

# Self-reported early detection activities for breast cancer in Colombia in 2010: impact of socioeconomic and demographic characteristics

Anna Font-Gonzalez, MSc,<sup>(1)</sup> Marion Piñeros, MD, MSc,<sup>(2)</sup> Esther de Vries, MSc, PhD.<sup>(1)</sup>

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## Abstract

**Objective.** To explore which socioeconomic and demographic characteristics influence Colombian women to utilize screening mammography (SMMG). **Materials and methods.** Data of women aged 40-49 years (n=12 345) and 50-69 years (n=14 771) from the Colombian national survey of demography and health 2010 was analyzed. Risk estimates (odds ratios, OR) of self-reported SMMG use were obtained using logistic regression. **Results.** Among women aged 50-69 years, high wealth index (OR=4.7; CI95% 3.9-5.8), affiliation to special or contributory health insurance regime (OR=3.4; CI95% 2.6-4.6 and OR=2.5; CI95% 2.1-3.0 respectively), health consultation in previous year (OR=2.7; CI95% 2.3-3.1), high education level (OR=2.3; CI95% 1.8-2.9) and very good self-reported health (OR=1.5; CI95% 1.1-2.0) positively influenced SMMG utilization. Among women aged 40-49 years, likelihood of having a SMMG was high after a health consultation in the previous year. **Conclusions.** Socioeconomic and demographic differences in use of SMMG need to be contemplated in screening recommendations before considering an organized population-based programme.

Key words: breast cancer; cancer early detection; mass screening; developing countries; Colombia

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## Resumen

**Objetivo.** Explorar qué características socioeconómicas y demográficas influyen la utilización de mamografía de tamizaje (MT) en mujeres colombianas. **Material y métodos.** Se analizaron datos de mujeres entre 40 y 49 años (n=12 345) y 50-69 años (n=14 771) de la Encuesta Nacional de Demografía y Salud 2010 y estimaciones de riesgo (odds ratios, OR) del uso autorreportado de MT obtenidas usando regresión logística. **Resultados.** En mujeres de 50-69 años con alto índice de riqueza (OR=4.7; IC95% 3.9-5.8), la afiliación al seguro de salud especial o contributivo (OR=3.4; IC95% 2.6-4.6 y OR=2.5; 2.1-3.0 respectivamente), consulta de salud el año previo (OR=2.7; IC95% 2.3-3.1), alto nivel educativo (OR=2.3; IC95% 1.8-2.9) y muy buena salud autoreportada (OR=1.5; IC95% 1.1-2.0) influyeron positivamente en la utilización de MT. En mujeres de 40 y 49 años, hubo alta probabilidad de uso de MT si había consulta de salud el año previo. **Conclusiones.** Las diferencias socioeconómicas y demográficas en uso de MT deben contemplarse en recomendaciones de cribado antes de implementar tamización organizada.

Palabras clave: cáncer de mama; detección precoz del cáncer; tamizaje masivo; países en desarrollo; Colombia

(1) Department of Public Health, Erasmus MC, Rotterdam, The Netherlands.

(2) Subdirección de Investigaciones y Salud Pública, Instituto Nacional de Cancerología, Bogotá, Colombia.

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Correspondence author: Esther de Vries, Department of Public Health,  
Erasmus MC, Postbus 2040 3000 CA Rotterdam, The Netherlands.  
E-mail: e.devries@erasmusmc.nl

Colombia is a middle-income country facing breast cancer as an emerging public health issue. Annual female breast cancer mortality rates increased in Colombia from an average age-standardized rate (ASR, world standard population, per 100 000 person-years) of 12 during the period 1984-1988 to 14 in the period 2004-2008.<sup>1</sup> Similarly, breast cancer incidence increased from ASR 27 in 1962-1966 to 48 in 2003-2007.<sup>1</sup>

In 2008 breast cancer was estimated to be the most frequently occurring female cancer in Colombia with a cumulative incidence risk of 11.4% at age 75, sharing the first place with cervical cancer in Colombian female cancer mortality (cumulative death risk at age 75, 6.2%).<sup>2</sup> Predictions for 2030 in breast cancer incidence and mortality for Colombian women show a continuing increase.<sup>2</sup>

