

# BMJ Open

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<http://bmjopen.bmj.com>).

If you have any questions on BMJ Open's open peer review process please email [editorial.bmjopen@bmj.com](mailto:editorial.bmjopen@bmj.com)

# BMJ Open

## Cervical and breast cancer screening participation and utilization of maternal health services among immigrant women in Southern Italy

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-016306
Article Type:	Research
Date Submitted by the Author:	06-Feb-2017
Complete List of Authors:	Bianco, Aida; University of Catanzaro "Magna Græcia", Department of Health Sciences Larosa, Elisabetta; University of Catanzaro "Magna Græcia", Department of Health Sciences Pileggi, Claudia; University of Catanzaro "Magna Græcia", Department of Health Sciences Nobile, Carmelo; University of Catanzaro "Magna Græcia", Department of Health Sciences PAVIA, Maria; University of Catanzaro "Magna Græcia", Department of Health Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research
Keywords:	cancer screening, immigrant, Italy, maternal health, women

SCHOLARONE™  
Manuscripts

only

1  
2  
3 1 **Cervical and breast cancer screening participation and utilization of maternal**  
4 2 **health services among immigrant women in Southern Italy**  
5  
6  
7 3  
8  
9 4  
10

11 5 Aida Bianco MD, Elisabetta Larosa MD, Claudia Pileggi MD, Carmelo G. A. Nobile MD,  
12 6 Maria Pavia MD, MPH  
13  
14  
15  
16 7  
17  
18 8  
19  
20 9  
21

22 10 Department of Health Sciences, University of Catanzaro "Magna Græcia", Campus of  
23 11 Germaneto, 88100 Catanzaro, Italy  
24  
25  
26 12  
27  
28 13  
29  
30 14  
31  
32 15  
33

34 16 Author responsible for correspondence and whom requests for reprints should be addressed:  
35  
36 17 Maria Pavia MD, MPH  
37  
38 18 Chair of Hygiene  
39  
40 19 Department of Health Sciences  
41  
42 20 Medical School  
43  
44 21 University of Catanzaro "Magna Græcia"  
45  
46 22 Via T. Campanella, 115, 88100 Catanzaro, Italy  
47  
48 23 ph +39 (0)961 712371  
49  
50 24 fax +39 (0)961 712382  
51  
52 25 e-mail [pavia@unicz.it](mailto:pavia@unicz.it)  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 26 **Abstract**

4  
5 27 **Objectives**

6  
7 28 Among ten of the main issues regarding women's health cancer screening and maternal  
8  
9 29 health are included, and migrants often tend to be the most vulnerable population groups,  
10  
11 30 especially women.

12  
13 31 To explore breast and cervical cancer screening participation and to acquire information  
14  
15 32 regarding access to healthcare services during pregnancy, childbirth and the postpartum  
16  
17 33 period among age eligible immigrant women in Southern Italy.

18  
19 34 **Methods**

20  
21 35 A structured questionnaire was used to collect data from each participant. Women aged  
22  
23 36 25-64 years who had never experienced hysterectomy and women aged 50-69 years  
24  
25 37 without previous diagnosis of invasive or in situ breast cancer were considered eligible  
26  
27 38 for evaluation of cervical and breast screening participation, respectively. Moreover,  
28  
29 39 women who had delivered at least once in Italy were enrolled to describe antenatal care  
30  
31 40 services use.

32  
33 41 **Results**

34  
35 42 On study population of 464 women, 39.1% and 45.6% had had cervical or breast  
36  
37 43 screening, respectively. About one third of immigrant women (32.3%) have experienced  
38  
39 44 a Pap-test for screening purposes within three years from interview. Among those who  
40  
41 45 had had a mammogram, less than one quarter (20.8%) had their mammography within the  
42  
43 46 recommended time interval of two years. About 80% of the respondents did not report  
44  
45 47 difficulties of access and use of prenatal and postpartum services.

46  
47 48 **Conclusion**

48  
49 49 This study provides currently unavailable information about adherence to cancer  
50  
51 50 screening and maternal and child health that could encourage future research to develop  
52  
53 51 and test culturally appropriate, women-centered strategies for promoting timely and  
54  
55 52 regular cancer screening among immigrant women in Italy.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

53

54 **Key words:**

55 Cancer screening, immigrant, Italy, maternal health, women.

For peer review only

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64

56 **Strengths and limitations of this study**

- 57 ■ The high participation rate (92.3%) is extremely satisfactory and restricts one  
58 major potential source of bias in the results.
- 59 ■ Immigrants who did not speak Italian or who had low literacy levels have not  
60 been excluded from the study, helped by linguistic and cultural mediators.
- 61 ■ The sample may not be representative of all immigrants within the region, but  
62 only of those connected to NPOs and with a regular stay permit.
- 63 ■ There may be an effect of recall bias on self reported information about CS  
64 screening practices.

1  
2  
3 65 **Cancer screening participation and utilization of maternal health services among**  
4  
5 66 **immigrant women in Southern Italy**  
6  
7 67

8  
9 68 **Background**  
10

11 69 Estimates from the United Nations show that women make up approximately half  
12  
13 70 of the world's one billion migrants.<sup>1</sup> The effects of migration on women's health are  
14  
15 71 varied and hard to predict and may be determined by a number of factors: the conditions  
16  
17 72 under which the migration occurred; how well a particular individual has integrated in the  
18  
19 73 host society, the social status of the individual in the host country, and the health  
20  
21 74 conditions that are existent in the host country.  
22

23 75 Cancer screening and maternal health have been included among the ten main  
24  
25 76 issues pertinent to women's health, whether it be in immigrants or native inhabitants.<sup>2</sup>  
26  
27 77 Studies have indicated that migrants tend to be the most vulnerable population groups  
28  
29 78 when it comes to healthcare, more so in the case of women.<sup>3</sup>  
30

31 79 Two of the most common cancers affecting women are breast and cervical  
32  
33 80 cancers. Detecting both these cancers early is key to keeping women alive and healthy.  
34  
35 81 Increased health risks have been noted immigrants and ethnic minorities who also may  
36  
37 82 receive less healthcare than the native population,<sup>4,5</sup> whilst at the same time numerous  
38  
39 83 studies have documented lower participation in cancer screening programs among various  
40  
41 84 migrant groups.<sup>6-8</sup> Furthermore ethnic minority women residing in Western countries are  
42  
43 85 more likely to be diagnosed with advanced-stage disease and hence have higher mortality  
44  
45 86 rates,<sup>9</sup> often as a result of lower utilization of timely cancer screening services.<sup>10-12</sup>  
46

47 87 Over the course of the last century there have been many tremendous  
48  
49 88 improvements in pregnancy and childbirth care, but the benefits of these have not  
50  
51 89 extended everywhere and to everyone. Compared with the native population, maternal  
52  
53 90 health has also been suggested to be worse among migrant women,<sup>13</sup> with many studies,  
54  
55 91 including social, economic, behavioral, and environmental factors in their findings.<sup>14-17</sup>  
56  
57  
58  
59  
60

1  
2  
3 92 The aims of this study were to explore breast and cervical cancer screening  
4  
5 93 participation and to acquire information regarding access to healthcare services during  
6  
7 94 pregnancy, childbirth and the postpartum period among age eligible immigrant women in  
8  
9 95 Southern Italy.

## 10 96 **Methods**

11  
12  
13 97 The survey was conducted from May 2012 until April 2013. The study  
14  
15 98 population consisted of a specific subset of immigrants. For this study, immigrants were  
16  
17 99 defined as those from low or middle-income countries according to the classification of  
18  
19 100 the World Bank based on per capita GDP.<sup>18</sup> Tourists were excluded.

20  
21 101 Details regarding sampling of individuals for this study have been described  
22  
23 102 elsewhere.<sup>19</sup> In addition, women aged 25-64 years who had never experienced  
24  
25 103 hysterectomy and women aged 50-69 years without previous diagnosis of invasive or in  
26  
27 104 situ breast cancer were considered eligible for evaluation of cervical and breast screening  
28  
29 105 participation, respectively. Moreover, women who had delivered at least once in Italy  
30  
31 106 were enrolled to describe antenatal care services use.

32  
33 107 Before interview, the research team presented the aims of the study, emphasized  
34  
35 108 the anonymity of the responses and acquired informed written consent. All questionnaires  
36  
37 109 were administered by physicians who had been previously trained, standardized and  
38  
39 110 evaluated in interview methods. On average, the interview lasted ten minutes, and, if  
40  
41 111 necessary, a cultural mediator supported the interviewers with information and translation  
42  
43 112 of the different views and concepts relevant to an individual's cultural background.

### 44 113 *Survey instrument*

45  
46  
47 114 A structured questionnaire was used to collect data from each participant. Socio-  
48  
49 115 demographics included information on gender, age, marital and legal status, education  
50  
51 116 level, religion, nationality, working activity, duration of residence in Italy. The questions  
52  
53 117 on lifestyle and health status included information on physical activity, smoking habits,  
54  
55 118 alcohol consumption, chronic and infectious diseases. The questions on participation in



1  
2  
3 119 screening programs included breast and cervical CS practices. In Italy, organized  
4  
5 120 nationwide CS programs include personal invitations for a Pap-test sent to women aged  
6  
7 121 25-64 years every three years and for mammography screening to women aged 50-69  
8  
9 122 years every two years. Uptake of cervical CS was determined by asking ‘Have you ever  
10  
11 123 undergone Pap test for control without any symptoms?’. Women who answered  
12  
13 124 affirmatively were asked ‘When was the last time you underwent Pap test?’. Women who  
14  
15 125 had undergone Pap test within the previous three years were considered as ‘uptake’, as  
16  
17 126 corresponds to women who comply with the recommended screening period. Uptake of  
18  
19 127 breast CS was determined by asking, ‘Have you ever undergone a mammography for  
20  
21 128 control without any symptoms?’. Women who answered affirmatively were asked a  
22  
23 129 second question, ‘When was the last time you had a mammography?’. Women who  
24  
25 130 reported that they had undergone their most recent mammography within the previous  
26  
27 131 two years were considered as ‘uptake’, as corresponds to women who comply with the  
28  
29 132 recommended screening period.

31 133 The questionnaire also contained items on services utilization during pregnancy  
32  
33 134 and childbirth. Access to antenatal and postnatal care was assessed by number and timing  
34  
35 135 of examination, such as time of first pregnancy appointment, number of prenatal visits  
36  
37 136 and ecographies, antenatal care by health-care professionals including general practitioner  
38  
39 137 (GP), gynecologist, nurse, midwife/obstetrician, or other care providers, prenatal  
40  
41 138 screening and diagnostic testing (i.e. maternal serum markers such as beta human  
42  
43 139 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis, etc.),  
44  
45 140 smoking habits during pregnancy, counseling on infant feeding and postpartum  
46  
47 141 contraceptive methods, reasons of access to maternal and newborn healthcare services  
48  
49 142 (family planning centers and child care service centers). All information was self-  
50  
51 143 reported.

53 144 The study protocol was ratified by the Institutional Ethical Committee (‘Mater  
54  
55 145 Domini’ Hospital of Catanzaro, Italy) (20/04/2012).

1  
2  
3 146 *Statistical analysis*  
4

5 147 Descriptive statistics were presented to give an overview of the study  
6  
7 148 participants. Bivariate analysis was done to find the potential relationship between the  
8  
9 149 explanatory variables and the outcome variable.

