography in the previous 2 years in women 25 years of age or over, a prevalence of 36.1% was indicated for mammography, with important predictive factors: age distribution (40-59 years), medical consultation in the previous year, living in urban areas, high income and having health insurance (Novaes, Braga and Schout, 2003).

In the city of Pelotas, Rio Grande do Sul, Southern Brazil, it was seen that the performance of mammography, at any time of life, among women between 40 and 69 years of age, was positively associated with social class, with the family history of breast cancer, with the current use of hormone replacement therapy, with previous breast biopsy/surgery, with the clinical breast examination and the gynecological consultation (Sclowitz et al., 2005).

The hormonal and reproductive issues are considered important in the etiology of breast cancer. In this study non-users of HRT (p 0.01) and having no family history of breast cancer (p 0.03) correlated with the non-performance of the mammography. The majority no using HRT (79.2%) and these, 32.1% non-performance of mammography, but among the HRT users, 8.4% non-performance of mammography. The use of combined estrogen plus progestin was associated with increased risk of breast cancer and coronary heart disease according the publication of the study the Women's Health Initiative. The decreased breast cancer incidence from 2002 a 2003, has been attributed to reductions in the use by women of menopausal hormone therapy (American Cancer Society, 2013).

Family history of breast cancer was related by 13.6% of the women and 16.1% of theirs non-performance of mammography. According of the American Cancer Society, (2013) the risk of breast cancer is also increased by a family with history in this cancer, especially having one or more first-degree relatives with breast cancer. This risk almost doubles in women that having a first-degree relative with breast cancer and have 2 first-degree relatives increases her risk in 3-fold (American Cancer Society, 2012).

The result of a study of 2,000 women who underwent the mammography in a public hospital and a private clinic in Goiânia, which identified HRT without prior mammographic evaluation in approximately 20% of the

interviewees and additionally observed that 30% had never undergone mammography, even when having a family history of breast cancer (Godinho and Koch, 2002).

The mammography has been recommended to women who seek specialized treatment for issues related to the menopause, not only because of their age, but also because they are potential candidates for use of HRT (Siqueira et al., 2004).

The professional contact with a physician has been associated with the performance of the examination (Barret and Legg, 2005; Lima-Costa and Matos, 2007) this statement of the authors is in agreement with the findings of our study, which show that the women who had not performed any medical consultations in the previous year had not performed the mammography, the same occurred with those who did not consult with the gynecologist (p<0.01). Thus, the physician's recommendation holds unquestionable relevance among the predictive factors associated with adherence to the screening (Barr et al., 2001).

Authors who studied the profile of women that undergo mammography questioned the reasons why the women are not performing the mammography, with issues being raised about the failure in the process, such as those related to the assistant physician, to the structure of the Healthcare System and/or to the lack of information for the woman (Godinho and Koch, 2002). They also claim that these issues remain unanswered due to the lack of studies in the area. The contact with the physician, in this case the gynecologist or mastologist, and other indicators of regular gynecological consultations, such as the oncologic colpocytology collection (Papanicolaou test), are the variables strongly associated with the performance of the mammography (Lima-Costa and Matos, 2007; Marchi and Gurgel, 2010).

Not having performed the Papanicolaou test (p<0.01) was a significant variable when associated with non-performance of the mammography.

The performance of clinical breast examination depends largely on access to the medical consultation, i.e. once the patient reaches the physician they should have their breasts examined. For the performance of the mammography and, similarly for the frequency of gynecological consultations in the previous year, the association between the combination of risk factors and the increase in the prevalence of these procedures is quite clear (Sclowitz et al., 2005). The spontaneous demand for any medical consultation motivates the performance of the clinical breast examination and the request for the mammography (Brasil, 2005).

The perception of fair or poor health status self-reported by the women of the present study showed a statistically significant association with the non-performance of the mammography examination (p<0.01). In a study conducted with 4,621 women, one of the risk factors associated with non-performance of the mammography was having a negative self-evaluation of health (Matos et al., 2009). Factors associated with the performance of the mammography been described by other authors, while studying women with lower ages than in the present study (≥25 years), have been described by other authors,

including a positive self-evaluation of health among others (Novaes, Braga and Schout, 2006).

In conclusion, it can be concluded that a low level of schooling, paid employment and habits such as a sedentary lifestyle and smoking, were associated with not performing the preventive mammography. In relation to the background and behavior of the women studied, not using HRT, no family history of breast cancer, non-performance of medical and gynecological consultations within the previous year, non-performance of the Papanicolaou test and clinical breast examination, have also been described for the non-performance of the screening. When evaluated by logistic regression, only those items related to the fair and poor health status and the absence of comorbidities obtained the same association.

Although the discussion regarding the efficacy of the mammography has been constant in recent decades, the prevention programs for breast cancer should stimulate the initiation of mammographic screening in those at an appropriate age, and should promote measures to establish increased rates of adherence and repetition of the examinations.

Achieving and maintaining high rates of adherence to represent obedience to retry intervals between examinations, properly defined as less than 24 months, is crucial to achieve the reduction in mortality observed in our country. In this context, this study reveals the factors "responsible" for the non-realization of the mammography, contributing to improve the performance of the professionals in health care for women, especially those in the climacteric, to act to control breast cancer.

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