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Impact of geographic origin on gynecological cancer screening in Spain

ABSTRACT

OBJECTIVE: To assess the association between geographic origin and the use of screening cervical smears and mammograms.

METHODS: Data was obtained from the 2006 Spanish National Health Survey that included 13,422 females over 16 years of age. The dependent variable was use of screening mammograms and cervical smears in the past 12 months. The measure of association (odds ratio and its related 95% confidence interval) was estimated using logistic regression.

RESULTS: African women were 0.36 (95% CI 0.21,0.62), Eastern European 0.40 (95%CI 0.22;0.74), Western European, American and Canadian 0.60 (95%CI 0.43,0.84), and Central and South American 0.64 times (95%CI 0.52, 0.81) less likely to undergo a mammogram compared with the general population of Spain. In regard to cervical cancer screening, Eastern European women were 0.38 (95%CI 0.28,0.50), African 0.47 (95%CI 0.33,0.67) and Western European, American and Canadian 0.61 times (95%CI 0.46, 0.81) less likely to undergo cervical smears. These associations were independent of age, socioeconomic condition, health status and health insurance coverage.

CONCLUSIONS: Immigrant women use less screening programs than native Spanish women. This finding may suggest difficult access to prevention programs.

DESCRIPTORS: Vaginal Smears. Mammography. Equity in Access. Emigrants and Immigrants. Socioeconomic Factors. Health Inequalities. Mass Screening.

INTRODUCTION

Breast cancer is the most common cancer among women from Western countries. The incidence rate of breast cancer (standardized by age) estimated in member states of the European Union was 107.6 cases per 100,000 women in 2006,[a] much higher than worldwide estimates (37.4 cases/100,000 women in 2002).[15] In Spain, the estimated rate of breast cancer was 93.6 cases/100,000 women in 2006.[a] However, 80% of cervical cancer cases occur in countries with low levels of economic development. In addition, these cases are more frequent in regions such as South Africa (38.2 cases/100,000 women), the Caribbean (32.6 cases/100,000 women) and South America (28.6 cases/100,000 women).[15] For cervical cancer, it is estimated that in the European Union, the incidence rate (standardized by age) was 13.8 cases/100,000 women in 2006,[a] which is lower than the rate estimated worldwide (16.0 cases/100,000 women).[15] In

[a] European Cancer Observatory. International Agency for Research on Cancer. Lyon; 2009[cited 2010 May 2]. Available from: http://eu-cancer.iarc.fr

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Spain, specifically, the estimated incidence of cervical cancer was 10.3 cases per 100,000 women.[a]

Breast and cervical cancer screening tests reduce the incidence and mortality rates associated with these cancers.[b] In Spain, Autonomous Communities (ACs) have population screening programs for breast cancer that include women aged 50 to 64 years, while some ACs broaden that age range to 45 to 69 years. In the majority of ACs, programs that screen for cervical cancer recommend cytology for women between 35 and 64 years of age, with periodic testing every three to five years.[c]

Numerous studies from the United States have analyzed gynecological cancer rates according to ethnicity. These investigations reveal lower rates of breast cancer among ethnic minority women. These same women also have decreased survival and higher mortality rates.[17] Both the incidence and mortality rates of cervical cancer are also higher among ethnic minority women.[1,2]

An important factor contributing to this elevated mortality is late diagnosis due to the decreased participation of ethnic minority women in screening programs.[4] The reasons for this lower representation are heterogeneous and can be explained in part by socioeconomic inequalities, linguistic and cultural barriers or barriers in accessing the healthcare system.[9,13,19,21] Goel et al showed that in the United States, the decreased use of preventative programs is associated with being an immigrant rather than belonging to a specific race/ethnicity.[9]

In the European region, studies that have analyzed the use of screening programs according to place of birth are scarce, and the results of these studies present some heterogeneity. A study performed in Switzerland did not identify a relationship between country of origin (Switzerland, Spain, Italy, Portugal, Yugoslavia) and the use of mammography.[8] Moser et al indicate that ethnicity was a strong predictor for the use of cervical cancer screening programs but was not related to breast cancer screening in the United Kingdom, independent of sociodemographic and socioeconomic variables.[14]

Given that immigration is a recent phenomenon in Spain, the utilization of preventative services with respect to geographic origin has received little attention. Studies conducted at the regional level show that immigrant women make less use of gynecological cancer screening than do Spanish women,[16] although these results have not been adjusted for factors related to healthcare access, factors shown to be explanatory in studies completed by other authors.[7]

Because nationwide information on the use of gynecological screening programs according to region of geographic origin does not exist, the objective of this study was to analyze the association between region of origin and the use of cytology and mammography.

