

# Inequalities in the use of mammography in Spain: effect of caring for disabled family

Belén Sanz-Barbero · Maurice Sopacua ·  
Laura Otero-García · Alfredo Borda-Olivas ·  
María Victoria Zunzunegui

Received: 25 January 2012/Revised: 2 July 2012/Accepted: 11 July 2012/Published online: 14 August 2012  
© Swiss School of Public Health 2012

## Abstract

**Objective** To examine the association between caring for disabled household members and the use of mammography in Spain during the 2 years before the interview.

**Methods** Weighted cross-sectional data from the 2006 National Health Survey in Spain. Using logistic regression models we analyzed the association between the dependent variable and caring for disabled family members.

**Results** After adjusting for predisposing, enabling and need determinants of the use of mammography screening, having primary caregiving responsibilities for disabled family members-dependent persons, was associated with a lower probability of having received a mammogram (OR 0.56; 95 % CI 0.32–0.98).

**Conclusions** Although women in Spain have incorporated mammography into their preventive healthcare regimen, inequalities in its use persist in some groups of women such those with primary caregiving responsibilities for disabled family members.

**Keywords** Mammography · Caregivers · Preventive health services · Health inequalities · Health services accessibility

## Introduction

Breast cancer is the most common cancer in women living in Western countries. The age-standardized incidence of breast cancer in Spain in 2008 was 61.0 cases/100,000 women, close to the rate in the WHO European Region and much higher than the estimated rate worldwide for the same year (Ferlay et al. 2010). Breast cancer early detection is a priority health issue in women since solid evidence exists that screening mammography reduces the mortality of this kind of cancer (Ferlay et al. 2010).

Distance to services, place of origin, socioeconomic level and type of screening program have been associated with access to and use of mammography (Borda et al. 2011; Palència et al. 2010; Pons-Vigués et al. 2011; Sanz-Barbero et al. 2011; Schueler et al. 2008). Living in rural areas far from mammography units (Borda et al. 2011) or living in situations of economic and/or social deprivation are associated with a lower probability of having a mammogram (Sanz-Barbero et al. 2011; Schueler et al. 2008). These socioeconomic inequalities persist in some countries with regional or opportunistic screening, but not in countries with nationwide population-based screening programs (Palència et al. 2010). However, few studies have examined the impact of women's caregiving role on breast cancer screening programs, and the results obtained to date are not homogeneous (Baker and Silverstein 2008; Kinnear et al. 2010). This is important given that in Spain most of the caregivers of disabled persons (74 %) are women (García-Calvente et al. 2011). Moreover, there is a positive

---

B. Sanz-Barbero (✉) · L. Otero-García · A. Borda-Olivas  
National School of Public Health, Instituto de Salud Carlos III,  
Madrid, Spain  
e-mail: bsanz@isciii.es

B. Sanz-Barbero  
CIBER Epidemiología y Salud Pública (CIBERESP),  
Barcelona, Spain

M. Sopacua  
University Medical Center Groningen, Groningen,  
The Netherlands

M. V. Zunzunegui  
Département de Médecine Sociale et Préventive,  
Université de Montréal, Montréal, Quebec, Canada

association between dedication to informal care and economic and social deprivation (Glaser and Grundy 2002; García-Calvente et al. 2011).

In Spain, breast cancer screening programs are population-based and are managed at the regional level (autonomous communities). These programs were launched in the decade of the 1990s, and by 2006 nationwide coverage had been achieved (Castells et al. 2007). In all regions, they follow the European guidelines for breast cancer screening and invite women to screening every 2 years (Perry et al. 2008).

Given that the Spanish National Health Survey in 2006 included information on caring for disabled family members the objective of the present study was to examine the association between having primary caregiving responsibilities for disabled family members and mammography utilization in Spain.

## Methods

### Data sources

The data analyzed were obtained from the 2006 Spanish National Health Survey conducted in the population aged 16 years and over (<http://www.msps.es/estadEstudios/estadisticas/solicitud.htm>). The sampling framework consisted of all non-institutionalized persons residing in Spain. Stratified, multistage sampling was carried out. The first-stage units were the census sections, grouped into strata based on the size of the municipality. The second-stage units were the primary residences, which were selected with equal probability within each section. Finally, one individual was randomly selected within each household. (Instituto Nacional de Estadística 2006; Sanz-Barbero et al. 2012).

The present study only included women covered by the breast cancer-screening program in their region of residence. The age range varies by region given that across regions, programs begin at ages 45 or 50 and finish at ages 64, 65 or 69–. We excluded women who had had a mammogram in the last 2 years because they or a health-care worker had detected a breast abnormality.