The health care system in Colombia is a social insurance system with benefit packages administered by health insurers. Two main regimes are specified: the contributory (47% of the population) and the subsidized (40% of the population). The former covers retired workers, currently employed population, independent workers and their spouses and children. The subsidized regime covers the low income population who cannot afford to make insurance contributions. The vulnerable and poor population without any health insurance (11% of the population) are covered by the health districts or department authorities. A special regime (2.5% of the population) covers the members of the state social companies.<sup>3,4</sup>

Since 2000, Colombian legislation<sup>5,6</sup> includes breast cancer as a disease of public health interest. Recommendations issued in 2005, based on the Breast Health Global Initiative<sup>7</sup>, cover breast self-examination (BSE), clinical breast examination (CBE) and opportunistic screening with screening mammography (SMMG).<sup>8</sup> National targets state that 20% of women aged between 50 and 69 years in the contributory regime should have biennial SMMG, whereas a 0% target is defined for women in the subsidized regime and those without health insurance. As an effect, SMMG was only reimbursed in the benefits package of the contributory regime until January 2012. Recently, a new legislation<sup>9</sup> includes women in the subsidized regime.

In many developed countries, organized screening programmes with SMMG are common practice.<sup>10,11</sup> Recent studies have questioned its benefits, with false positives and over-diagnosis at the centre of the debate.<sup>12,13</sup> Implementation of organized SMMG in middle-income countries, with lower incidence levels and less resources available, needs a cautious approach.<sup>14</sup>

In Colombia, a pilot project of quality control for SMMG and CBE was performed as a step towards fu-

ture organized screening.<sup>15</sup> The majority of Colombian women (64%) are diagnosed with locally advanced breast cancer, versus 24% with early stage breast cancer.<sup>16</sup> Advanced stage at presentation<sup>16</sup> and indications of lack of equity in access to SMMG for Colombian women at the lower end of the socioeconomic scale have been previously suggested.<sup>17</sup>

In order to provide recommendations in breast cancer early detection activities and reinforce adequate screening practice in Colombia, we performed an in-depth analysis of the main socioeconomic and demographic characteristics of women self-reporting to participate in SMMG and explored which characteristics influence SMMG use.

## Materials and methods

### Study participants and data collection

The source population was obtained from the national survey of demography and health (ENDS) published in 2010, detailed elsewhere.<sup>18</sup> ENDS is part of Demographic and Health Surveys (DHS): nationally representative household surveys in low and middle-income countries.<sup>19</sup>

The survey covered the population living in private households of urban and rural areas of the country, with the exception of the Amazonía and Orinoquía regions where their capitals and population centres were included but the dispersed rural population was excluded. Participation was voluntary and verbal agreement was sought from participants before completing the questionnaires.

A total of 53 521 women (94.1% response rate) from 51 447 households were interviewed. For our analysis, a female-only study sample comprising the respondents aged 40-69 years was obtained, resulting in a study sample of 12 345 women aged 40-49 years and 14 771 aged 50-69 years.

### Study variables

Self-reported BSE, CBE and mammography (MMG) use for symptoms and screening were defined as dichotomous variables. Other study variables comprised: affiliation to health system, marital status, employment status, education, ethnicity, region, wealth index, area of residence, health status and health consultation in last year.

Department of residence was expressed as one of the six main regions of the country (Atlantic, Oriental, Central, Pacific, Bogotá, Orinoquía and Amazonía).<sup>20</sup>

Area of residence was categorized in urban and rural areas, with urban areas being the capital of the

municipality and rural areas the rest of the municipality. Residence in urban areas indicates easier access to basic public services and a higher degree of urbanization than in rural areas. Since the capital (Bogotá) has more general and specialized hospitals it is not comparable to the other urban areas of the country and was kept as a separate category.

Ethnicity was presented in four categories: Indigenous, Mestizo, Black (which comprises Mulatta, Afrocolombian or Afrodescendant) and 'others'. The latter included Gypsy, Raizal and Palenquero. According to the last census in 2005, 3.4% of the total population is Indigenous, 86% Mestizo, 10.6% Black and 0.01% Gypsy, Raizal or Palenquero. These ethnicities are not evenly distributed among the country. The largest proportion of Indigenous live in Amazonía and Orinoquía, Mestizos across the whole territory, Blacks in the Pacific region, Gypsies in Central and Oriental regions, Raizales in the Central region and Palenqueros in the Atlantic region.<sup>21</sup>

Wealth index was defined in terms of active wealth and not in terms of income, following the methodology of the World Bank.<sup>18</sup>

Questions regarding childbearing were only asked to women aged 40-49 years and hence, results only present information of this subgroup of participants.