METHODS

The data originated from the 2006 Spanish National Health Survey, which sampled the non-institutionalized population older than 16 years. This survey was conducted by the National Statistical Institute and included 13,422 women.[d] Sampling was stratified. Units in the first stage were census selections, grouped in layers depending on the size of the municipality. Sections were selected in each layer with a probability proportional to size. Units of the second stage were main family dwellings and were selected within each section with equal probability by systematic sampling with a random base. Within each home, we randomly selected an individual 16 years of age or older. The response rate was 96.1%. When the selected person could not give information due to problems related to communication, illness or handicap, obtaining information from another sufficiently informed and capable household resident was permitted. Questionnaires in official Spanish languages were made and translated to English.

Women aged 16 to 74 years were asked about cervical cancer screening (vaginal cytology). Women aged 35 to 74 years were asked about breast cancer screening (mammography). These age ranges were chosen taking into account the age coverage of the screening programs while also attempting to interview a sufficient number of women to obtain estimations.

The dependent variables covered the following topics: 1) having had a mammography in the last year [questions: "Have you received a mammogram at some point (breast radiography)?" and "In what year did you have your last mammogram?"] and 2) having had a vaginal cytology examination in the past year [questions: "Have you received a vaginal cytology (cell sample) assessment?" and "In what year did you have your last vaginal cytology?].

The geographic areas of origin (the principal independent variable) were defined by the countries of birth of the interviewees: Spain, Western Europe, the United States and Canada, Eastern Europe, Central and South America, Africa and Asia.

Confounding variables included age, highest level of completed education of the interviewee and social

[b] World Health Organization. International Agency for Research on Cancer. Geneva; 2008[cited 2010 May 2]. Available from: http://www.iarc.fr/en/publications/list/handbooks/index.php

[c] Ministerio de Sanidad y Consumo. Descripción del cribado del cáncer en España. Proyecto DESCRIC. Informe de Evaluación de Tecnologías Sanitarias (AATRM No 2006/01). Madrid; 2006.

[d] Instituto Nacional de Estadística. INEbase: Lista de operaciones estadísticas incluídas Madrid; [s.d.][cited 2010 May 2]. Available from: http://www.ine.es/inebmenu/indice.htm#12

class of reference in the home (defined by the National Statistical Institute as the current or the last occupation undertaken by the person who contributes most the household income). Levels of education included the following: no education/cannot read or write, elementary or equivalent and high school or university. Categories of social class included the following: I) executives and professionals associated with a university degree; II) professional staff and administrative support, self-employed, supervisors of manual workers; IV) semi-skilled manual laborers; and V) unskilled manual laborers. These categories were further grouped as follows: high class, I+II; middle class, III; and lower class, IV + V. Total household income was categorized as the following: less than 600 €/month; between 601-1200 €/month; 1201-3600 €/month; more than 3601 €/month; or did not answer.

To evaluate the need for healthcare assistance, we analyzed self-perceived health in the last year (very good, good, fair, bad or very bad) and the number of chronic illnesses that the interviewee suffered (no illness, 1-2 illnesses, 3-4 illnesses, more than four illnesses).

Health coverage (public, public and private, only private or other forms of coverage, including people without coverage and loss of information) was included as a mediator of healthcare. The number of subjects without information was small; therefore, it was not included as an independent category.

The distribution of the variables was calculated for each of the categories of geographic areas of origin. The association between geographic area of origin and having a mammography/cytology in the year before the interview was calculated. The measure of association used was the odds ratio with a 95% confidence interval (95%CI), calculated by logistic regression. Model 0 estimated the crude association; the following models successively included age (model 1), socioeconomic variables (model 2), state of health (model 3) and healthcare coverage (model 4). The reference category was the Spanish population.

Data were subject to the statistical confidentiality law (article 50.b of the public statistic law),[e] which ensures the protection of the identities of the persons interviewed.

RESULTS

The total sample included 13,422 women, 13.9% of whom were immigrants. According to geographic area of origin, the distribution was the following: Spain, 86%; Central and South America, 7.4%; Eastern Europe, 2.3%; Western Europe, the United States and Canada, 2%; Africa, 1.7%; and Asia, 0.5% (Table 1).

The average age of the population was 43.23 years (SD: 15.84). The youngest women came from Eastern Europe (31.74 years; DS: 10.13 years), followed by those from Africa (33.6 years; DS: 12.16 years), Central and South America (35.9 years; DS: 11.8 years), Asia (36.2 years; DS: 12.8 years), Western Europe, the United States and Canada (43.9 years; DS: 14.9 years) and Spain (44.4 years; DS: 16.0 years).