### Definition of variables

Self-reported exposure to a mammogram in the 2 years before the interview was the outcome. The variable was constructed based on the questions: *Have you ever had a mammogram (breast x-ray)? In what year did you have your most recent mammogram?* For women that answered the survey in 2006, we accepted that she was exposed to a mammogram in the 2 years before the interview, when she answered 2004, 2005 or 2006. For women that answered

the survey in 2007, we accepted that she was exposed to a mammogram in the 2 years before the interview, when she answered 2005, 2006 or 2007.

The exposure variable, caregiving of a disabled family member, was constructed according to the following questions: *Are there any persons with some disability or limitation living in your household who cannot take care of him/herself? Who takes care of him/her?* A dichotomous variable was created with the value of one if the respondent was the primary caregiver of a co-habiting disabled family member and the value zero, otherwise.

Following Andersen's behavioral model (Andersen 1995), the independent variables were structured as

1. Enabling variables that included the main exposure previously defined and the type of health coverage, categorized as only public (yes/no).
2. Predisposing variables that included: age, categorized in 10-year age groups; place of origin, categorized as Spanish/foreign based on the respondent's country of birth; living with a partner (yes/no); and the respondent's educational level, categorized as no education (illiterate or incomplete primary education), or some education.
3. Need variables that included the number of chronic diseases diagnosed, categorized as none, one, or more than one.

We also adjusted for region of residence to control for the type of screening program and the length of time it had been in operation.

### Statistical analysis

The frequency distribution of the independent variables according to self-reported exposure to mammography in the last 2 years was calculated.

To determine whether mammography use among women living in the same region was more similar than mammography use in women living in different regions, we calculated the intraclass correlation coefficient (ICC), the percentage of total variability which is due to differences between regions (Snijders and Bosker 1999).

Given the lack of variability between regions, the association between the dependent variable and the independent variables was subsequently analyzed by single-level logistic regressions. After conducting univariate analysis, multivariate analysis was carried out using forward selection for inclusion of variables.

Interactions were tested by including products terms: caregiver for disabled persons by place of origin, education and public health coverage; and place of origin by education, public health coverage.

All analyses used the weighting factors included in the National Health Survey. The calculations were made with the statistical programs SPSS 18.0 and STATA 11.

## Results

After eliminating 292 women who have had a mammogram in the last 2 years due to potential abnormalities in the breast, the weighted sample was composed of 3,201 women. In 2006, 83.6 % of women covered by a breast cancer-screening program in Spain reported having at least one mammogram in the 2 years before the interview. The reasons for the most recent mammogram are previous appointment by mail through a screening program (61.5 %) and physician recommendation (24.7 %).

Table 1 describes mammography utilization according to enabling, predisposing and need variables. Mammography

**Table 1** Description of mammography self reported utilization in the last 2 years. Spanish National Health Survey, 2006

Variables	Mammogram in last 2 years		Total	
	Yes (N)	(row %)	(N)	(column %)
<b>Enabling variables</b>				
Caregiver for disabled persons				
No	2,600	(83.9)	3,100	(96.8)
Yes	75	(74.3)	101	(3.2)
Public health coverage (exclusively)				
No	359	(91.1)	394	(12.3)
Yes	2,316	(82.5)	2,807	(87.7)
<b>Predisposing variables</b>				
Age				
45–54 years	919	(81.1)	1,133	(35.4)
55–64 years	1,441	(86.1)	1,674	(52.3)
65–74 years	314	(79.9)	393	(12.3)
Place of origin				
Foreign	142	(60.9)	233	(7.3)
Spanish	2,532	(85.3)	2,967	(92.7)
Living with a partner				
No	498	(72.2)	690	(21.6)
Yes	2,177	(86.7)	2,511	(78.4)
Education				
No	359	(78.2)	459	(14.5)
Yes	2,298	(83.8)	2,742	(85.5)
<b>Need variables</b>				
Chronic diseases				
None	232	(74.4)	312	(9.7)
One	730	(82.2)	888	(27.7)
More than one	1,713	(85.6)	2,001	(62.5)
Total	2,675	(83.6)	3,201	(100)

N frequency, % percentage

use was lower in women having primary responsibility for the care of disabled persons (74.3 vs. 83.9 %).