10  
11 150 Multivariate stepwise logistic regression analysis was performed. One model was  
12  
13 151 developed including those variables potentially associated with having received cervical  
14  
15 152 CS through Pap smear in the previous three years (Model 1) (0 = no, 1 = yes). Model  
16  
17 153 building strategy and particularly ways to include independent variables in the model  
18  
19 154 (ordinal or categorical) took into account how each of these ways better fitted the data at  
20  
21 155 the bivariate analysis and we chose that way in the multivariate analysis. In the model the  
22  
23 156 explanatory variables included were the following: age (continuous), marital status (1 =  
24  
25 157 married, 2 = other), children (1 = no, 2 = yes), education level (ordinal: 1 =  $\leq 7$  yy, 2 = 8-  
26  
27 158 13 yy, 3 = university degree), employment status (four categories: 1 = unemployed, 2 =  
28  
29 159 housekeeper, caregiver, 3 = manual worker; 4 = sedentary workers) included as a dummy  
30  
31 160 variable with the unemployed being the reference category, nationality (four categories: 1  
32  
33 161 = European, 2 = African, 3 = Asiatic and Oceanic, 4 = South American) included as a  
34  
35 162 dummy variable with the European being the reference category, length of stay in Italy  
36  
37 163 (ordinal: 1 = 1-2 yy, 2 = 3-5 yy, 3 = 6-8 yy, 4 =  $\geq 9$  yy), self-reported legal status (1 =  
38  
39 164 regular, 2 = irregular), chronic diseases (1 = no, 2 = yes), physical activity (1 = no, 2 =  
40  
41 165 yes), current smoker (1 = no, 2 = yes), alcohol consumption in the previous 30 days (1 =  
42  
43 166 no, 2 = yes). The significance level for variables entering the logistic regression models  
44  
45 167 was set at 0.2 and for removal from the model at 0.4. Adjusted odds ratio (ORs) and 95%  
46  
47 168 confidence intervals (CIs) were calculated. The data were analyzed using the Stata  
48  
49 169 software program, version 11.2.<sup>20</sup>

50  
51  
52 170 **Results**

53  
54 171 The participants were between the ages of 18 and 70 (mean 40.1 y) and only  
55  
56 172 13.7% had obtained university degree. More than half (55.9%) of women were

1  
2  
3 173 housekeepers or caregivers. A low percentage (11.1%) declared to be irregular. 164  
4  
5 174 (32.6%) had been living in Italy for 9 years or more. Paid employment was the most  
6  
7 175 common reason for migration (65.8%) among participants. Most women were from  
8  
9 176 Europe (46.5%) and main country of origin was Ukraine (25.8%). Only 14.7% were  
10  
11 177 current smokers. The vast majority of women (70.6%) reported no alcohol drinking in the  
12  
13 178 previous 30 days. About 48% of the respondents were affected by chronic diseases.

14  
15 179 Of the 503 immigrant women who were approached for the study, 492 met at  
16  
17 180 least one of the inclusion criterion and 464 were enrolled, giving a participation rate of  
18  
19 181 94.3%.

20  
21 182 Table 1 shows results on CS practices. Rates of CS were low for cervical as well  
22  
23 183 as breast cancer. On eligible study population, 39.1% and 45.6% had had cervical or  
24  
25 184 breast CS, respectively. About one third of immigrant women (32.3%) have experienced  
26  
27 185 a Pap-test for screening purposes within three years from interview. Among those who  
28  
29 186 had had a mammogram, less than one quarter (20.8%) had their mammography within the  
30  
31 187 recommended time interval of two years. Among eligible immigrants, pap smear in the  
32  
33 188 previous three years was significantly more likely in South American (OR=8.36; 95% CI  
34  
35 189 1.99-35.06; p=0.004) and Asian (OR=0.41; 95% CI 0.22-0.76; p=0.005) female  
36  
37 190 immigrants with greater duration of residence in Italy (OR=1.60; 95% CI 1.29-1.97;  
38  
39 191 p<0.001) (Table 2).

40  
41 192 Table 3 shows main pregnancy, prenatal and post-birth care characteristics of the  
42  
43 193 eligible population. The number of immigrant women who delivered in Italy at least once  
44  
45 194 was 123. About 80% of the respondents did not report difficulties of access and use of  
46  
47 195 prenatal and postpartum services. In terms of prenatal care, 70.9% of immigrant women  
48  
49 196 had their first pregnancy appointment within 12 weeks of pregnancy and 84.2% had two  
50  
51 197 or more prenatal visits. Only 12.9% of mothers underwent fewer than two prenatal  
52  
53 198 ultrasound checks. More than half (56.3%) of pregnant women were not submitted to  
54  
55 199 prenatal diagnostic testing (maternal serum markers such as beta human chorionic  
56  
57  
58  
59  
60

1  
2  
3 200 gonadotropin, pregnancy-associated plasma protein A, amniocentesis). Only about a third  
4  
5 201 (27%) of respondents participated to prepartum course/prenatal class, although Italian  
6  
7 202 National Health Service guarantees free access to this healthcare service. The vast  
8  
9 203 majority (79.7%) were nonsmokers before pregnancy. With regard to postpartum care,  
10  
11 204 79.8% of the respondents reported a visit within 12 months from delivery. 85 (69.6%)  
12  
13 205 mothers chose breastfeeding only and less than half (45.9%) of participants received  
14  
15 206 counseling on postpartum contraceptive methods. More than half (54.5%) used family  
16  
17 207 planning centers; the vast majority (86%) of mothers selected pediatrician like their  
18  
19 208 child's physician, whereas the remaining part of the sample preferred specialist or a  
20  
21 209 maternal healthcare centre physician or none at all. Moreover, among immigrant women  
22  
23 210 with children living in Italy, 207 (96.7%) chose to immunize their children with infants'  
24  
25 211 mandatory and recommended vaccinations included in the national programs.

## 212 **Discussion**

213         The present study sought to describe cancer screening (CS) practices and  
214         antenatal care services use among a sample of age eligible immigrant women in the South  
215         of Italy.

216         The existence of a notable difference in preventive practice utilization and  
217         motherhood protection according to immigration status has been reported in previous  
218         studies.<sup>21-24</sup> Immigrant women may not be accustomed to having regular health check-ups  
219         in their home countries and may be less familiar with the opportunity of routine screening  
220         to detect health problems before the onset of symptoms.<sup>25</sup> These shortcomings may  
221         reduce the women's ability to maintain their health in specific periods during the lifetime  
222         (e.g. during pregnancy) and to participate in preventive care.

223         In our immigrants sample, adherence to screening recommended practices is  
224         discernibly much lower than those reported in several studies<sup>4,26</sup> and than those of the  
225         Italian native populations.<sup>27</sup> Indeed, the percentage of Italian women who underwent  
226         routine cervical and breast CS were 77% and 71%, respectively.<sup>27</sup> It is obvious that the

1  
2  
3 227 populations could be different with respect to cultural and socioeconomic factors, but the  
4  
5 228 participation is slightly lower for immigrants than for native regional populations. In Italy  
6  
7 229 there is a geographical difference in CS coverage, with the highest percentage of women  
8  
9 230 who actually participate in them being in the north of the country and the lowest in the  
10  
11 231 south.<sup>28</sup> Low coverage for CS in our sample may be also related to the only recently  
12  
13 232 organized screening program in Southern regions. In our area of study, among native  
14  
15 233 citizens, CS for early detection of breast and cervical cancers has reached less than half of  
16  
17 234 the target population: regional figures have shown that cervical and breast CS rates had  
18  
19 235 decreased to 34.5% and 49.9%, respectively.

20  
21 236 Only less than one-third of the sample had received CS at the recommended time  
22  
23 237 intervals, and for this reason efforts should be made to emphasize that it is not enough to  
24  
25 238 get screened once or sporadically.

26  
27 239 The duration of residence in the host country may be a significant predictor of  
28  
29 240 whether an individual migrant adheres to the CS program.<sup>29</sup> The results of our study  
30  
31 241 indicate that being a recent immigrant is a barrier to receiving cervical CS. Certainly  
32  
33 242 women that have spent more time in Italy may be more likely to be proficient in the  
34  
35 243 Italian language, and therefore feel more confident approaching the Italian health-care  
36  
37 244 system. Hence it would be prudent to provide immigrants with culturally sensitive and  
38  
39 245 specific information to overcome any barriers. Organized screening programs may help to  
40  
41 246 reduce “ethnic” disparities by offering a systematic (and free) examination to all the  
42  
43 247 women of the target age groups, and by using specific strategies to reach the most  
44  
45 248 underserved women. The importance of invitation letters has been mentioned,<sup>30,31</sup> and one  
46  
47 249 way of overcoming a language barrier is to send the letter written in the language of the  
48  
49 250 individual migrant as well as that of the country in which they reside.

50  
51 251 Our study showed that South American immigrant women had a lower rate of  
52  
53 252 Pap testing when compared with European immigrant women. The Pap smear is a more  
54  
55 253 personal and invasive procedure that may pose particular cultural barriers and thus can

1  
2  
3 254 hinder these women from obtaining the appropriate services.<sup>32</sup> Culturally tailored  
4  
5 255 messages are important to promote screening in specific ethnic groups to enable the  
6  
7 256 identification of the target group with these messages. The message must reflect the same  
8  
9 257 values and beliefs of the target group, and it should accommodate literacy levels to ensure  
10  
11 258 comprehension. Working closely with the target group is also crucial to ensure screening  
12  
13 259 participation. It would be important for program developers to contact ethnic group  
14  
15 260 gatekeepers, such as key religious or community leaders.

16  
17 261 Immigrant women in our study have experienced an acceptable level of care  
18  
19 262 during pregnancy and childbirth. Indeed, every woman living in Italy, either Italian or  
20  
21 263 foreign, is entitled to motherhood protection, and has the right to participate in a specific  
22  
23 264 programme of care during pregnancy and up to one month after delivery. The provided  
24  
25 265 activities are free and include obstetrical examinations, echographies, instrumental check-  
26  
27 266 ups and tests, childbirth preparation course assistance during labour and childbirth, etc..  
28  
29 267 In the present study, immigrants were sampled through the third sector and non-profit  
30  
31 268 organizations (NPOs) who work to facilitate immigrants access to healthcare,  
32  
33 269 representing a culturally appropriate channel to increase access, particularly during  
34  
35 270 pregnancy. We also found that education and advice for breastfeeding and newborn care  
36  
37 271 could be improved in our sample.

38  
39 272 In general, one way of reducing barriers for participation would be for health-care  
40  
41 273 professionals to introduce immigrant women to preventive care. In particular, GPs could  
42  
43 274 play an important role in this respect, especially when one takes into account that a  
44  
45 275 survey conducted among immigrant populations in the same area showed that 85% of the  
46  
47 276 sample had access to a GP at least once, indicating that immigrants in our area of study  
48  
49 277 had adequate access to primary care.<sup>19</sup> As a result, the acculturation process into the  
50  
51 278 health-care system could be shortened.

52  
53 279 *Strength and limitations of the study*

1  
2  
3 280 The strengths of the study lie in the enrollment technique and the high  
4  
5 281 participation rate. The questionnaires were completed by a physician who was not  
6  
7 282 involved in the provision of health care, and helped by a linguistic and cultural mediator.  
8  
9 283 This probably made participants feel safe enough to report all aspects of the preventive  
10  
11 284 health care they received. Furthermore, since linguistic and cultural mediators were  
12  
13 285 available, immigrants who did not speak Italian or who had low literacy levels have not  
14  
15 286 been excluded from the study. The almost 92.3% participation rate is extremely  
16  
17 287 satisfactory and restricts one major potential source of bias in the results. Participation  
18  
19 288 rate remains an important indicator of survey quality, and we believe that the time and  
20  
21 289 effort spent by survey researchers to improve it and the extreme importance of the topic  
22  
23 290 surveyed has made this possible.

24  
25 291 Our findings are subject to some limitations. First, we used a convenience  
26  
27 292 sampling method, and this factor limits the generalizability of the results. Furthermore,  
28  
29 293 we chose locations of focus due to logistical constraints, and, therefore, the study sample  
30  
31 294 was composed of people connected to NPOs that assist migrant population and also  
32  
33 295 mediated healthcare encounters. Therefore the views expressed may be different from  
34  
35 296 migrants who have no such connection to those organizations. We found that the vast  
36  
37 297 majority of participants had a regular residence permit and, consequently, health  
38  
39 298 insurance coverage, and we acknowledge that irregular immigrants have been  
40  
41 299 underrepresented. Therefore, the sample may not be representative of all immigrants  
42  
43 300 within the region, but only of those connected to NPOs and with a regular stay permit.