The African population had the highest percentage of women without education (23.5%), followed by the Spanish population (10.3%). The groups with the highest percentages in the higher social class were from Western Europe, the United States and Canada (55.3%) and Spain (44.6%). Asia was polarized in the high (46.3%) and low (43.3%) social classes.

The percentages of respondents with positive self-perceived health (very good, good) were greater among the Eastern European population (74.2%) and those from Western Europe, the United States and Canada (71.4%).

Fewer mammograms were received by women of Eastern European origin (20.8%), followed by populations from Africa (23.0%), Central and South America (32.4%), Western Europe, the United States and Canada (36.1%), Asia (42.9%) and Spain (44.7%). Decreased use of cytology was reported by women from Africa (20.8%), followed by those from Eastern Europe (24.8%), Asia (33.8%), Western Europe, the United States and Canada (36.7%), Spain (47.7%) and Central and South America (48.9%) (Table 2).

The association between geographic area of origin and receipt of mammography was significant and was less than the units of all the other groups in the study, with the exception of populations from Asia, after adjusting for age, socioeconomic indicators and healthcare coverage. The probability of having had a mammography in the last year, using the Spanish population as a reference, was 0.36 (95%CI 0.21;0.62) times less among women from Africa, 0.40 (95%CI 0.22;0.74) times less than women from Eastern Europe, 0.60 (95%CI 0.43;0.84) times less among women from Western Europe, the United States and Canada and 0.64 (95%CI 0.52;0.81) times less than women from Central and South America. The probability of having had a mammography in the last year was similar in the Asian and Spanish populations (Table 3).

The probability of having undergone cytology was 0.38 (95%CI 0.28;0.50) times less among women from Eastern Europe, 0.47 (95%CI 0.33;0.67) times less among women from Africa and 0.61 (95%CI 0.46;0.81) times less among the population from Western Europe,

[e] Instituto Nacional de Estadística. Ley de la Función Estadística Pública. Madrid: 1989 [cited 2010 May 10]. Available from: http://www.ine.es/normativa/leyes/l1289.htm

Table 1. Women between 16-74 years of age by geographic area of origin: Spain, 2006.

Variable	Geographic area of origin												
	Spain		Western Countries, the USA and Canada		Eastern Europe		Central/ South America		Africa		Asia		Total
	n = 11549		n = 272		n = 314		n = 995		n = 226		n = 66		n = 13422
	n	%	n	%	n	%	n	%	n	%	n	%	n
Age (years)													
16 to 24	1468	12.7	30	11.0	58	18.5	155	15.6	60	26.5	11	16.7	1782
25 to 34	2198	19.0	50	18.4	178	56.7	363	36.5	79	35.0	21	31.8	2889
35 to 44	2385	20.7	70	25.7	44	14.0	246	24.7	36	15.9	18	27.3	2799
45 to 54	2059	17.8	47	17.3	21	6.7	154	15.5	37	16.4	11	16.7	2329
55 to 64	1792	15.5	47	17.3	6	1.9	58	5.8	9	4.0	5	7.6	1917
65 to 74	1647	14.3	28	10.3	7	2.2	19	1.9	5	2.2	0	0.0	1706
Level of education (n = 125)													
Not applicable/ Does not know how to read or write / no education	1187	10.3	9	3.3	8	2.6	14	1.4	53	23.5	5	7.6	1276
Elementary school or equivalent	3692	32.0	40	14.6	42	13.4	181	18.2	64	28.3	16	24.2	4035
Secondary education (1st and 2nd stages)	4542	39.3	165	60.2	199	63.6	598	60.2	94	41.6	29	43.9	5627
University education (1st and 2nd stages)	2016	17.5	60	21.9	56	17.9	195	19.6	15	6.6	16	24.2	2358
Social class (n = 322)													
High: executives, university professionals, employees	5147	44.6	151	55.3	59	18.8	252	25.3	44	19.4	31	46.3	5684
Middle: skilled manual laborers	3192	27.6	58	21.2	124	39.6	252	25.3	74	32.6	3	4.5	3703
Low: semi- and unskilled manual laborers	2934	25.4	61	22.3	126	40.3	469	47.1	96	42.3	29	43.3	3715
Income Level (€/month)													
< 600	825	7.1	11	4.0	6	1.9	51	5.1	19	8.4	4	6.0	916
601 to 1200	3428	29.7	71	26.0	90	28.8	318	32.0	88	38.9	20	29.9	4015
1201 to 3600	5039	43.6	125	45.8	151	48.2	463	46.5	56	24.8	17	25.4	5851
> 3601	475	4.1	16	5.9	17	5.4	38	3.8	6	2.7	5	7.5	557
No information	1782	15.4	50	18.3	49	15.7	125	12.6	57	25.2	21	31.3	2084
Self-perceived health													
Very good	1859	16.1	77	28.2	89	28.4	199	20.0	52	23.0	11	16.4	2287
Good	5530	47.9	118	43.2	144	46.0	426	42.8	100	44.2	26	38.8	6344
Regular	3106	26.9	66	24.2	69	22.0	312	31.4	55	24.3	23	34.3	3631
Bad	762	6.6	6	2.2	7	2.2	52	5.2	8	3.5	7	10.4	842
Very bad	291	2.5	6	2.2	5	1.6	6	0.6	11	4.9	0	0.0	319
Number of chronic illnesses													
None	2495	21.6	95	34.8	111	35.5	295	29.6	108	47.8	19	28.4	3123
1 to 2	3794	32.9	98	35.9	117	37.4	334	33.6	62	27.4	32	47.8	4437
3 to 4	2488	21.5	49	17.9	71	22.7	193	19.4	22	9.7	12	17.9	2835
More than 4	2772	24.0	30	11.0	15	4.8	173	17.4	34	15.0	4	6.0	3028
Health coverage													
Public	9889	85.6	202	74.0	270	86.3	843	84.7	202	89.4	55	82.1	11461
Public and private	1478	12.8	38	13.9	10	3.2	113	11.4	6	2.7	11	16.4	1656
Private	109	0.9	31	11.4	15	4.8	16	1.6	4	1.8	0	0.0	175
Other forms	72	0.6	1	0.4	18	5.8	23	2.3	14	6.2	1	1.5	129