### Statistical analysis

Descriptive analysis of the characteristics of women in the study, self-reported use of BSE and CBE, frequency of SMMG and reason for MMG by socioeconomic and demographic characteristics was done by calculating proportions of women in each group. The difference in use of BSE, CBE, frequency of SMMG and reason for MMG were assessed with Chi-square tests according to sociodemographic and economic characteristics.

Univariate and multivariate logistic regression analyses were performed to examine the relation between study variables and SMMG use. Chi-square tests were applied to identify study variables that differed between use and not use of SMMG. Analyses and results were stratified by age (40-49 years old and 50-69 years old).

The statistical significance was set at  $p$ -value  $<0.05$ . Statistical analyses were performed using the statistical software programme SPSS V 17.0.2.

## Results

### Characteristics of participants

Table I describes the characteristics of the included women who performed BSE, CBE and MMG. Chi-square

tests were performed for BSE, CBE and MMG use. Statistically significant differences in BSE, CBE and MMG were found among all socioeconomic and demographic variables except for marital status.

The majority of the women who practiced BSE and CBE reported an excellent health status, affiliation to the special or contributory regime, living in an urban area, a high level of education, being employed, a health consultation in the last year, a very high level of wealth and living in the capital (Bogotá). Among women aged 40-49 years old, those who had none or up to three children underwent more BSE and CBE than women with four or more children.

Very similar results were seen for women who had either screening or symptomatic MMG, with the exception of marital status where no differences were observed (table I).

### Frequency of screening mammography

Table II shows the frequency of SMMG among women aged 50-69 years. Most women (45%) reported having had one SMMG, the percentage of women who stated having a SMMG every two years was 20%. Most of the women who utilized SMMG every two years had excellent health status, were affiliated to special or contributory regime, lived in a urban area, had high education, were of Mestizo ethnicity, had a health consultation in last year, were of the highest wealth index and lived in Bogotá. Chi-square tests showed that all sociodemographic and economic characteristics were statistically associated with frequency of SMMG except employment status.

### Users of screening mammography

We explored the sociodemographic and economic characteristics for women of 50-69 years of age who had a MMG due to symptoms. All characteristics except a health consultation in the last year were significantly associated with reason for MMG (results not shown).

Among women aged 40-49 years, those with high educational level were almost twice as likely to undergo SMMG; for women of the highest wealth index this was 3.8 times more likely compared to women of lower educational and wealth index levels (table III). Women affiliated to the contributory (OR=1.5; CI95% 1.2-2.0) and special regime (OR=1.8; CI95% 1.3-2.6) were significantly more likely to use SMMG than women without affiliation. Having had a health consultation in the last year was associated to a more than doubling of the likelihood to have had a SMMG. Women who

**Table I**  
**PERCENTAGE OF WOMEN AGED 40 TO 69 YEARS, UNDERGOING BREAST SELF-EXAMINATION, CLINICAL BREAST EXAMINATION OR MAMMOGRAPHY BY SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS IN COLOMBIA, 2010**