Table 2 shows the variables associated with mammography use in Spain. After adjusting for predisposing, enabling and need determinants variable of the use of mammography screening, being primarily responsible for the care of disabled persons was associated with a lower odd of having received a mammogram (OR 0.56; 95 % CI 0.32–0.98, ref: no). Having public health insurance exclusively was associated with a lower odd of having received a mammogram (OR 0.42; 95 % CI 0.27–0.67, ref: no). Other variables associated with a higher odd of mammography use were: being born in Spain (OR 3.69; 95 % CI 2.36–5.78, ref: foreign), living with a partner (OR 2.27; 95 % CI 1.78–2.90, ref: no), having some education

**Table 2** Variables associated with mammography self reported use in Spain. Spanish National Health Survey, 2006

Variables	Univariate		Multivariate			
	OR	95 % CI	OR <sup>a</sup>		95 % CI	
		Lower	Upper	Lower	Upper	
<b>Enabling variables</b>						
Caregiver for disabled persons						
No (reference)	1.00			1.00		
Yes	0.56	0.32	0.97	0.56	0.32	0.98
Public health coverage (exclusively)						
No (reference)	1.00			1.00		
Yes	0.42	0.27	0.67	0.42	0.27	0.67
<b>Predisposing variables</b>						
Age						
45–54 years (reference)	1.00			1.00		
55–64 years	1.44	1.12	1.84	1.32	1.02	1.71
65–74 years	0.92	0.65	1.30	1.04	0.70	1.53
Place of origin						
Foreign (reference)	1.00			1.00		
Spanish	3.71	2.42	5.70	3.69	2.36	5.78
Living with a partner						
No (reference)	1.00			1.00		
Yes	2.51	1.98	3.18	2.27	1.78	2.90
Education						
No (reference)	1.00			1.00		
Yes	1.50	1.12	2.02	1.43	1.03	1.99
<b>Need variables</b>						
Chronic diseases						
None (reference)	1.00			1.00		
One	1.60	1.13	2.27	1.67	1.15	2.40
More than one	2.06	1.48	2.85	2.17	1.55	3.05

<sup>a</sup> Adjusted for region of residence

OR odds ratio, 95 % CI 95 % confidence interval

(OR 1.43; 95 % CI 1.03–1.99, ref: no) and the presence of chronic diseases ( $p < 0.001$ ).

None of the tested interactions were statistically significant.

## Discussion

In Spain, 83.6 % of women covered by a breast cancer screening program reported having had at least one mammogram in the last 2 years before the interview. Mammography utilization does not vary by region. Being the primary caregiver for disabled co-habiting family members was associated with a lower probability of having had a mammogram. Other variables associated with a higher probability of mammography use were: being born in Spain, living with a partner, having some education, the presence of chronic diseases and having private insurance.

This study has important strengths which should be emphasized. With respect to the definition of the sample, the inclusion/exclusion criteria made it possible to obtain robust results. The present study included women in a age range covered by the breast cancer screening program in their region of residence, and it excluded those women in whom a breast problem had previously been detected. Our work focuses on an aspect little explored to date: caregiving provided to household members. However, limitations must also be considered. With respect to the definition of the dependent variable, it is possible that there has been some misclassification based on the inaccuracy of the year as the temporal measure (since the gathering of information took place between June 2006 and June 2007). However, any error resulting from this inaccuracy would bias the measure of association toward the null value.

The survey design does not allow quantification of the time dedicated to caregiving, but women who report being primary caregivers for disabled family members can be considered to have a high work burden in providing informal care. In addition, the information collected in the survey is self-reported, which could introduce a social desirability bias. Potential residual confounding may still be present due to the absence of adjustment for unknown variables.

### Possible explanations

In Spain, the percentage of women who referred having had a mammogram in the 2 years before the interview was high—even higher than what is desirable by the European Union (75 %) (Perry et al. 2008). This is seen in all regions, with no significant variability among them. However, women who provide exclusive care for disabled family members have a lower probability of having a mammogram

than those who do not have these caregiving tasks. A previous study showed that women who were raising their grandchildren reported fewer preventive behaviors, including use of mammograms, than grandmothers not raising a grandchild (Baker and Silverstein 2008). In addition, a study published recently by Kinnear et al. (2010) shows that women providing 1–19 h/week of care for family members have a higher probability of having a mammogram than those who are not caregivers, while those providing >50 h/week were less likely to attend breast screening than non-caregivers.

These results confirm that women with a strong engagement in caring for household members make less use of screening programs. There may be emerging a group of women with difficulties in access to and utilization of screening programs, which needs to be explored.

As described in both Spain and other European countries (Consedine 2011; Pons-Vigués et al. 2011; Sanz-Barbero et al. 2011), place of origin is strongly associated with the probability of having a mammogram. Spanish women are 3.7 higher odds of having a mammogram than immigrant women. Various authors argue that language, culture or employment situation could constitute barriers to accessing the health system (Sanz et al. 2011). Given that, as our study results show, the most common reasons motivating women to have a mammogram are previous appointment by mail through a screening program and physician recommendation, it may be that the residential mobility and lower use of health services described in the immigrant population (Sanz et al. 2011) is partly related to this mammography underuse among foreign women.