44  
45 301 Moreover, the cross-sectional design of our study could not capture temporal  
46  
47 302 changes in the ability of immigrants to use and access health services. There may be an  
48  
49 303 effect of recall bias on self reported information about CS screening practices: patients  
50  
51 304 frequently tend to over-report their use of Pap test or mammogram and underreport the  
52  
53 305 time lapse since their last screening. We have attempted to minimize these biases by  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 306 conducting the survey with the use of access measures that are less subjective and  
4  
5 307 measure patient experience, not simply satisfaction.  
6

7 308 **Conclusion**

8  
9 309 Even with these potential limitations, this study provides currently unavailable  
10  
11 310 information about adherence to CS and maternal and child health that could encourage  
12  
13 311 future research to develop and test culturally appropriate, women-centered strategies for  
14  
15 312 promoting timely and regular CS among immigrant women in Italy.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



1  
2  
3 313 **List of abbreviations**

4  
5 314 CS: cancer screening; GP: general practitioner; OR: odds ratio; CI: confidence interval;  
6  
7 315 NPO: non-profit organization.

8  
9 316 **Acknowledgements**

10  
11 317 The authors would like to give thanks to all cultural and linguistic mediators and to the  
12  
13 318 staff at non-profit organizations who contributed to the survey, as well as special thanks  
14  
15 319 to all of the study participants.

16  
17 320 **Authors' contributions**

18  
19 321 AB participated in the conception and design of the study, collected the data, contributed  
20  
21 322 to the data analysis and its interpretation, and wrote the first draft of the article. CGAN,  
22  
23 323 EL and CP collected the data, and contributed to the data analysis and interpretation. MP  
24  
25 324 designed the study, was responsible for the data analysis and interpretation, and wrote the  
26  
27 325 article. AB and MP are guarantors for the study.

28  
29 326 **Funding**

30  
31 327 This research did not receive any specific grant from funding agencies in the public,  
32  
33 328 commercial, or not-for-profit sectors.

34  
35 329 **Competing interests**

36  
37 330 All authors have completed the ICMJE uniform disclosure form  
38  
39 331 at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for  
40  
41 332 the submitted work; no financial relationships with any organisations that might have an  
42  
43 333 interest in the submitted work in the previous three years; no other relationships or  
44  
45 334 activities that could appear to have influenced the submitted work.

46  
47 335 **Data sharing statement**

48  
49 336 Survey data was not included in the present article and are available from the authors.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

337 **References**

- 338 1. United Nations, Population Division, Department of Economic and Social Affairs  
339 (UN DESA) – Trends in International Migrants Stock: The 2015 Revision  
340 (POP/DB/MIG/Stock/Rev.2015, Table  
341 1).[http://www.un.org/en/development/desa/population/migration/data/estimates2/  
342 data/UN\\_MigrantStockTotal\\_201](http://www.un.org/en/development/desa/population/migration/data/estimates2/data/UN_MigrantStockTotal_201). Accessed December 6, 2016.
- 343 2. Bustreo F. Promoting health through the life-course. Ten top issues for women's  
344 health. World Health Organization. [http://www.who.int/life-  
345 course/news/commentaries/2015-intl-womens-day/en/](http://www.who.int/life-course/news/commentaries/2015-intl-womens-day/en/). Accessed November 22,  
346 2016.
- 347 3. Almeida LM, Caldas JP, Ayres-de-Campos D, Dias S. Assessing maternal  
348 healthcare inequities among migrants: a qualitative study. *Cad Saude Publica*  
349 2014;30:333-40. doi: 10.1590/0102-311X00060513
- 350 4. Harcourt N, Ghebre RG, Whembolua GL, Zhang Y, Warfa Osman S, Okuyemi  
351 KS. Factors associated with breast and cervical cancer screening behavior among  
352 African immigrant women in Minnesota. *J Immigr Minor Health* 2014;16:450-6.  
353 doi: 10.1007/s10903-012-9766-4
- 354 5. Grillo F, Valle'e J, Chauvin P. Inequalities in cervical cancer screening for  
355 women with or without a regular consulting in primary care for gynaecological  
356 health, in Paris, France. *Prev Med* 2012;54:259-65.  
357 doi:10.1016/j.ypmed.2012.01.013
- 358 6. Norredam M, Nielsen SS, Krasnik A. Migrants' utilization of somatic healthcare  
359 services in Europe—a systematic review. *Eur J Public Health* 2010;20:555-63. doi:  
360 10.1093/eurpub/ckp195

- 1  
2  
3 361 7. Schueler KM, Chu PW, Smith-Bindman R. Factors associated with  
4  
5 362 mammography utilization: a systematic quantitative review of the literature. *J*  
6  
7 363 *Womens Health (Larchmt)* 2008;17:1477-98. doi: 10.1089/jwh.2007.0603  
8  
9 364 8. Kristiansen M, Thorsted BL, Krasnik A, von Euler-Chelpin M. Participation in  
10  
11 365 mammography screening among migrants and non-migrants in Denmark. *Acta*  
12  
13 366 *Oncol* 2012;51:28-36. doi: 10.3109/0284186X.2011.626447  
14  
15  
16 367 9. Ghafoor A, Jemal A, Ward E, Cokkinides V, Smith R, Thun M. Trends in breast  
17  
18 368 cancer by race and ethnicity. *CA Cancer J Clin* 2003;53:342-55. doi:  
19  
20 369 10.3322/canjclin.53.6.342  
21  
22 370 10. Nerbs MV, Mark HF. Breast cancer among Asian women. *Med Health RI*  
23  
24 371 1996;79:388-91.  
25  
26  
27 372 11. O'Malley MS, Earp JA, Hawley ST, Chell MI, Mathews HF, Mitchell J. The  
28  
29 373 association of race/ethnicity, socioeconomic status, and physician  
30  
31 374 recommendation for mammography: Who gets the message about breast cancer  
32  
33 375 screening? *Am J Public Health* 2001;91:49-54.  
34  
35 376 12. Frisby CM. Messages of hope: Health communications strategies that address  
36  
37 377 barriers preventing black women from screening for breast cancer. *J Black Stud*  
38  
39 378 2002;32:489-505. <http://www.jstor.org/stable/3180949>. Accessed December 4,  
40  
41 379 2016.  
42  
43  
44 380 13. Gibson-Helm ME, Teede HJ, Cheng IH, et al. Maternal health and pregnancy  
45  
46 381 outcomes comparing migrant women born in humanitarian and non humanitarian  
47  
48 382 source countries: a retrospective, observational study. *Birth* 2015;42:116-24. doi:  
49  
50 383 10.1111/birt.12159  
51  
52 384 14. Yuan B, Qian X, Thomsen S. Disadvantaged populations in maternal health in  
53  
54 385 China who and why? *Glob Health Action* 2013;6:19542. doi:  
55  
56 386 10.3402/gha.v6i0.19542  
57  
58  
59  
60

- 1  
2  
3 387 15. Kusuma YS, Kumari R, Kaushal S. Migration and access to maternal healthcare:  
4 388 determinants of adequate antenatal care and institutional delivery among socio-  
5 389 economically disadvantaged migrants in Delhi, India. *Trop Med Int Health*  
6 390 2013;18:1202-10. doi: 10.1111/tmi.12166
- 7  
8  
9  
10  
11 391 16. Lauria L, Bonciani M, Spinelli A, Grandolfo ME. Inequalities in maternal care in  
12 392 Italy: the role of socioeconomic and migrant status. *Ann Ist Super Sanita*  
13 393 2013;49:209-18. doi: 10.4415/ANN\_13\_02\_12
- 14  
15  
16  
17  
18 394 17. Singh PK, Rai RK, Singh L. Examining the effect of household wealth and  
19 395 migration status on safe delivery care in urban India, 1992–2006. *PLoS One*  
20 396 2012;7:e44901. doi: 10.1371/journal.pone.0044901
- 21  
22  
23  
24 397 18. The World Bank. 2011. The World Bank. <http://data.worldbank.org/>. Accessed  
25 398 July 22, 2014.
- 26  
27  
28 399 19. Bianco A, Larosa E, Pileggi C, Nobile CG, Pavia M. Utilization of health-care  
29 400 services among immigrants recruited through non-profit organizations in  
30 401 southern Italy. *Int J Public Health* 2016;61:673-82. doi: 10.1007/s00038-016-  
31 402 0820-1
- 32  
33  
34  
35  
36 403 20. StataCorp. Stata: Release 11. Statistical Software. 2009, College Station, TX:  
37 404 StataCorp LP.
- 38  
39  
40 405 21. Ricardo-Rodrigues I, Jiménez-García R, Hernández-Barrera V, Carrasco-Garrido  
41 406 P, Jiménez-Trujillo I, López de Andrés A. Social disparities in access to breast  
42 407 and cervical cancer screening by women living in Spain. *Public Health*  
43 408 2015;129:881-8. doi: 10.1016/j.puhe.2015.02.021
- 44  
45  
46  
47  
48 409 22. Rondet C, Lapostolle A, Soler M, Grillo F, Parizot I, Chauvin P. Are immigrants  
49 410 and nationals born to immigrants at higher risk for delayed or no lifetime breast  
50 411 and cervical cancer screening? The results from a population-based survey in  
51 412 Paris metropolitan area in 2010. *PLoS One* 2014;9:e87046; doi:  
52 413 10.1371/journal.pone.0087046. eCollection 2014.

- 1  
2  
3 414 23. Bollini P, Pampallona S, Wanner P, Kupelnick B. Pregnancy outcome of migrant  
4  
5 415 women and integration policy: a systematic review of the international literature.  
6  
7 416 Soc Sci Med 2009;68:452-61. doi: 10.1016/j.socscimed.2008.10.018  
8  
9 417 24. Almeida LM, Caldas J, Ayres-de-Campos D, Salcedo-Barrientos D, Dias S.  
10  
11 418 Maternal healthcare in migrants: a systematic review. *Matern Child Health J*  
12  
13 419 2013;17:1346-54. doi: 10.1007/s10995-012-1149-x  
14  
15 420 25. Feldstein AC, Vogt TM, Aickin M, Hu WR. Mammography screening rates  
16  
17 421 decline: A person-time approach to evaluation. *Prev Med* 2006;43:178-82;  
18  
19 422 doi:10.1016/j.ypmed.2006.03.009  
20  
21 423 26. Hasnain M, Menon U, Ferrans CE, Szalacha L. Breast cancer screening practices  
22  
23 424 among first-generation immigrant muslim women. *J Womens Health (Larchmt)*  
24  
25 425 2014;23:602-12. doi: 10.1089/jwh.2013.4569  
26  
27 426 27. Campostrini S, Carrozzi G, Salmaso S, Severoni S. (a cura di) *Malattie croniche*  
28  
29 427 *e migranti in Italia. Rapporto sui comportamenti a rischio, prevenzione e*  
30  
31 428 *diseguaglianze di salute, Organizzazione Mondiale della Sanità - Istituto*  
32  
33 429 *Superiore della Sanità - Università Ca' Foscari, Venezia, 2015.*  
34  
35 430 28. The National Centre for Screening Monitoring Tenth Report. *Epidemiol Prev*  
36  
37 431 2012;36:1-96.  
38  
39 432 <http://www.osservatorionazionale screening.it/sites/default/files/allegati/EPv36i6s>  
40  
41 433 1.pdf. Accessed December 2, 2016.  
42  
43 434 29. Vahabi M, Lofters A, Kumar M, Glazier RH. Breast cancer screening disparities  
44  
45 435 among urban immigrants: a population-based study in Ontario, Canada. *BMC*  
46  
47 436 *Public Health* 2015;15:679. doi: 10.1186/s12889-015-2050-5  
48  
49 437 30. Blomberg K, Tishelman C, Ternstedt BM, Tornberg S, Leval A, Widmark C.  
50  
51 438 How can young women be encouraged to attend cervical cancer screening?  
52  
53 439 Suggestions from face-to-face and internet focus group discussions with 30-year-

- 1  
2  
3 440 old women in Stockholm. Sweden Acta Oncologica 2011;50:112-20. doi:  
4  
5 441 10.3109/0284186X.2010.528790  
6  
7 442 31. Everett T, Bryant A, Griffin MF, Martin-Hirsch PP, Forbes CA, Jepson RG.  
8  
9 443 Interventions targeted at women to encourage the uptake of cervical screening.  
10  
11 444 Cochrane Database of Systematic Reviews 2011;5:CD002834. doi:  
12  
13 445 10.1002/14651858.CD002834.pub2  
14  
15 446 32. Abdullahi A. Cervical screening: perceptions and barriers to uptake among  
16  
17 447 Somali women in Camden. Public Health 2009;123:680-5. doi:  
18  
19 448 10.1016/j.puhe.2009.09.011  
20  
21 449  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