Variables	Total	BSE		p <0.05	CBE		p <0.05	MMG		p <0.05
	N	N (%)	NK		N (%)	NK		N (%)	NK	
Age (years)				&			&			&
40-49	12 345	8 332 (67)	881		6 481 (52)	9		3 046 (25)	779	
50-69	14 771	8 854 (60)	2 036		7 720 (52)	44		7 221 (49)	1 573	
Health Status				&			&			&
Excellent	1 189	900 (76)	62		758 (64)	2		485 (41)	44	
Very good	1 769	1 271 (72)	117		1 091 (62)	3		834 (47)	71	
Good	12 275	8 279 (67)	1 005		6 818 (55)	18		4 866 (40)	839	
Regular	10 831	6 260 (58)	1 466		5 116 (47)	24		3 798 (35)	1 184	
Bad	1 051	477 (45)	267		419 (40)	6		284 (27)	214	
Affiliation health system				&			&			&
Contributory	12 714	9 516 (75)	494		8 215 (65)	27		6 987 (55)	281	
Subsidized	11 335	5 746 (51)	2 111		4 386 (39)	23		2 148 (19)	1 836	
Special*	975	769 (79)	30		683 (70)	0		621 (64)	17	
No affiliation	2 059	1 136 (55)	281		900 (44)	3		501 (24)	214	
Not known	33	20 (59)	1		18 (53)	0		9 (27)	4	
Area of residence				&			&			&
Urban	21 404	14 455 (67)	1 607		12 160 (57)	41		9 224 (43)	1 053	
Rural	5 711	2 731 (48)	1 310		2 041 (36)	11		1 043 (18)	1 299	
Education				&			&			&
None	1 933	598 (31)	721		582 (30)	11		331 (17)	638	
Elementary	12 038	6 508 (54)	1 820		5 264 (44)	28		3 724 (31)	1 489	
Secondary - high School	9 060	6 657 (73)	336		5 353 (59)	11		3 833 (42)	185	
University	4 018	3 394 (84)	29		2 965 (74)	1		2 353 (59)	27	
Not known	68	29 (43)	12		37 (55)	2		26 (39)	14	
Ethnicity				&			&			&
Indigenous	941	432 (46)	233		343 (36)	4		218 (23)	260	
Others <sup>‡</sup>	64	49 (76)	6		44 (68)	0		26 (40)	1	
Black <sup>§</sup>	2 374	1 451 (61)	280		1 110 (47)	3		672 (28)	221	
Mestizo	23 737	15 254 (64)	2 398		12 705 (53)	45		9 351 (39)	1 871	
Employment status				&			&			&
Employed	12 484	8 520 (68)	915		6 915 (55)	10		4 409 (35)	765	
Not employed	14 632	8 666 (59)	2 002		7 286 (50)	42		5 858 (40)	779	
Health consultation in last year				&			&			&
Yes	22 430	14 592 (65)	2 176		12 398 (55)	41		9 369 (42)	1 721	
No	4 634	2 567 (55)	735		1 784 (38)	12		881 (19)	630	
Not known	51	27 (53)	6		20 (38)	0		16 (32)	2	

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Wealth index				&		&		&
Lowest	4 083	1 584 (39)	1 166		1 178 (29)	9	495 (12)	1 192
Low	4 741	2 607 (55)	721		1 996 (42)	7	1 076 (23)	563
Medium	5 101	3 177 (62)	511		2 522 (49)	10	1 588 (31)	297
High	5 920	4 186 (71)	332		3 453 (58)	8	2 568 (43)	206
Highest	7 271	5 632 (77)	187		5 053 (69)	18	4 539 (62)	95
Region				&		&		&
Atlantic	4 870	2 480 (51)	624		2 090 (43)	4	1 412 (29)	440
Oriental	4 924	3 104 (63)	731		2 343 (48)	11	1 600 (32)	596
Central	7 330	4 837 (66)	765		3 960 (54)	15	2 850 (39)	625
Pacific	4 550	3 028 (66)	550		2 324 (51)	14	1 603 (35)	495
Bogotá	5 010	3 533 (70)	138		3 319 (66)	8	2 692 (54)	106
Orinoquía and Amazonía	431	205 (47)	110		165 (38)	1	111 (26)	91
Marital status								
Married and cohabiting	16 173	10 337 (64)	1 631		8 454 (52)	24	6 028 (37)	1 413
Separated, widowed or single	10 939	6 845 (63)	1 286		5 743 (52)	28	4 236 (39)	939
Not known	4	4 (100)	0		4 (100)	0	3 (66)	0
Children <sup>#</sup>				&		&		&
No children	853	636 (75)	38		515 (60)	0	296 (35)	34
1-3	8 029	5 764 (72)	390		4 599 (57)	6	2 202 (27)	308
4 and more	3 463	1 932 (56)	453		1 368 (39)	3	548 (16)	437

\* Members of state social companies

‡ Gypsy, Raizal and Palenquero

§ Comprises Mulatta, AfroColombian and Afrodescendent

# Variable only applicable to women between 40 to 49 years old

&amp; Indicates that the Chi-square test had a p-value of &lt;0.05

NK: not known

BSE: breast self-examination

CBE: clinical breast examination

MMG: mammography (screening or symptomatic)

lived in the Pacific and Oriental regions were 0.6 times less likely to use SMMG compared to women living in Bogotá. Women without children were more likely to have had a SMMG (OR=1.6; CI95% 1.3-2.1) than women with four or more children. Health status, ethnicity, employment and marital status were not significantly linked to SMMG use.