Table 2. Use of breast and cervical cancer screenings according to geographic area of origin: Spain, 2006.

Use of screening	Geographic area of origin													
	Spain		Western Countries, the USA and Canada		Eastern Europe		Central/ South America		Africa		Asia		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Mammography in the last year (35-74 years of age)	3636	46,1	69	36,1	16	20,8	154	32,4	20	23,0	15	42,9	3910	44,7
Cytology in the last year (16-64 years of age)	4727	47,7	90	36,7	76	24,8	477	48,9	46	20,8	23	33,8	5439	46,7

the United States and Canada in relation to the Spanish population. Women from Central and South America and those from Asia did not show significant differences from those from Spain. These associations are independent of age, socioeconomic indicators, state of health and healthcare coverage.

DISCUSSION

Immigrant women have a decreased probability of undergoing screening for gynecological cancer compared to Spanish women. The probability of having a yearly mammogram was lower among immigrant women than in Spanish women, with the exception of women from Asia, who are likely to receive mammography with the same frequency as the Spanish population. This association was independent of sociodemographic and socioeconomic characteristics, state of health and health coverage. For cervical cancer screening programs, the probability of having cytology within the year of the study was lower among immigrant women than among Spanish women, with the exception of women from Central and South America and those from Asia, who all had probabilities similar to native women.

Studies completed in Spain and in other countries have identified a series of variables related to the use of gynecological screening programs. Socioeconomic indicators and sociodemographic variables have been studied widely, illustrating that older women and those from a high social class participate more in gynecological screening programs than young women or those from a lower social class.[5,12]

Table 3. Use of breast and cervical cancer screenings according to geographic area of origin: Spain, 2006.

Screening / Model	Geographic area of origin									
	Spain	Western Countries, USA and Canada		Eastern Europe		Central and South America		Africa		Asia	
	OR	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)	OR	(95%CI)
Mammography											
0	1	0.63	(0.46;0.85)	0.31	(0.18;0.54)	0.55	(0.45;0.67)	0.33	(0.20;0.56)	0.93	(0.46;1.87)
1	1	0.60	(0.44;0.83)	0.39	(0.21;0.69)	0.64	(0.52;0.79)	0.31	(0.18;0.53)	1.02	(0.48;2.18)
2	1	0.55	(0.40;0.77)	0.36	(0.20;0.66)	0.66	(0.53;0.82)	0.33	(0.19;0.58)	1.02	(0.47;2.23)
3	1	0.59	(0.43;0.82)	0.39	(0.21;0.70)	0.64	(0.51;0.79)	0.34	(0.19;0.58)	1.06	(0.49;2.31)
4	1	0.60	(0.43;0.84)	0.40	(0.22;0.74)	0.64	(0.52;0.81)	0.36	(0.21;0.62)	1.03	(0.47;2.26)
Cytology											
0	1	0.65	(0.49;0.84)	0.35	(0.27;0.45)	1.04	(0.91;1.19)	0.30	(0.22;0.42)	0.76	(0.44;1.32)
1	1	0.62	(0.47;0.81)	0.35	(0.26;0.45)	1.03	(0.90;1.19)	0.31	(0.22;0.43)	0.81	(0.46;1.42)
2	1	0.57	(0.43;0.75)	0.35	(0.27;0.47)	1.10	(0.95;1.27)	0.43	(0.30;0.60)	0.81	(0.45;1.44)
3	1	0.63	(0.48;0.84)	0.36	(0.27;0.47)	1.11	(0.96;1.29)	0.45	(0.32;0.64)	0.84	(0.47;1.51)
4	1	0.61	(0.46;0.81)	0.38	(0.28;0.50)	1.13	(0.98;1.31)	0.47	(0.33;0.67)	0.84	(0.46;1.52)