450 **Table 1. Cervical and breast cancers screening practice**

<b>Cancer screening services</b>	<b>No.</b>	<b>Percent</b>
<b>Cervix<sup>†</sup></b>		
<b>Having received cervical cancer screening through Pap smear (419)</b>		
No	247	59
Yes, for control	164	39.1
Yes, I had problems	8	1.9
<b>Time since last pap test, years (418)</b>		
≤ 3	135	32.3
> 3 or never	283	67.7
<b>Breast<sup>#</sup></b>		
<b>Having received breast cancer screening through mammography (125)</b>		
No	61	48.8
Yes, for control	57	45.6
Yes, I had problems	7	5.6
<b>Time since last mammogram, years (125)</b>		
≤ 2	26	20.8
> 2 or never	99	79.2

451 <sup>†</sup> All sexually active women aged 25-64 years and having an intact uterus were eligible452 <sup>#</sup> Women aged 50-69 years were eligible

453 **Table 2. Multiple logistic regression analysis between several variables and Pap smear in the**  
 454 **previous three years**

Variable	OR	SE	95% CI	P value
<i>Model Outcome: Pap smear in the previous three years</i>				
<i>Log-likelihood = -228.62, <math>\chi^2 = 48.79</math>, P value &lt; 0.0001,</i>				
<i>No. of obs. = 402</i>				
Length of stay in Italy, ordinal	1.60	0.17	1.29-1.97	<0.001
Nationality				
European*	1.00	-	-	-
South American	8.36	6.12	1.99-35.06	0.004
Asian	0.41	0.13	0.22-0.76	0.005
Chronic diseases	1.40	0.33	0.88-2.22	0.152
Employment status				
Unemployed*	1.00	-	-	-
Housekeeper, caregiver	0.75	0.18	0.47-1.21	0.244
Manual workers	0.59	0.36	0.18-1.94	0.382
Alcohol consumption in the previous 30 days	0.76	0.20	0.45-1.28	0.302
Not married	0.79	0.19	0.50-1.27	0.336

455 \* reference category



456 **Table 3. Pregnancy, prenatal and post-birth care characteristics of the eligible women**

Characteristic	N (%)
<b>Pregnancies in Italy (123)</b>	
1	90 (73.2)
2	24 (19.5)
≥3	9 (7.3)
<b>Smoking status (123)</b>	
Nonsmoker	98 (79.7)
Smoker before pregnancy	14 (11.4)
Smoker	11 (8.9)
<b>Prepartum course participation (122)</b>	
No	89 (73)
Yes	33 (27)
<b>Visit after delivery (within 12 months) (119)</b>	
Yes	95 (79.8)
No	24 (20.2)
<b>Counseling on postpartum contraceptive methods (122)</b>	
No	66 (54.1)
Yes	56 (45.9)
<b>Infant feeding (122)</b>	
Breastfeeding only	85 (69.6)
Breastfeeding and bottle-feeding	24 (19.7)
Bottle-feeding only	13 (10.7)
<b>Utilization of family planning clinic (121)</b>	
Yes	66 (54.5)
No	55 (45.5)

457 The number of participants responding to the questions is indicated in brackets

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item N <sup>o</sup>	Recommendation	Page
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6,7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7,8
Bias	9	Describe any efforts to address potential sources of bias	13
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9,10
		(b) Indicate number of participants with missing data for each variable of interest	21,23

Outcome data	15*	Report numbers of outcome events or summary measures	9,10; 21-23
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9,10; 21-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	10-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	10-14
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

## Cervical and breast cancer screening participation and utilization of maternal health services: a cross-sectional study among immigrant women in Southern Italy

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-016306.R1
Article Type:	Research
Date Submitted by the Author:	24-Apr-2017
Complete List of Authors:	Bianco, Aida; University of Catanzaro "Magna Græcia", Department of Health Sciences Larosa, Elisabetta; University of Catanzaro "Magna Græcia", Department of Health Sciences Pileggi, Claudia; University of Catanzaro "Magna Græcia", Department of Health Sciences Nobile, Carmelo; University of Catanzaro "Magna Græcia", Department of Health Sciences PAVIA, Maria; University of Catanzaro "Magna Græcia", Department of Health Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research
Keywords:	cancer screening, immigrant, Italy, maternal health, women

SCHOLARONE™  
Manuscripts

only

1  
2  
3 1 **Cervical and breast cancer screening participation and utilization of maternal**  
4 2 **health services: a cross-sectional study among immigrant women in Southern Italy**

5  
6  
7 3

8  
9 4

10  
11 5 Aida Bianco MD, Elisabetta Larosa MD, Claudia Pileggi MD, Carmelo G. A. Nobile MD,  
12 6 Maria Pavia MD, MPH

13  
14  
15 7

16  
17 8

18  
19 9

20  
21  
22 10 Department of Health Sciences, University of Catanzaro "Magna Græcia", Campus of  
23 11 Germaneto, 88100 Catanzaro, Italy

24  
25 12

26  
27 13

28  
29 14

30  
31 15

32  
33  
34 16 Author responsible for correspondence and whom requests for reprints should be addressed:

35 17 Maria Pavia MD, MPH

36 18 Chair of Hygiene

37 19 Department of Health Sciences

38 20 Medical School

39 21 University of Catanzaro "Magna Græcia"

40 22 Via T. Campanella, 115, 88100 Catanzaro, Italy

41 23 ph +39 (0)961 712371

42 24 fax +39 (0)961 712382

43 25 e-mail [pavia@unicz.it](mailto:pavia@unicz.it)

1  
2  
3 **26 Abstract**

4  
5 **27 Objectives**

6  
7 Women make up approximately half of the world's one billion migrants. Immigrant  
8  
9 women tend to be one of the most vulnerable population groups with respect to  
10  
11 healthcare. Cancer screening (CS) and maternal and reproductive health have been  
12  
13 included among the ten main issues pertinent to women's health.

14  
15 To explore breast and cervical CS participation and to acquire information regarding  
16  
17 access to healthcare services during pregnancy, childbirth and the postpartum period  
18  
19 among age eligible immigrant women in Southern Italy.

20  
21 **35 Methods**

22  
23 A structured questionnaire was used to collect data from each participant. Women aged  
24  
25 25-64 years who had not had a hysterectomy and women aged 50-69 years were  
26  
27 considered eligible for evaluation of cervical and breast CS participation, respectively.  
28  
29 Moreover, women who had delivered at least once in Italy were enrolled to describe  
30  
31 antenatal care services use. All women were recruited through the third-sector and non-  
32  
33 profit organizations (NPOs).  
34

35  
36 **42 Results**

37  
38 Rate of cervical CS among the 419 eligible women was low (39.1%), but the vast  
39  
40 majority had had a Pap-test for screening purposes (82.3%) within a three year period  
41  
42 from interview. Regarding breast CS practices, 45.6% had had a mammography for  
43  
44 control purposes. Among these, less than half (26, 45.6%) had their mammography  
45  
46 within the recommended time interval of two years. About 80% of the respondents did  
47  
48 not report difficulties of access and use of prenatal and postpartum services.

49  
50 **49 Conclusion**

51  
52 This study provides currently unavailable information about adherence to CS and  
53  
54 maternal and child health that could encourage future research to develop and test  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

52 culturally appropriate, women-centered strategies for promoting timely and regular CS  
53 among immigrant women in Italy.

54

55 **Key words:**

56 Cancer screening, immigrant, Italy, maternal health, women.

For peer review only

1  
2  
3 57 **Strengths and limitations of this study**  
4

5 58 ■ The high participation rate (92.3%) is extremely satisfactory and restricts one  
6  
7 59 major potential source of bias in the results.

8  
9 60 ■ Immigrants who did not speak Italian or who had low literacy levels have not  
10  
11 61 been excluded from the study, helped by linguistic and cultural mediators.

12  
13 62 ■ The sample may not be representative of all immigrants within the region, but  
14  
15 63 only of those connected to non-profit organizations and with a regular stay  
16  
17 64 permit.

18  
19 65 ■ There may be an effect of recall bias on self reported information about cancer  
20  
21 66 screening practices.  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



1  
2  
3 67 **Cancer screening participation and utilization of maternal health services: a cross-**  
4  
5 68 **sectional study among immigrant women in Southern Italy**

6  
7 69 **Background**

8  
9 70 Estimates from the United Nations show that women make up approximately half  
10  
11 71 of the world's one billion migrants.<sup>1</sup> The effects of migration on women's health are  
12  
13 72 varied and hard to predict and may be determined by a number of factors: the conditions  
14  
15 73 under which the migration occurred; how well a particular individual has integrated in the  
16  
17 74 host society, the social status of the individual in the host country, and the health  
18  
19 75 conditions that are existent in the host country. Studies have indicated that women who  
20  
21 76 migrate tend to be one of the most vulnerable population groups with respect to  
22  
23 77 healthcare.<sup>2,3</sup> In particular, women who do not speak the host country language and do not  
24  
25 78 have a job are less likely to benefit from the health system of the host nation.<sup>4</sup> These  
26  
27 79 women are usually dependent on men and are unaware of the available health services.  
28  
29 80 Governments should ensure that appropriate health services are provided that adequately  
30  
31 81 address all aspects of women's health, particularly cancer screening (CS) and maternal  
32  
33 82 and reproductive health. These basic health care services have been included among the  
34  
35 83 ten main issues pertinent to women's health, whether it be in immigrants or native  
36  
37 84 inhabitants,<sup>5</sup> and they ought to be available to everyone in society in accordance with  
38  
39 85 social equality.

40  
41 86 Breast cancer is the most frequently diagnosed cancer and the leading cause of  
42  
43 87 cancer death among females worldwide, breast cancer incidence rate can be several times  
44  
45 88 higher in more developed countries compared with less developed countries. Cervical  
46  
47 89 cancer is the second most commonly diagnosed cancer and third leading cause of cancer  
48  
49 90 death among females in less developed countries. In several Western countries, cervical  
50  
51 91 cancer rates have decreased by as much as 65% over the past 40 years thanks to screening  
52  
53 92 programs.<sup>6</sup>

1  
2  
3 93 Detecting both these cancers early is key to keeping women alive and healthy.  
4  
5 94 Increased health risks have been noted among immigrants and ethnic minorities who also  
6  
7 95 may receive less healthcare than the native population,<sup>7,8</sup> whilst at the same time  
8  
9 96 numerous studies have documented lower participation in CS programs among various  
10  
11 97 migrant groups.<sup>9-11</sup> Furthermore ethnic minority women residing in Western countries are  
12  
13 98 more likely to be diagnosed with advanced-stage disease and hence have higher mortality  
14  
15 99 rates,<sup>12</sup> often as a result of lower utilization of timely CS services.<sup>13-15</sup>  
16

17  
18 Over the course of the last century there have been many tremendous  
19  
20 101 improvements in maternal and neonatal outcomes in terms of pregnancy-related  
21  
22 102 complications, maternal and infant mortality rates.<sup>16</sup> But the benefits of these have not  
23  
24 103 extended everywhere and to everyone, since significant disparities by race and ethnicity  
25  
26 104 persist. Studies on the determinants of maternal health care delivery suggest that social,  
27  
28 105 economic, behavioral, and environmental factors explain the worse health status among  
29  
30 106 migrants<sup>17-20</sup> in terms of preterm delivery, congenital anomalies, low birth weight, fetal  
31  
32 107 growth restriction, and infant mortality<sup>21-23</sup> when compared with the native population.<sup>24</sup>  
33  
34 108 In Italy, both native and foreign women, have the right to participate free of charge in a  
35  
36 109 specific programme of care during pregnancy and up to one month following delivery.

37  
38 110 The aims of this survey were to explore breast and cervical CS participation and  
39  
40 111 to acquire information regarding access to healthcare services during pregnancy,  
41  
42 112 childbirth and the postpartum period among age eligible immigrant women in Southern  
43  
44 113 Italy.

## 45 114 **Methods**

### 46 115 *Study population*

47  
48  
49 116 The survey was conducted from May 2012 until April 2013. The study  
50  
51 117 population consisted of a specific subset of immigrants. For this study, immigrants were  
52  
53 118 defined as those from low or middle-income countries according to the classification of  
54  
55 119 the World Bank based on per capita GDP.<sup>25</sup> Tourists were excluded.