In the 50-69 years group, women with university education were 2.3 times more likely of being users of SMMG than those without. Having the highest level of wealth was associated to almost five times the likelihood to have had a SMMG than those on the lowest level. Reporting a very good health status showed 1.4 times, and a health consultation in the last year 2.7 times more likelihood to use SMMG. Women affiliated to the

special (OR=3.4; CI95% 2.6-4.6) and the contributory (OR=2.5; CI95% 2.1-3.0) regimes were more, and those affiliated to the subsidized regime were less (OR=0.6; CI95% 0.5-0.7) likely to use SMMG compared to those with no affiliation. Ethnic minorities were less likely than Mestizo women to use SMMG.

Employed women were about 20% less likely to have a SMMG than unemployed women. Women living in the Atlantic, Oriental, and Central or Pacific regions were 40 to 50% less likely to use SMMG compared to women living in Bogotá. Being married or living together slightly increased likelihood of SMMG use (OR=1.1; CI95% 1.0-1.3) compared to those separated, widowed or single. In the contributory and subsidized regime payment was completely provided by the insurance

**Table II**  
**FREQUENCY OF SCREENING MAMMOGRAPHY AMONG WOMEN BETWEEN 50 AND 69 YEARS OLD WHO HAD MAMMOGRAPHY**  
**BY SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS IN COLOMBIA, 2010**

Variables	Once only N (%)	Every two years N (%)	Once a year N (%)	Twice a year N (%)	p <0.05
Health status					#
Excellent	83 (37)	64 (28)	68 (30)	10 (4)	
Very good	168 (39)	112 (26)	141 (33)	10 (2)	
Good	1 075 (41)	517 (20)	894 (34)	114 (4)	
Regular	973 (52)	338 (18)	504 (27)	71 (4)	
Bad	81 (62)	18 (14)	27 (21)	4 (3)	
Affiliation health system					#
Contributory	1 562 (40)	820 (21)	1 314 (34)	167 (4)	
Subsidized	578 (70)	109 (13)	118 (14)	16 (2)	
Special <sup>†</sup>	111 (30)	86 (24)	148 (41)	19 (5)	
No affiliation	130 (58)	29 (13)	56 (25)	8 (4)	
Not known	0 (1)	4 (99)	0 (0)	0 (0)	
Area of residence					#
Urban	2 082 (43)	1 007 (21)	1 558 (32)	197 (4)	
Rural	299 (69)		42 (10)	77 (18)	
Education					#
None	135 (75)	17 (9)	24 (13)	5 (3)	
Elementary	1 176 (55)	350 (16)	521 (25)	74 (3)	
Secondary - high school	732 (39)	402 (22)	629 (34)	88 (5)	
University	330 (30)	274 (25)	458 (41)	42 (4)	
Not known	9 (49)	6 (36)	3 (15)	0 (0)	
Ethnicity					#
Indigenous	61 (64)	17 (17)	15 (15)	3 (4)	
Others <sup>‡</sup>	4 (33)	1 (7)	7 (58)	0 (2)	
Black <sup>§</sup>	134 (46)	47 (16)	86 (29)	26 (9)	
Mestizo	2 182 (45)	984 (20)	1 527 (31)	180 (4)	
Employment status					
Employed	756 (47)	308 (19)	491 (30)	63 (4)	
Not employed	1 624 (44)	741 (20)	1 144 (31)	146 (4)	
Health consultation in last year					#
Yes	2 141 (44)	992 (20)	1 511 (31)	200 (4)	
No	237 (56)	58 (13)	121 (28)	9 (2)	
Not known	3 (53)	0 (0)	3 (47)	0 (0)	
Wealth index					#
Lowest	158 (80)	23 (12)	16 (8)	1 (0)	
Low	287 (67)	32 (7)	97 (23)	12 (3)	
Medium	454 (61)	91 (12)	177 (24)	23 (3)	
High	605 (46)	247 (19)	403 (31)	55 (4)	
Highest	877 (34)	657 (25)	942 (36)	118 (5)	