OR: odds ratio; CI95%: confidence interval at 95%
- Model 0: univariate
- Model 1: adjusted for age
- Model 2: adjusted for age, education level, social class and income
- Model 3: adjusted for age, education level, social class, income, self-perceived health and chronic illness
- Model 4: adjusted for age, education level, social class, income, self-perceived health, chronic illness and type of healthcare coverage

The evaluation of participation in gynecological screening programs according to geographic area of origin has received little attention. Investigations in the United States, Canada and the United Kingdom have evaluated the differences in participation in screening programs according to ethnicity.[7,14] The results indicate that ethnic minorities use gynecological screening programs less frequently and that these differences are diminished, but do not disappear, by adjusting for sociodemographic and socioeconomic variables. The work of Goel et al[9] (2003) shows that inequalities attributed to ethnicity are not attributable to ethnic group alone, but to the country of origin. Moreover, independent of ethnic group, immigrant women participate less in gynecological screening programs than do native women. The reasons for this lower level of participation, beyond the sociodemographic and socioeconomic characteristics, have not yet been clearly identified.

Difficulties communicating with service providers are associated with less frequent uses of these services. Linguistic barriers are widely cited by immigrant women.[21] This language barrier is important because the recommendation of screening tests by medical staff is a powerful predictor of their completion and can be compromised by communication problems.[3,18] Our work does not adjust for language skills; however, this hypothesis might explain the fact that women from Central and South America are as likely to have cervical cytology as the Spanish population. This hypothesis explains neither the frequent use of cytology among women from Asia, which was similar to the frequency in the Spanish population, nor the lower probability of participation among women from Central and South America in breast cancer screening programs.

A variable that has been important in other works but was not investigated in this study due to the lack of relevant information in the National Health Survey is length of stay in the host country and the administrative status of women. The participation of immigrant women in gynecological screening programs increases with duration of stay in the host country.[20] Shorter stays in the host country imply less social integration; this trend likely extends to healthcare. This phenomenon may partially explain our results because immigration is a recent phenomenon in Spain. Studies conducted in the United States show that undocumented women infrequently use both screening tests.[7] In Spain, having an unregulated administrative status might be associated with greater job insecurity, lack of health coverage and less knowledge of the healthcare system. In short, unregulated status could be compromising the use of services.

In our study, women from Asia were an exception to the association between immigration and participation in breast cancer screening. Currently, there are no other studies that support these results, which is perhaps due to the low representation of this group of women in the survey.

Although there are questions that this study cannot answer, the decreased use of screening programs by immigrant women may result from a lack of knowledge regarding cancer or a different early prevention culture. The participation in screening programs[11] may have a strong cultural component, as has been shown by other studies in other contexts.[6,10]

This investigation presents certain limitations. An absence of variables related to the migratory process, including duration of residence in Spain or native language, has already been mentioned. When collecting data, although questionnaires were translated into English, we did not have the help of translators. This shortcoming might bias the sample toward the selection of people with a better knowledge of Spanish and presumably toward those with greater use of health services. Therefore, we may be underestimating the associations identified this study. However, the geographic areas studied are heterogeneous in relation to the countries that were included, and a greater stratification would not permit us to obtain such robust estimations.

Analyzing the association between the geographic area of origin and the use of preventative services is important because we can identify groups of people that might demonstrate the problems of access to prevention programs. Greater use of programs contributes to early detection, early cancer treatment and lower mortality. Immigrant women may encounter additional barriers to services that require further exploration. Therefore, it is necessary to analyze, among other factors, the level of knowledge that immigrant women possess pertaining to screening programs and their benefits in Spain, such as beliefs regarding cancer and its prevention.

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