1  
2  
3 120 Details regarding sampling of individuals for this study have been described  
4  
5 121 elsewhere.<sup>26</sup> Briefly, since probability or random sampling can not be carried out on  
6  
7 122 immigrants, a convenience sampling method was applied. Women aged 18 or more living  
8  
9 123 in Italy for at least 12 months were recruited through the third-sector and non-profit  
10  
11 124 organizations (NPOs) that provide support to immigrants and work to facilitate their  
12  
13 125 access to healthcare.

14  
15 126 In Italy, organized nationwide CS programs include personal invitations for a  
16  
17 127 Pap-test sent to women aged 25-64 years every three years and for mammography  
18  
19 128 screening to women aged 50-69 years every two years. Therefore, sexually active women  
20  
21 129 aged 25-64 years who had not had a hysterectomy and women aged 50-69 years without  
22  
23 130 previous diagnosis of invasive or in situ breast cancer were considered eligible for  
24  
25 131 evaluation of cervical and breast CS participation, respectively. Moreover, women who  
26  
27 132 had delivered at least once in Italy were enrolled to describe antenatal and perinatal care  
28  
29 133 services use.

#### 30 31 134 *Survey instrument*

32  
33 135 Written consent was acquired prior to interview. A structured questionnaire  
34  
35 136 (available as supplementary file) was used to collect data from each participant.  
36  
37 137 Questionnaires were administered by physicians competent in interview methods, with  
38  
39 138 help, when necessary, from a cultural mediator. The interviews lasted ten minutes on  
40  
41 139 average.

42  
43 140 A pilot study was undertaken. Validation of the survey instrument was performed  
44  
45 141 through the assessment of internal and test-retest (external) reliability in addition to face  
46  
47 142 and content validity. Test-retest reliability was checked in the pilot study through an  
48  
49 143 additional interview of 50 women within a time interval of 20 days from the first  
50  
51 144 administration of the questionnaire. Face and content validity were examined in order to  
52  
53 145 assess the clarity of the wording of the items which in turn generated new items.  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 146 Modifications were made according to the comments recorded by the women in order to  
4  
5 147 clarify the content of the questionnaire and to simplify its wording.

6  
7 148 *Outcomes and covariates*

8  
9 149 Socio-demographics included information on gender, age, marital and legal  
10  
11 150 status, education level, religion, nationality, working activity, duration of residence in  
12  
13 151 Italy. The questions on lifestyle and health status included information on physical  
14  
15 152 activity, smoking habits, alcohol consumption, chronic and infectious diseases. The  
16  
17 153 questions on participation in screening programs included breast and cervical CS  
18  
19 154 practices. Uptake of cervical CS was determined by asking ‘Have you ever undergone  
20  
21 155 Pap test for control without any symptoms?’. Women who answered affirmatively were  
22  
23 156 asked ‘When was the last time you underwent Pap test?’. Women who had undergone a  
24  
25 157 Pap test within the previous three years were considered as ‘uptake’, corresponding to  
26  
27 158 women who comply with the recommended screening period. Uptake of breast CS was  
28  
29 159 determined by asking, ‘Have you ever undergone a mammography for control without  
30  
31 160 any symptoms?’. Women who answered affirmatively were asked a second question,  
32  
33 161 ‘When was the last time you had a mammography?’. Women who reported that they had  
34  
35 162 undergone their most recent mammography within the previous two years were  
36  
37 163 considered as ‘uptake’, corresponding to women who comply with the recommended  
38  
39 164 screening period.

40  
41 165 The questionnaire also contained items on services utilization during pregnancy  
42  
43 166 and childbirth. Access to antenatal and postnatal care was assessed by number and timing  
44  
45 167 of examination, such as time of first pregnancy appointment, number of prenatal visits  
46  
47 168 and ecographies, antenatal care by health-care professionals including general practitioner  
48  
49 169 (GP), gynecologist, nurse, midwife/obstetrician, or other care providers, prenatal  
50  
51 170 screening and diagnostic testing (i.e. maternal serum markers such as beta human  
52  
53 171 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis, etc.),  
54  
55 172 smoking habits during pregnancy, counseling on infant feeding and postpartum

1  
2  
3 173 contraceptive methods, reasons for access to maternal and newborn healthcare services  
4  
5 174 (family planning centers and child care service centers). All information was self-  
6  
7 175 reported.

8  
9 176 The study protocol was ratified by the Institutional Ethical Committee ('Mater  
10  
11 177 Domini' Hospital of Catanzaro, Italy) (20/04/2012).

12  
13 178 *Statistical analysis*

14  
15 179 Descriptive statistics were presented to give an overview of the study  
16  
17 180 participants.

18  
19 181 Multivariate stepwise logistic regression analysis was performed. One model was  
20  
21 182 developed in which were included those variables potentially associated with having  
22  
23 183 received cervical CS through Pap smear in the previous three years (Model 1) (0 = no, 1 =  
24  
25 184 yes). Women that had had a pap smear not for screening purposes were included in the  
26  
27 185 "no" option of the outcome variable. The model building strategy consisted of the  
28  
29 186 following steps: 1) bivariate analysis was performed for each of the potential explanatory  
30  
31 187 variables to find out which coding (categorical, ordinal, continuous) better fitted the data  
32  
33 188 and we chose that in the multivariate analysis; 2) stepwise logistic regression with  
34  
35 189 backward elimination was performed setting the significance level for variables entering  
36  
37 190 the model at 0.2 and for removal from the model at 0.4. Adjusted odds ratio (ORs) and  
38  
39 191 95% confidence intervals (CIs) were calculated; 3) on the basis of the results of the  
40  
41 192 bivariate analysis, the coding of the explanatory variables included in the model was the  
42  
43 193 following: age (continuous), marital status (1 = married, 2 = other), children (1 = no, 2 =  
44  
45 194 yes), education level (ordinal: 1 =  $\leq 7$  yrs, 2 = 8-13 yrs, 3 = university degree),  
46  
47 195 employment status (four categories: 1 = unemployed, 2 = housekeeper, caregiver, 3 =  
48  
49 196 manual worker; 4 = sedentary workers) included as a dummy variable with the  
50  
51 197 unemployed being the reference category, nationality (four categories: 1 = European, 2 =  
52  
53 198 African, 3 = Asian, 4 = South American) included as a dummy variable with the  
54  
55 199 European being the reference category, length of stay in Italy (ordinal: 1 = 1-2 yrs, 2 = 3-

1  
2  
3 200 5 yrs, 3 = 6-8 yrs, 4 =  $\geq$  9 yrs), self-reported legal status (1 = regular, 2 = irregular),  
4  
5 201 chronic diseases (1 = no, 2 = yes), physical activity (1 = no, 2 = yes), current smoker (1 =  
6  
7 202 no, 2 = yes), alcohol consumption in the previous 30 days (1 = no, 2 = yes). The data  
8  
9 203 were analyzed using the Stata software program, version 11.2.<sup>27</sup>

#### 10 11 204 Results

12  
13 205 Of the 503 immigrant women who were approached for the study, 492 met at  
14  
15 206 least one of the inclusion criteria and 464 were enrolled, giving a participation rate of  
16  
17 207 94.3%. The participants were between the ages of 18 and 70 years (mean 40.1 yrs) and  
18  
19 208 only 13.7% had obtained university degree. More than half (55.9%) of women were  
20  
21 209 housekeepers or caregivers. A low percentage (11.1%) declared to be irregular. 164  
22  
23 210 (32.6%) had been living in Italy for 9 years or more. Paid employment was the most  
24  
25 211 common reason for migration (65.8%) among participants. Most women were from  
26  
27 212 Europe (46.5%) and the main country of origin was Ukraine (25.8%). Only 14.7% were  
28  
29 213 current smokers. The vast majority of women (70.6%) reported no alcohol drinking in the  
30  
31 214 previous 30 days. About 48% of the respondents were affected by chronic diseases.

32  
33 215 Three different sub-groups were included in the final sample: sexually active  
34  
35 216 women between 25-64 years of age without hysterectomy that were eligible for  
36  
37 217 participation in cervical CS (419); women aged 50-69 years without previous diagnosis of  
38  
39 218 invasive or in situ breast cancer that were eligible for participation in breast CS (125); and  
40  
41 219 women of any age who had delivered at least once in Italy that were eligible to access  
42  
43 220 antenatal and perinatal care services (123). Seven women were part of the three sub-  
44  
45 221 groups.

46  
47 222 The mean age of the population eligible for cervical CS was 41.1 years with an  
48  
49 223 age range between 25 and 64 years. More than half (58.1%) were married and 247  
50  
51 224 (58.9%) had completed high school. About 60% were housekeepers or caregivers. Rate of  
52  
53 225 cervical CS among the 419 eligible women was low (39.1%), but the vast majority had  
54  
55 226 had a Pap-test for screening purposes (82.3%) within a three year period from interview

1  
2  
3 227 (Table 1). Having had a routine pap smear in the previous three years was significantly  
4  
5 228 more likely in South American women (OR=8.36; 95% CI 1.99-35.06; p=0.004)  
6  
7 229 compared with European female immigrants with longer duration of residence in Italy  
8  
9 230 (OR=1.60; 95% CI 1.29-1.97; p<0.001) whereas a lower probability of cervical CS  
10  
11 231 participation was found in Asian females (OR=0.41; 95% CI 0.22-0.76; p=0.005)  
12  
13 232 compared with European women (Table 2).

14  
15 233 Among the 125 women considered eligible for breast CS, 43.2% were married  
16  
17 234 and 71 (56.4%) had completed high school. More than three quarter (85.7%) were  
18  
19 235 practicing Christians religion and 65.1% were from Europe. More than half (51.6%) had  
20  
21 236 been living in Italy for 9 years or more and the vast majority (86.5%) had a regular  
22  
23 237 residence permit. Regarding breast CS practices, 45.6% had had a mammography for  
24  
25 238 control purposes. Among these, less than half (26, 45.6%) had their mammography  
26  
27 239 within the recommended time interval of two years (Table 1).

28  
29 240 Table 3 shows main pregnancy, prenatal and post-birth care characteristics of the  
30  
31 241 eligible population. The number of immigrant women who delivered in Italy at least once  
32  
33 242 was 123. The mean age of the population eligible was 34.9 years with an age range  
34  
35 243 between 19 and 54 years. About 80% of the respondents did not report difficulties of  
36  
37 244 access and use of prenatal and postpartum services. In terms of prenatal care, 70.9% of  
38  
39 245 immigrant women had their first pregnancy appointment within 12 weeks of pregnancy  
40  
41 246 and 84.2% had two or more prenatal visits. Only 12.9% of mothers underwent fewer than  
42  
43 247 two prenatal ultrasound checks. More than half (56.3%) of pregnant women were not  
44  
45 248 submitted to prenatal diagnostic testing (maternal serum markers such as beta human  
46  
47 249 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis) (data not  
48  
49 250 shown). Only about a third (27%) of respondents participated in prepartum  
50  
51 251 course/prenatal class, although Italian National Health Service guarantees free access to  
52  
53 252 this healthcare service. The vast majority (86%) of mothers chose a pediatrician such as  
54  
55 253 their child's physician as caregiver, whereas the remaining part of the sample preferred a

1  
2  
3 254 specialist or a maternal healthcare centre physician or none at all. Moreover, among  
4  
5 255 immigrant women with children living in Italy (122), 115 (94.3%) chose to immunize  
6  
7 256 their children with mandatory and recommended vaccinations for infants included in the  
8  
9 257 national programs.

## 10 258 **Discussion**

11  
12  
13 259 The present study sought to describe CS practices, antenatal and perinatal care  
14  
15 260 services use among a sample of age eligible immigrant women in the South of Italy.

16  
17 261 The existence of a notable difference in preventive practice utilization and  
18  
19 262 motherhood protection according to immigration status has been reported in previous  
20  
21 263 studies.<sup>21, 28-30</sup> Immigrant women may not be accustomed to having regular health check-  
22  
23 264 ups in their home countries and may be less familiar with the opportunity of routine  
24  
25 265 screening to detect health problems before the onset of symptoms.<sup>31</sup> These shortcomings  
26  
27 266 may reduce the women's ability to maintain their health in specific periods during their  
28  
29 267 lifetime (e.g. during pregnancy) and to participate in preventive care.