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Marital status					#
Married or cohabiting	1 259 (43)	601 (21)	915 (32)	120 (4)	
Separated, widowed or single	1 122 (47)	448 (19)	720 (30)	89 (4)	
Not known	0 (0)	0 (0)	0 (0)	0 (0)	
Region					#
Bogotá	553 (35)	455 (29)	500 (31)	85 (5)	
Atlantic	349 (53)	113 (17)	176 (27)	17 (2)	
Oriental	405 (54)	115 (15)	207 (28)	20 (3)	
Central	673 (47)	222 (16)	497 (35)	38 (3)	
Pacific	373 (46)	137 (17)	245 (30)	50 (6)	
Orinoquia and Amazonia	28 (63)	6 (15)	9 (21)	0 (1)	

\* Members of state social companies

‡ Gypsy, Raizal and Palenquero

§ Comprises Mulatta, AfroColombian and Afrodescendent

# Indicates that the Chi-square test had a  $p$ -value of  $<0.05$ 

Table III

**UNIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION ANALYSIS OF SCREENING MAMOGRAPHY PRACTICE BY SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS PRESENTED BY AGE GROUP IN COLOMBIA, 2010**

Variables	40-49 years					50-69 years				
	cOR	95% CI	aOR	95% CI	P value	cOR	95% CI	aOR	95% CI	P value
<b>Health Status</b>										
Bad	1		1			1		1		
Excellent	2.3	1.4-3.9	1.1	0.6-1.8	0.834	3.2	2.4-4.2	1.2	0.9-1.7	0.229
Very good	3.2	1.9-5.4	1.4	0.8-2.5	0.183	4.4	3.4-5.6	1.4	1.1-2.0	0.017
Good	1.9	1.2-3.1	1.0	0.6-1.7	0.852	3.0	2.4-3.7	1.3	1.0-1.6	0.069
Regular	1.7	1.0-2.7	1.4	0.8-2.3	0.193	1.8	1.5-2.2	1.2	0.9-1.5	0.140
<b>Affiliation health system</b>										
No affiliation	1		1			1		1		
Contributory	2.8	2.2-3.5	1.5	1.2-2.0	<0.001	5.1	4.3-6.0	2.5	2.1-3.0	<0.001
Subsidized	0.8	0.6-1.0	0.9	0.7-1.2	0.604	0.5	0.5-0.7	0.6	0.5-0.7	<0.001
Special*	3.5	2.5-5.0	1.8	1.3-2.6	0.001	8.1	6.2-10.6	3.4	2.6-4.6	<0.001
<b>Education</b>										
None	1		1			1		1		
Elementary	1.1	0.7-1.9	0.7	0.4-1.2	0.258	2.4	2.0-2.8	1.3	1.0-1.6	0.012
Secondary - high school	2.3	1.4-3.8	1.0	0.6-1.7	0.986	5.4	4.6-6.5	1.6	1.3-1.9	<0.001
University	6.2	3.8-10.1	1.9	1.1-3.2	0.017	12.7	10.4-15.6	2.3	1.8-2.9	<0.001
<b>Ethnicity</b>										
Mestizo	1		1			1		1		
Indigenous	0.7	0.5-1.0	1.0	0.7-1.6	0.801	0.5	0.4-0.6	1.1	0.8-1.4	0.609
Others‡	1.1	0.4-3.3	0.7	0.2-2.3	0.583	0.7	0.3-1.5	0.6	0.3-1.6	0.355
Black§	0.7	0.5-0.8	0.8	0.7-1.0	0.104	0.5	0.4-0.6	0.7	0.6-0.9	<0.001