With respect to socioeconomic inequalities, in countries where screening programs are managed regionally, socioeconomic inequalities in the use of preventive services persist (Baker and Silverstein 2008). In Spain, however, the inequalities detected are not associated with regional differences in the implementation of screening programs.

As regards health status, a higher number of chronic diseases diagnosed could be indicating better access to the health system, as well as a higher probability that health professionals are promoting preventive practices.

## Conclusions

Although women in Spain have incorporated mammography into their preventive healthcare regimen, inequalities in its use persist in some groups of women, such those with primary caregiving responsibilities for disabled persons, immigrants, and women of lower socioeconomic status. Mechanisms are needed to increase participation in screening programs of women who, according to this study, make less use of breast cancer screening.

## References

- Andersen RM (1995) Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 36:1–10
- Baker LA, Silverstein M (2008) Preventive health behaviours among grandmothers raising grandchildren. *J Gerontol B Psychol Sci Soc Sci* 63:S304–S311
- Borda A, Sanz B, Otero L et al (2011) Travel time and participation in breast cancer screening in a region with high population dispersion. *Gac Sanit* 25:151–156
- Castells X, Sala M, Ascunce N et al (2006) Descripción del cribado del cáncer en España. Proyecto DESCRIC. Madrid: Plan de Calidad para el Sistema Nacional de Salud. Ministerio de Sanidad y Consumo. Agència d'Avaluació de Tecnologia i Recerca Mediques de Catalunya; 2007. Informes de Evaluación de Tecnologías Sanitarias, AATRM núm. 2006/01. <http://aunets.isciii.es/ficherosproductos/70/AATRM%202006-01.pdf>. Accessed 4 Mar 2011
- Considine NS (2011) The demographic, system, and psychosocial origins of mammographic screening disparities: prediction of initiation versus maintenance screening among immigrant and non-immigrant women. *J Immigr Minor Health* 9 [Epub ahead of print]
- Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM (2010) GLOBOCAN 2008 v1.2, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 10 [Internet]. International Agency for Research on Cancer, Lyon, France. <http://globocan.iarc.fr>. Accessed 22 Sept 2011
- García-Calvente M, del Río-Lozano M, Marcos-Marcos J (2011) Desigualdades de género en el deterioro de la salud como consecuencia del cuidado informal en España. *Gaceta Sanitaria* 25(suppl 2):100–107
- Glaser K, Grundy E (2002) Class, caring and disability: evidence from the British *Retirement Survey*. *Ageing Soc* 22:325–342
- Instituto Nacional de Estadística. Encuesta Nacional de Salud (2006) Metodología detallada. <http://www.ine.es/metodologia/t15/t153041906.pdf>. Accessed 9 Feb 2011
- Kinnear H, Connolly S, Rosato M et al (2010) Are caregiving responsibilities associated with non-attendance at breast screening? *BMC Public Health* 10:749
- Palència L, Espelt A, Rodríguez-Sanz M et al (2010) Socio-economic inequalities in breast and cervical cancer screening practices in Europe: influence of the type of screening program. *Int J Epidemiol* 39:757–765
- Perry N, Broeders M, de Wolf C, Tornberg S, Holland R, Von KL (2008) European guidelines for quality assurance in breast cancer screening and diagnosis. Fourth edition—summary document. *Ann Oncol* 19:614–622
- Pons-Vigués M, Puigpinós-Riera R, Rodríguez-Sanz M et al (2011) Preventive control of breast and cervical cancer in immigrant and native women in Spain: the role of country of origin and social class. *Int J Health Serv* 41:483–499
- Sanz-Barbero B, Otero L, Blasco T (2012) The effect of distance on the use of emergency hospital services in a Spanish region with high population dispersion: a multilevel analysis. *Med Care* 50:27–34
- Sanz B, Regidor E, Galindo S et al (2011) Pattern of health services use by immigrants from different regions of the world residing in Spain. *Int J Public Health* 56:567–576
- Sanz-Barbero B, Galindo S, Regidor E (2011) Impact of geographic origin on gynecological cancer screening in Spain. *Rev Saúde Pública* 45:1019–1026
- Schueler KM, Chu PW, Smith-Bindman R (2008) Factors associated with mammography utilization: a systematic quantitative review of the literature. *J Womens Health (Larchmt)* 17:1477–1498
- Snijders TAB, Bosker RJ (1999) Multilevel analysis: an introduction to basic and advanced multilevel modelling. Sage Publications, Thousand Oaks, pp 13–37