30  
31 268 In our immigrant sample, adherence to screening recommended practices is  
32  
33 269 discernibly much lower than those reported in several studies<sup>6,32</sup> and lower than those of  
34  
35 270 the Italian native populations.<sup>33</sup> Indeed, the percentage of Italian women who underwent  
36  
37 271 routine cervical and breast CS were 77% and 71%, respectively.<sup>33</sup> It is possible that the  
38  
39 272 differences between our sample population and other samples studies could be due to  
40  
41 273 differences in cultural and socioeconomic factors. Furthermore, one must consider that in  
42  
43 274 Italy there is a geographical difference in CS coverage, with the highest percentage of  
44  
45 275 women who actually participate in them being in the north of the country and the lowest  
46  
47 276 in the south.<sup>34</sup> One reason for the low coverage for CS in our sample may be due to the  
48  
49 277 fact that in the regions in the South of the country, a screening program has only recently  
50  
51 278 been organized. In fact in our area of study, among native citizens, CS for early detection  
52  
53 279 of breast and cervical cancers has reached less than half of the target population: regional  
54  
55 280 figures have shown that cervical and breast CS rates had decreased to 58.3%<sup>35</sup> and



1  
2  
3 281 49.7%<sup>36</sup>, respectively. Although these are much lower than the national figures,  
4  
5 282 nonetheless, they are still higher than those of the immigrant women in our sample.

6  
7 283 Only less than half of the sample had received breast CS at the recommended  
8  
9 284 time intervals, and for this reason efforts should be made to emphasize that it is not  
10  
11 285 enough to get screened once or sporadically.

12  
13 286 The duration of residence in the host country may be a significant predictor of  
14  
15 287 whether an individual migrant adheres to the CS program.<sup>37</sup> The results of our study  
16  
17 288 indicate that being a recent immigrant is a barrier to receiving cervical CS. Certainly  
18  
19 289 women that have spent more time in Italy may be more likely to be proficient in the  
20  
21 290 Italian language, and therefore feel more confident approaching the Italian health-care  
22  
23 291 system. Hence it would be prudent to provide immigrants with culturally sensitive and  
24  
25 292 specific information to overcome any barriers. Organized screening programs may help to  
26  
27 293 reduce “ethnic” disparities by offering a systematic (and free) examination to all the  
28  
29 294 women of the target age groups, and by using specific strategies to reach the most  
30  
31 295 underserved women. The importance of invitation letters has been mentioned,<sup>38,39</sup> and one  
32  
33 296 way of overcoming a language barrier is to send the letter written in the language of the  
34  
35 297 individual migrant as well as that of the country in which they reside.

36  
37 298 Our study showed that Asian immigrant women had a lower rate of Pap testing  
38  
39 299 when compared with European immigrant women. The Pap smear is a more personal and  
40  
41 300 invasive procedure that may pose particular cultural barriers and thus can hinder these  
42  
43 301 women from obtaining the appropriate services.<sup>40</sup> Culturally tailored messages are  
44  
45 302 important to promote screening in specific ethnic groups to enable the identification of  
46  
47 303 the target group with these messages. The message must reflect the same values and  
48  
49 304 beliefs of the target group, and it should accommodate literacy levels to ensure  
50  
51 305 comprehension. Working closely with the target group is also crucial to ensure screening  
52  
53 306 participation. It would be important for program developers to contact ethnic group  
54  
55 307 gatekeepers, such as key religious or community leaders.

1  
2  
3 308 Immigrant women in our study have experienced an acceptable level of care  
4  
5 309 during pregnancy and childbirth. We also found that education and advice for  
6  
7 310 breastfeeding and newborn care could be improved in our sample.

8  
9 311 In general, one way of reducing barriers for participation would be for health-care  
10  
11 312 professionals to introduce immigrant women to preventive care. In particular, GPs could  
12  
13 313 play an important role in this respect, especially when one takes into account that a  
14  
15 314 survey conducted among immigrant populations in the same area showed that 85% of the  
16  
17 315 sample had access to a GP at least once, indicating that immigrants in our area of study  
18  
19 316 had adequate access to primary care.<sup>26</sup> As a result, the acculturation process into the  
20  
21 317 health-care system could be shortened.

#### 22 23 318 *Strength and limitations of the study*

24  
25 319 The strengths of the study lie in the enrolment technique and the high  
26  
27 320 participation rate. A physician not involved in providing health care to the migrants was  
28  
29 321 chosen to complete the questionnaire as it was our belief that this would make the  
30  
31 322 participants more confident in reporting all aspects of health care they had received.  
32  
33 323 Furthermore, the physician was supported by linguistic and cultural mediators to help  
34  
35 324 those who could not speak Italian or with low literacy skills. Moreover, the 92.3%  
36  
37 325 participation rate is very satisfactory, reducing a major source of bias, and we believe this  
38  
39 326 is related to the great efforts of the survey researchers in promoting migrant involvement  
40  
41 327 in the study.

42  
43 328 Our findings are subject to some limitations. First, we used a convenience  
44  
45 329 sampling method, and this factor limits the generalizability of the results. Furthermore,  
46  
47 330 we chose locations of focus due to logistical constraints, and, therefore, the study sample  
48  
49 331 was composed of people connected to NPOs that assist migrant population and also  
50  
51 332 mediated healthcare encounters. Therefore the views expressed may be different from  
52  
53 333 migrants who have no such connection to those organizations. Furthermore, a large  
54  
55 334 proportion of our migrant participants had a regular residence permit which carries with it

1  
2  
3 335 health insurance cover, which again is not the case with irregular immigrants. Therefore,  
4  
5 336 the sample may not be representative of all immigrants within the region, but only of  
6  
7 337 those connected to NPOs and with a regular stay permit.

8  
9 338 Moreover, the cross-sectional design of our study could not capture temporal  
10  
11 339 changes in the ability of immigrants to use and access health services. There may be an  
12  
13 340 effect of recall bias on self reported information about CS practices: patients frequently  
14  
15 341 tend to over-report their use of Pap test or mammogram and underreport the time lapse  
16  
17 342 since their last screening. We have attempted to minimize these biases by conducting the  
18  
19 343 survey with the use of access measures that are less subjective and measure patient  
20  
21 344 experience, not simply satisfaction. Moreover, there may be women who were pregnant  
22  
23 345 in Italy some years ago and, unintentionally, gave incorrect information due to poor or  
24  
25 346 incomplete memory recall. However, given that the mean age of women in this subgroup  
26  
27 347 is 34.9 years, it is likely that the mean time from pregnancy would have been within an  
28  
29 348 acceptable time range thus minimizing recall bias.

### 31 **Conclusion**

32  
33 350 Even with these potential limitations, this study provides currently unavailable  
34  
35 351 information about preventive care utilization among immigrant women in Italy that could  
36  
37 352 encourage future research to develop and test culturally appropriate, women-centered  
38  
39 353 strategies for promoting timely and regular CS and to better understand the factors that  
40  
41 354 predict maternal and child health services utilization and identify potential targets for  
42  
43 355 intervention among immigrant women.  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 356 **List of abbreviations**

4  
5 357 CS: cancer screening; GP: general practitioner; OR: odds ratio; CI: confidence interval;  
6  
7 358 NPO: non-profit organization.

8  
9 359 **Acknowledgements**

10  
11 360 The authors would like to give thanks to all cultural and linguistic mediators and to the  
12  
13 361 staff at non-profit organizations who contributed to the survey, as well as special thanks  
14  
15 362 to all of the study participants.

16  
17 363 **Authors' contributions**

18  
19 364 AB participated in the conception and design of the study, collected the data, contributed  
20  
21 365 to the data analysis and its interpretation, and wrote the first draft of the article. CGAN,  
22  
23 366 EL and CP collected the data, and contributed to the data analysis and interpretation. MP  
24  
25 367 designed the study, was responsible for the data analysis and interpretation, and wrote the  
26  
27 368 article. AB and MP are guarantors for the study.

28  
29 369 **Funding**

30  
31 370 This research did not receive any specific grant from funding agencies in the public,  
32  
33 371 commercial, or not-for-profit sectors.

34  
35 372 **Competing interests**

36  
37 373 All authors have completed the ICMJE uniform disclosure form at  
38  
39 374 [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for the  
40  
41 375 submitted work; no financial relationships with any organisations that might have an  
42  
43 376 interest in the submitted work in the previous three years; no other relationships or  
44  
45 377 activities that could appear to have influenced the submitted work.

46  
47 378 **Data sharing statement**

48  
49 379 Survey data was not included in the present article and are available from the authors.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

380 **References**

- 381 1. United Nations, Population Division, Department of Economic and Social Affairs  
382 (UN DESA) – Trends in International Migrants Stock: The 2015 Revision  
383 (POP/DB/MIG/Stock/Rev.2015, Table  
384 1).[http://www.un.org/en/development/desa/population/migration/data/estimates2/data/  
385 UN\\_MigrantStockTotal\\_201](http://www.un.org/en/development/desa/population/migration/data/estimates2/data/UN_MigrantStockTotal_201). Accessed December 6, 2016.
- 386 2. Llacer A, Zunzunegui MV, del Amo J, Mazarrasa L, Bolumar F. The contribution of  
387 a gender perspective to the understanding of migrants' health. *J Epidemiol Community  
388 Health* 2007;61:4–10.
- 389 3. Almeida LM, Caldas JP, Ayres-de-Campos D, Dias S. Assessing maternal healthcare  
390 inequities among migrants: a qualitative study. *Cad Saude Publica* 2014;30:333-40.  
391 doi: 10.1590/0102-311X00060513
- 392 4. Bollini P, Stotzer U, Wanner P. Pregnancy outcomes and migration in Switzerland:  
393 results from a focus group study. *Int J Public Health* 2007;52:78-86
- 394 5. Bustreo F. Promoting health through the life-course. Ten top issues for women's  
395 health. World Health Organization. [http://www.who.int/life-  
396 course/news/commentaries/2015-intl-womens-day/en/](http://www.who.int/life-course/news/commentaries/2015-intl-womens-day/en/). Accessed November 22, 2016
- 397 6. Torre LA, Siegel RL, Ward EM, Jemal A. Global Cancer Incidence and Mortality  
398 Rates and Trends-An Update. *Cancer Epidemiol Biomarkers Prev* 2016;25:16-27. doi:  
399 10.1158/1055-9965.EPI-15-0578
- 400 7. Harcourt N, Ghebre RG, Whembolua GL, Zhang Y, Warfa Osman S, Okuyemi KS.  
401 Factors associated with breast and cervical cancer screening behavior among African  
402 immigrant women in Minnesota. *J Immigr Minor Health* 2014;16:450-6. doi:  
403 10.1007/s10903-012-9766-4

- 1  
2  
3 404 8. Grillo F, Valle'e J, Chauvin P. Inequalities in cervical cancer screening for women  
4  
5 405 with or without a regular consulting in primary care for gynaecological health, in  
6  
7 406 Paris, France. *Prev Med* 2012;54:259-65. doi:10.1016/j.ypmed.2012.01.013  
8  
9  
10 407 9. Norredam M, Nielsen SS, Krasnik A. Migrants' utilization of somatic healthcare  
11  
12 408 services in Europe—a systematic review. *Eur J Public Health* 2010;20:555-63. doi:  
13  
14 409 10.1093/eurpub/ckp195  
15  
16 410 10. Schueler KM, Chu PW, Smith-Bindman R. Factors associated with mammography  
17  
18 411 utilization: a systematic quantitative review of the literature. *J Womens Health*  
19  
20 412 (Larchmt) 2008;17:1477-98. doi: 10.1089/jwh.2007.0603  
21  
22  
23 413 11. Kristiansen M, Thorsted BL, Krasnik A, von Euler-Chelpin M. Participation in  
24  
25 414 mammography screening among migrants and non-migrants in Denmark. *Acta Oncol*  
26  
27 415 2012;51:28-36. doi: 10.3109/0284186X.2011.626447  
28  
29 416 12. Ghafoor A, Jemal A, Ward E, Cokkinides V, Smith R, Thun M. Trends in breast  
30  
31 417 cancer by race and ethnicity. *CA Cancer J Clin* 2003;53:342-55. doi:  
32  
33 418 10.3322/canjclin.53.6.342  
34  
35 419 13. Nerbs MV, Mark HF. Breast cancer among Asian women. *Med Health RI*  
36  
37 420 1996;79:388-91.  
38  
39 421 14. O'Malley MS, Earp JA, Hawley ST, Chell MI, Mathews HF, Mitchell J. The  
40  
41 422 association of race/ethnicity, socioeconomic status, and physician recommendation for  
42  
43 423 mammography: Who gets the message about breast cancer screening? *Am J Public*  
44  
45 424 *Health* 2001;91:49-54.  
46  
47  
48 425 15. Frisby CM. Messages of hope: Health communications strategies that address barriers  
49  
50 426 preventing black women from screening for breast cancer. *J Black Stud* 2002;32:489-  
51  
52 427 505. <http://www.jstor.org/stable/3180949>. Accessed December 4, 2016.  
53  
54  
55 428 16. Centers for Disease Control and Prevention. Achievements in public health, 1900–  
56  
57 429 1999: Healthier mothers and babies. *MMWR* 1999;48:849-58.