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Employment status										
Not employed	I		I			I		I		
Employed	1.3	1.2-1.5	0.9	0.8-1.1	0.243	1.0	1.0-1.1	0.8	0.7-0.9	<0.001
Health consultation in last year										
No	I		I			I		I		
Yes	2.7	2.2-3.2	2.2	1.8-2.7	<0.001	2.9	2.6-3.2	2.7	2.3-3.1	<0.001
Wealth index										
Lowest	I		I			I		I		
Low	2.4	1.7-3.3	1.8	1.3-2.6	<0.001	1.9	1.5-2.2	1.2	1.0-1.5	0.032
Medium	2.8	2.0-3.8	1.9	1.3-2.6	<0.001	3.5	3.0-4.2	1.9	1.5-2.3	<0.001
High	4.6	3.3-6.2	2.5	1.8-3.6	<0.001	6.8	5.8-8.1	2.5	2.1-3.0	<0.001
Highest	9.4	6.9-12.7	3.8	2.7-5.3	<0.001	19.6	16.5-23.2	4.7	3.9-5.8	<0.001
Region										
Bogotá	I		I			I		I		
Atlantic	0.5	0.4-0.5	0.9	0.7-1.1	0.206	0.2	0.2-0.2	0.5	0.4-0.6	<0.001
Oriental	0.4	0.3-0.5	0.6	0.5-0.8	<0.001	0.3	0.2-0.3	0.5	0.4-0.6	<0.001
Central	0.7	0.6-0.8	1.0	0.9-1.2	0.567	0.3	0.3-0.4	0.6	0.5-0.7	<0.001
Pacific	0.4	0.3-0.5	0.6	0.5-0.8	<0.001	0.3	0.3-0.4	0.6	0.5-0.7	<0.001
Orinoquía and Amazonía	0.4	0.2-0.7	0.9	0.6-1.6	0.853	0.2	0.1-0.3	0.9	0.6-1.4	0.565
Marital status										
Separated, widowed, single	I		I			I		I		
Married or cohabiting	0.9	0.8-1.1	1.0	0.9-1.1	0.997	1.1	1.1-1.2	1.1	1.0-1.3	0.003
Children <sup>#</sup>										
4 or more	I		I							
No children	3.6	2.9-4.5	1.6	1.3-2.1	<0.001	-	-	-	-	
1 to 3	2.2	1.9-2.5	1.2	1.0-1.4	0.068	-	-	-	-	

\* Members of state social companies

‡ Gypsy, Raizal and Palenquero

§ Comprises Mulatta, AfroColombian and Afrodescendent

# Variable only applicable to women between 40 to 49 years old

cOR: crude OR

aOR: adjusted OR for all variables presented in the table

company for 68% of the women (aged 50-69 years), while in the special regime it was paid completely for 91% of the women. Twenty percent of the women from the subsidized regime self funded the MMG.

## Discussion

We observed that, among women aged 50-69 years, affiliation to the contributory or special regime, a health consultation in the last year, having the highest

level of wealth and education and a very good health status, positively influenced the use of SMMG. Ethnic minorities, affiliation to the subsidized regime, employment and living in regions different from Bogotá, negatively influenced the use of SMMG. Furthermore, many women under the age of 50 used SMMG despite recommendations to begin at age 50.

Results for the 50-69 years of age group are in agreement with previous research. In Colombia, lower education and being affiliated to the subsidized regime



or not being insured was associated with lower use of SMMG.<sup>17</sup> In Europe and the United States, a higher use of SMMG among women of a high socioeconomic level has been reported.<sup>22-25</sup>

In accordance with our results, previous studies identified low education as a determinant of low SMMG use.<sup>23</sup> One contrary finding was explained by the authors as being due to the highly educated women using more private screening services.<sup>24</sup> Employment status did not increase SMMG use in our study for women of 50-69 years of age, as seen in previous research.<sup>24</sup> In our study, good health status did not influence SMMG women aged 40-49 years, but good health was positively associated with SMMG amongst those aged 50-69 years. Possibly, poor health amongst the older age group was a reason for not referring to SMMG.

As expected in opportunistic screening, SMMG use was higher among women who had a health consultation in the previous year. Although a high percentage of women (73%) aged 50-69 years used MMG as a screening tool and not for symptoms (26%), the frequency of these was not biennial as recommended.<sup>8</sup> In the ENDS 2005<sup>26</sup> this total MMG use was 30.4%. There was however no distinction between screening and symptomatic MMG and the region of Orinoquía and Amazonía only included data of its capital but not the population centres. We found that only 29% of women from Bogotá and of 50-69 years of age reported the recommended frequency.