- 1  
2  
3 430 17. Yuan B, Qian X, Thomsen S. Disadvantaged populations in maternal health in China  
4  
5 431 who and why? *Glob Health Action* 2013;6:19542. doi: 10.3402/gha.v6i0.19542  
6  
7 432 18. Kusuma YS, Kumari R, Kaushal S. Migration and access to maternal healthcare:  
8  
9 433 determinants of adequate antenatal care and institutional delivery among socio-  
10  
11 434 economically disadvantaged migrants in Delhi, India. *Trop Med Int Health*  
12  
13 435 2013;18:1202-10. doi: 10.1111/tmi.12166  
14  
15 436 19. Lauria L, Bonciani M, Spinelli A, Grandolfo ME. Inequalities in maternal care in  
16  
17 437 Italy: the role of socioeconomic and migrant status. *Ann Ist Super Sanita* 2013;49:209-  
18  
19 438 18. doi: 10.4415/ANN\_13\_02\_12  
20  
21 439 20. Singh PK, Rai RK, Singh L. Examining the effect of household wealth and migration  
22  
23 440 status on safe delivery care in urban India, 1992–2006. *PLoS One* 2012;7:e44901. doi:  
24  
25 441 10.1371/journal.pone.0044901  
26  
27 442 21. Bollini P, Pampallona S, Wanner P, Kupelnick B. Pregnancy outcome of migrant  
28  
29 443 women and integration policy: a systematic review of the international literature. *Soc*  
30  
31 444 *Sci Med* 2009;68:452-61. doi: 10.1016/j.socscimed.2008.10.018  
32  
33 445 22. Gissler M, Alexander S, Macfarlane A, et al. Stillbirths and infant deaths among  
34  
35 446 migrants in industrialized countries. *Acta Obstet Gynecol Scand* 2009;88:134-48. doi:  
36  
37 447 10.1080/00016340802603805  
38  
39 448 23. Balaam MC, Akerjordet K, Lyberg A, et al. A qualitative review of migrant women's  
40  
41 449 perceptions of their needs and experiences related to pregnancy and childbirth. *J Adv*  
42  
43 450 *Nur* 2013;69:1919-30. doi: 10.1111/jan.12139  
44  
45 451 24. Gibson-Helm ME, Teede HJ, Cheng IH, et al. Maternal health and pregnancy  
46  
47 452 outcomes comparing migrant women born in humanitarian and non humanitarian  
48  
49 453 source countries: a retrospective, observational study. *Birth* 2015;42:116-24. doi:  
50  
51 454 10.1111/birt.12159  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 455 25. The World Bank. 2011. The World Bank. <http://data.worldbank.org/>. Accessed July  
4  
5 456 22, 2014.  
6  
7 457 26. Bianco A, Larosa E, Pileggi C, Nobile CG, Pavia M. Utilization of health-care  
8  
9 458 services among immigrants recruited through non-profit organizations in southern  
10  
11 459 Italy. *Int J Public Health* 2016;61:673-82. doi: 10.1007/s00038-016-0820-1  
12  
13 460 27. StataCorp. Stata: Release 11. Statistical Software. 2009, College Station, TX:  
14  
15 461 StataCorp LP.  
16  
17 462 28. Ricardo-Rodrigues I, Jiménez-García R, Hernández-Barrera V, Carrasco-Garrido P,  
18  
19 463 Jiménez-Trujillo I, López de Andrés A. Social disparities in access to breast and  
20  
21 464 cervical cancer screening by women living in Spain. *Public Health* 2015;129:881-8.  
22  
23 465 doi: 10.1016/j.puhe.2015.02.021  
24  
25 466 29. Rondet C, Lapostolle A, Soler M, Grillo F, Parizot I, Chauvin P. Are immigrants and  
26  
27 467 nationals born to immigrants at higher risk for delayed or no lifetime breast and  
28  
29 468 cervical cancer screening? The results from a population-based survey in Paris  
30  
31 469 metropolitan area in 2010. *PLoS One* 2014;9:e87046; doi:  
32  
33 470 10.1371/journal.pone.0087046. eCollection 2014.  
34  
35 471 30. Almeida LM, Caldas J, Ayres-de-Campos D, Salcedo-Barrientos D, Dias S. Maternal  
36  
37 472 healthcare in migrants: a systematic review. *Matern Child Health J* 2013;17:1346-54.  
38  
39 473 doi: 10.1007/s10995-012-1149-x  
40  
41 474 31. Grandahl M, Tydén T, Gottvall M, Westerling R, Oscarsson M. Immigrant women's  
42  
43 475 experiences and views on the prevention of cervical cancer: a qualitative study. *Health*  
44  
45 476 *Expect* 2015;18:344-54. doi: 10.1111/hex.12034  
46  
47 477 32. Hasnain M, Menon U, Ferrans CE, Szalacha L. Breast cancer screening practices  
48  
49 478 among first-generation immigrant muslim women. *J Womens Health (Larchmt)*  
50  
51 479 2014;23:602-12. doi: 10.1089/jwh.2013.4569  
52  
53 480 33. Campostrini S, Carrozzi G, Salmaso S, Severoni S. (Ed.) *Malattie croniche e migranti*  
54  
55 481 *in Italia. Rapporto sui comportamenti a rischio, prevenzione e diseguaglianze di*  
56  
57  
58  
59  
60



- 1  
2  
3 482 salute, Organizzazione Mondiale della Sanità - Istituto Superiore della Sanità -  
4  
5 483 Università Ca' Foscari, Venezia, 2015.  
6  
7 484 34. The National Centre for Screening Monitoring Tenth Report. *Epidemiol Prev*  
8  
9 485 2012;36:1-96.  
10  
11 486 <http://www.osservatorionazionalecreening.it/sites/default/files/allegati/EPv36i6s1.pdf>  
12  
13 487 . Accessed December 2, 2016.  
14  
15 488 35. La sorveglianza PASSI. Screening mammografico 2012-2015.  
16  
17 489 <http://www.epicentro.iss.it/passi/dati/ScreeningCervicale.asp>. Accessed April 10,  
18  
19 490 2017.  
20  
21 491 36. La sorveglianza PASSI. Screening cervicale 2012-2015.  
22  
23 492 <http://www.epicentro.iss.it/passi/dati/ScreeningMammografico.asp>. Accessed April  
24  
25 493 10, 2017.  
26  
27 494 37. Vahabi M, Lofters A, Kumar M, Glazier RH. Breast cancer screening disparities  
28  
29 495 among urban immigrants: a population-based study in Ontario, Canada. *BMC Public*  
30  
31 496 *Health* 2015;15:679. doi: 10.1186/s12889-015-2050-5  
32  
33 497 38. Blomberg K, Tishelman C, Ternstedt BM, Tornberg S, Leval A, Widmark C. How  
34  
35 498 can young women be encouraged to attend cervical cancer screening? Suggestions  
36  
37 499 from face-to-face and internet focus group discussions with 30-year-old women in  
38  
39 500 Stockholm. Sweden *Acta Oncologica* 2011;50:112-20. doi:  
40  
41 501 10.3109/0284186X.2010.528790  
42  
43 502 39. Everett T, Bryant A, Griffin MF, Martin-Hirsch PP, Forbes CA, Jepson RG.  
44  
45 503 Interventions targeted at women to encourage the uptake of cervical screening.  
46  
47 504 *Cochrane Database of Systematic Reviews* 2011;5:CD002834. doi:  
48  
49 505 10.1002/14651858.CD002834.pub2  
50  
51 506 40. Abdullahi A. Cervical screening: perceptions and barriers to uptake among Somali  
52  
53 507 women in Camden. *Public Health* 2009;123:680-5. doi: 10.1016/j.puhe.2009.09.011  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 508 41. Lauria L, Lamberti A, Buoncristiano M, Bonciani M, Andreozzi S (Ed.). Pre- and  
4  
5 509 post-natal assistance: promotion and assessment of operational models quality. The  
6  
7 510 2008-2009 and 2010-2011 surveys. Roma: Istituto Superiore di Sanità; 2012.  
8  
9 511 (Rapporti ISTISAN 12/39).  
10  
11 512

For peer review only

513 **Table 1. Cervical and breast cancer screening practices among immigrant women**

<b>Cancer screening services</b>	<b>No.</b>	<b>Percent</b>
<b>Cervix<sup>†</sup> (419)</b>		
<b>Having received cervical cancer screening through Pap smear (419)</b>		
No	247	59
Yes, for control	164	39.1
Yes, I had problems	8	1.9
<b>Time since last pap test, years (164)</b>		
≤ 3	135	82.3
> 3	29	17.7
<b>Breast<sup>#</sup> (125)</b>		
<b>Having received breast cancer screening through mammography (125)</b>		
No	61	48.8
Yes, for control	57	45.6
Yes, I had problems	7	5.6
<b>Time since last mammography, years (57)</b>		
≤ 2	26	45.6
> 2	31	54.4

514 <sup>†</sup> All sexually active women aged 25-64 years and having an intact uterus were eligible515 <sup>#</sup> Women aged 50-69 years were eligible

516 **Table 2. Stepwise multiple logistic regression analysis between variables potentially associated**  
 517 **with having received a Pap smear in the previous three years**

Variable	OR	SE	95% CI	P value
<i>Model Outcome: Pap smear for screening purposes in the previous three years</i>				
<i>Log-likelihood = -228.62, <math>\chi^2 = 48.79</math>, P value &lt; 0.0001, No. of obs. = 402<sup>s</sup></i>				
Length of stay in Italy, ordinal	1.60	0.17	1.29-1.97	<0.001
Nationality				
European*	1.00	-	-	-
South American	8.36	6.12	1.99-35.06	0.004
Asian	0.41	0.13	0.22-0.76	0.005
Chronic diseases	1.40	0.33	0.88-2.22	0.152
Employment status				
Unemployed*	1.00	-	-	-
Housekeeper, caregiver	0.75	0.18	0.47-1.21	0.244
Manual workers	0.59	0.36	0.18-1.94	0.382
Alcohol consumption in the previous 30 days	0.76	0.20	0.45-1.28	0.302
Not married	0.79	0.19	0.50-1.27	0.336
African	-			
Physical activity	-			
Age	-			
Current smoker	-			
Children	-			
Self-reported legal status	-			
Sedentary workers	-			

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Education level

-

---

518 \* reference category

519 <sup>§</sup> the observations do not sum to N (419) due to missing values

520 – excluded by the stepwise model building strategy

For peer review only

521 **Table 3. Pregnancy, antenatal and perinatal care characteristics of the eligible women and**  
 522 **comparison with Italian population**

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
<b>Age, years</b>		34.9±8.9	32
<b>Pregnancies in Italy (123)</b>			
1	90 (73.2)		(53.9)
≥2	33 (26.8)		(46.1)
<b>Smoking status (123)</b>			
Nonsmoker	98 (79.7)		(68.1)
Smoker before pregnancy	14 (11.4)		(24.4)
Smoker	11 (8.9)		(7.5)
<b>Prepartum course participation (122)</b>			
No	89 (73)		(60.5)
Yes	33 (27)		(39.5)
<b>Visit after delivery (within 12 months) (119)</b>			
Yes	95 (79.8)		/
No	24 (20.2)		/
<b>Counseling on postpartum contraceptive methods (122)</b>			
No	66 (54.1)		(40.9)
Yes	56 (45.9)		(59.1)
<b>Infant feeding (122)</b>			
Breastfeeding only	85 (69.6)		(88.5)
Breastfeeding and bottle-feeding	24 (19.7)		
Bottle-feeding only	13 (10.7)		(11.5)
<b>Utilization of family planning clinic (121)</b>			