Our findings support the hypothesis that differences in use of SMMG are related to regional and regime affiliation. The regional differences are in concordance with observed declines in breast cancer mortality in Bogotá, whereas in Colombia on the whole breast cancer mortality increased; the latter probably due to urbanization, decreasing fertility rates, older age at first birth<sup>27</sup> and a tendency towards western lifestyles.<sup>28</sup> The drop in mortality in Bogotá might be related to higher use of SMMG in comparison with rural and less urbanized areas,<sup>29</sup> as indicated by our findings, or be due to improving access to good quality adjuvant treatments.

For both age groups, affiliation to the contributory or special regime remained central with subsidized regime having the lowest rates of SMMG use. Women in the contributory regime tend to have higher education and higher wealth, which have been positively linked to SMMG use.

The variation in amount and quality of information of SMMG received among different population groups could also explain the observed variations of the present study. In 2012 the Colombian National Cancer Institute organized a breast cancer campaign in five cities (Bogotá, Pereira, Cali, Bucaramanga and San Andrés)

to raise awareness of BSE, CBE and SMMG, including advertisements on national TV. **National and local initiatives** on early detection of breast cancer have also been organised by non-governmental organizations. Women of high income and education might more actively search for information than women at the lower end of the socioeconomic scale and with lower education.

Furthermore, gynaecologists play an important role in SMMG use in absence of an organized screening programme.<sup>30</sup> Visits to the gynaecologist are likely to be more frequent among women of high socioeconomic status. Mailing information alone or in combination of telephone or home visit can significantly improve SMMG rates in disadvantaged communities.<sup>31</sup>

We observed a negative impact in SMMG use among ethnic minorities compared to Mestizo in women between 50-69 years of age. However, the sample sizes were too small to explore further the meaningful differences between specific ethnicities.

At present, the benefits of organized SMMG in Colombia are likely to be low. Breast cancer incidence in low- and middle-income countries is much lower than in western countries, the peak of incidence is younger and optimum participation rates will be difficult to achieve.<sup>32</sup> Even when resources are available, sufficient numbers of technicians or radiologists are necessary.<sup>33</sup> Interestingly, the current Colombian national target is not based on cost-effectiveness studies, which are warranted since findings from developed countries are not directly applicable to limited resources countries.<sup>34</sup>

Moreover, introduction of an organized screening programme is likely to increase the demand of SMMG and will worsen already existing provider delays before diagnosis.<sup>35</sup> Reducing such delays is a priority when considering implementing an organised screening.

Among women aged 40-49 recommendations were not followed, indicating suboptimal use of resources. Breast cancer advocacy can have a positive influence on societal awareness of attitudes towards the disease, breast health care services and funding of research, but can also introduce political pressure without scientific evidence. This could be the case among Colombian women aged 40-49 years who use SMMG.

Although BSE and CBE lack clear evidence on effectiveness and practical application, they might be an alternative for women at lower risk (e.g. aged 40-49 years) in order to offer SMMG to the high risk group (e.g. aged 50-69 years).<sup>36</sup> Furthermore, improving stage at diagnosis with CBE has been suggested as an option in other developing countries with limited resources.<sup>37</sup> Some limitations of our study should be considered. Recall bias with inaccurate or socially desirable answers in favour of increased use of prior BSE, CBE and MMG

cannot be ruled out. Information on risk factors or symptoms was not available from the survey. We could therefore not relate this information with socioeconomic and demographic characteristics, which would have given a broader perspective to our results. The rurally dispersed populations in Orinoquía and Amazonía were excluded from the survey but consist of a small part of the population. However, as these regions probably have low rates of SMMG attendance, their exclusion may have caused small overestimations of our findings.

## Conclusions

SMMG recommendations and national legislation need to address women with no education, of lowest wealth index, affiliated to the subsidized regime, from rural areas and from minority ethnic groups. In the absence of an organized screening programme, BSE and CBE are valuable tools. Screening practice needs to follow cost-effective and evidence-based recommendations. The recent new legislation, in which SMMG is also covered in the subsidized regime, is a step forward in equity of access to SMMG. Future research should assess the effect of the new legislation.

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