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
Yes	66 (54.5)		(27.9)
No	55 (45.5)		(72.1)

523 The number of participants responding to the questions is indicated in brackets

For peer review only



**UNIVERSITY OF CATANZARO "MAGNA GRÆCIA"**  
**DEPARTMENT OF HEALTH SCIENCES**  
**MEDICAL SCHOOL**  
**CHAIR OF HYGIENE**

**CERVICAL AND BREAST CANCER SCREENING PARTICIPATION AND UTILIZATION OF  
 MATERNAL HEALTH SERVICES AMONG IMMIGRANT WOMEN IN SOUTHERN ITALY**

*Questionnaire used in the survey*

Date of interview \_\_\_/\_\_\_/\_\_\_

No. \_\_\_\_\_

**A) Demographic characteristics**

**A.1. How old were you on your last birthday?** (years) \_\_\_\_\_

**A.2. What is your marital status?**  Single  Married with husband in Italy  Married without husband in Italy  
 Divorced  Widowed  Other (please, specify \_\_\_\_\_)

**A.3.1. Do you have any children?**  No (→A.4.)  Yes (n° \_\_\_\_\_) **A.3.2. Are they living in Italy?**  No  Yes (n° \_\_\_\_\_)

**A.3.3. How old were they on their last birthday? What is their sex?**

I. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VI. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
II. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
III. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VIII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
IV. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	IX. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
V. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	X. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F

**A.4. What is the highest level of education that you have completed?** (years)

< 5  5 – 7  8 – 12  ≥13, without university degree  
 ≥13, with university degree (please, specify \_\_\_\_\_)

**A.5. What is your occupation?**  None  Student  Housewife  
 Housekeeper, caregiver  Peddler  Farmer  Manual worker  
 Professional employed  Other (spec. \_\_\_\_\_)

**A.6. What is your religion?**  None  Catholic Christian  Orthodox Christian  
 Jewish  Islamic  Buddhist  Hindu  Other (spec. \_\_\_\_\_)

**A.7. What is your country of origin?** \_\_\_\_\_

**A.8. From what country did you arrive in**  Country of origin  Other country (please, specify \_\_\_\_\_)  
 Italy?

**A.9. How long have you lived in Italy?** (years) \_\_\_\_\_ (if less than 1 year, end interview.)

**A.10. What is your legal immigration status?**  Regular  Irregular  Asylum seeker

**B) General health conditions**

**B.1. Do you suffer from any of the following chronic diseases?** (please, if yes, specify one or more of the following diseases)

No/I don't know

Cardiovascular diseases (eg. hypertension, hypercholesterolemia, etc.) \_\_\_\_\_

Respiratory diseases (eg. asthma, chronic obstructive pulmonary disease, etc.) \_\_\_\_\_

Gastrointestinal diseases (eg. gastroenteritis, esophagitis, celiac disease, etc.) \_\_\_\_\_

Musculoskeletal diseases (eg. osteoarthritis, osteoporosis, carpal tunnel syndrome, etc.) \_\_\_\_\_

Oral diseases (dental caries, gingivitis, stomatitis, malocclusion, etc.) \_\_\_\_\_

Genitourinary diseases (calculi, erectile dysfunction, prostatitis, etc.) \_\_\_\_\_

Psychiatric disorders (depression, schizophrenia, eating disorders) \_\_\_\_\_

Metabolic diseases (eg. chronic renal failure, liver cirrhosis, diabetes, thyroid disease, etc.) \_\_\_\_\_

Autoimmune disorders (eg. SLE, psoriasis, inflammatory bowel diseases, ecc.) \_\_\_\_\_

Other (please, specify \_\_\_\_\_)

**B.2. Are you affected by any of the following infectious diseases?**  No/I don't know  HIV  Hepatitis B



- Hepatitis C     Tuberculosis     Parasitosis (es. malaria, toxoplasmosis, giardia, schistosomiasis, taenia, ecc.)  
 STD (eg. syphilis, gonorrhoea, HSV, etc.)     Other (please, specify \_\_\_\_\_)

### C) Health risk habits

#### C.1. Tobacco use

- C.1.1. Have you smoked at least 100 cigarettes in your entire life?     No (→C.2.1.)     Yes  
C.1.2. Do you now smoke cigarettes:     Some days (specify n° \_\_\_\_\_)     Every day (specify n° \_\_\_\_\_)     Never (→C.2.1.)  
C.1.3. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?     No     Yes

#### C.2. Alcohol consumption

- C.2.1. During the past 30 days, did you have at least one drink of any alcoholic beverage such as beer, wine or liquor?     No (→D.1.)     Yes  
C.2.2. During the past 30 days, how many days per month did you have at least one drink of any alcoholic beverage? \_\_\_\_\_  
C.2.3. During the past 30 days, on the days when you drank, approximately how many drinks did you drink on average?  
Wine \_\_\_\_\_    Beer \_\_\_\_\_    Liquor \_\_\_\_\_

### D) Prevention and screening

#### D.1. Immunization

##### D.1.1. Which of the following vaccinations have you had? (more than one option allowed)

- Diphtheria     Tetanus     Pertussis     Polio  
 Hepatitis B     Mumps     Rubella     Measles  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)

(If participant answered Yes to the question A.3.2. skip to question D.1.2.. If participant answered No to the question A.3.2. skip to question D.2.1.)

##### D.1.2. Have your children received vaccinations included in the national programs?    No    I don't remember    Yes (→D.1.4.)

##### D.1.3. Why have they not received children's vaccinations? (more than one option allowed)

- I was not aware of their availability     Vaccinations are not useful     Vaccinations are dangerous  
 Religious reasons     Lack of time     Other (please, specify \_\_\_\_\_)

##### D.1.4. Do you remember which of the following vaccinations your children have had?

- Mandatory vaccinations (diphtheria, tetanus, polio, hepatitis B)     Pertussis     Measles, mumps and rubella  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)

#### D.2. Screening

##### D.2.1. Have you ever had Pap test?

- No     Yes, for control     Yes, for problems

##### D.2.2. When was the last time you had a Pap test? (years)

- <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago

##### D.2.3. Have you had a hysterectomy?

- No     Yes

##### D.2.4. Have you ever had a mammography?

- No     Yes, for control     Yes, for problems

##### D.2.5. When was the last time you had a mammography? (years)

- <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago

### E) Utilization of maternal health services

(If participant answered Yes to question A.3.1. skip to question E.1. If participant answered No to question A.4.1. end interview.)

E.1. How many times have you given birth since you've been in Italy?     None     (spec. n°) \_\_\_\_\_

E.2. How many times have you had a miscarriage?     None     I don't remember     (spec. n°) \_\_\_\_\_

E.3. How many times have you had an abortion?     None     I don't remember     (spec. n°) \_\_\_\_\_

(If participant answered None to question E.1. end interview. Otherwise, complete interview with all following questions referred to last pregnancy.)

##### E.4. Who was mainly monitoring your pregnancy/ies?

- None     General practitioner

Gynecologist     Midwife     Other (please, specify \_\_\_\_\_)

##### E.5. How many prenatal visits did you attend during each pregnancy?

- None  1  >1 (*spec. n°*)
- 1 E.6. When did you receive your first pregnancy appointment?  I don't remember  (*please, specify weeks of pregnancy*)
- 2 E.7.1. How many prenatal ultrasound checks did you have during your pregnancy? (*spec. n°*)
- 3 E.7.2. Do you remember in which weeks of pregnancy you had these prenatal ultrasound checks? (*more than one option*)  None
- 4 allowed)
- 5  <8  8-12  13-16  17-20  21-24  25-28  29-32  ≥33
- 6 E.8. Did you know that prenatal visits and ultrasound checks are free?  No  Yes
- 7 E.9. Did you have any prenatal diagnostic testing? (*max. 4 options*)  No  Yes, maternal serum markers
- 8  Yes, chorionic villus sampling  Yes, amniocentesis  Yes, nuchal translucency  Other (*please, specify* \_\_\_\_\_)
- 9 E.10. Have you ever participated in a prepartum course/prenatal class?  No  Yes
- 10 E.11. Overall, do you believe you have had difficulties of access to and use of prenatal services during your  No
- 11 pregnancy? (*max. 3 options*)
- 12  Yes, I don't know system's organization  Yes, for language barriers  Yes, for long waiting times for access to health-care services
- 13  Yes, lack of time  Yes, for my poor socioeconomic situation  Other (*please, specify* \_\_\_\_\_)
- 14 E.12. Did you ever smoke during pregnancy?  No, I don't smoke  No, I stopped
- 15  Yes, I continued to smoke the same number of cigarettes  Yes, but I decreased the number of cigarettes
- 16 E.13. Did you have a postnatal visit within 12 months after delivery?  No  Yes
- 17 E.14. What was your chosen infant feeding method?  Breastfeeding only (→E.17.)  Bottle-feeding only
- 18  Breastfeeding and other (water, tisane, or other infusion)  Breastfeeding and bottle-feeding
- 19 E.15. Who advised you regarding the formula milk?  Nobody, I decided  Pediatrician
- 20  Family/Friends  Physician of hospital ward  Other (*please, specify* \_\_\_\_\_)
- 21 E.16. What is the reason for the formula milk? (*max. 3 options*)  I don't have enough milk  I stopped breastfeeding
- 22  The baby was not gains weight  The baby couldn't latch on well
- 23  I had painful nipples, and/or mastitis  I had acute health problems  My child had acute health problems
- 24  I had to resume work shortly  I had to moved my child abroad  I was tired
- 25  I took some drugs (*please, specify* \_\_\_\_\_)  Other (*please, specify* \_\_\_\_\_)
- 26 E.17. Who gave you information about infant feeding?  None  I know
- 27  Midwife of hospital ward  Midwife of family planning center  Pediatrician  Family/Friends
- 28  Other (*please, specify* \_\_\_\_\_)
- 29 E.18. Do you believe it is possible to get pregnant during the period of breastfeeding?
- 30  No, it's not possible  I don't know  Yes, it's possible
- 31 E.19. Who counseled you on postpartum contraceptive methods?
- 32  None (→E.21.)  Family/Friends  General practitioner
- 33  Specialist  Midwife of family planning center  Other (*please, specify* \_\_\_\_\_)
- 34 E.20. Do you believe this counseling has been sufficient?
- 35  Yes, I believe it has  No, I would like to know more
- 36 E.21. At the resumption of sexual relations, are you thinking of using contraception?
- 37  No  I don't know yet  Yes (*please, specify* \_\_\_\_\_)
- 38 E.22. Do you know a family planning center?
- 39  No (→E.24.)  Yes, but I never used it  Yes, I have used it (→ E.24.)
- 40 E.23. Why have you never used a family planning center? (*please, specify one or more reason*) \_\_\_\_\_
- 41
- 42 E.24. Are you accessing any healthcare services since discharge?  No (→E.26.)  Yes
- 43 E.25. Please, specify one or more of following healthcare services:
- 44  Pediatric planning center  Family planning center  Advice center  Specialist clinic
- 45  Emergency Department  Hospital  Other (*please, specify* \_\_\_\_\_)
- 46 E.26. Whom have you selected as the child's physician?  None  Specialist
- 47  Physician of family planning center  Physician of hospital ward  Pediatrician  Other (*please, specify* \_\_\_\_\_)
- 48
- 49
- 50
- 51
- 52
- 53
- 54
- 55
- 56
- 57
- 58
- 59
- 60

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item N <sup>o</sup>	Recommendation	Page
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6,7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7,8
Bias	9	Describe any efforts to address potential sources of bias	13
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9,10
		(b) Indicate number of participants with missing data for each variable of interest	21,23

Outcome data	15*	Report numbers of outcome events or summary measures	9,10; 21-23
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9,10; 21-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	10-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	10-14
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

## Cervical and breast cancer screening participation and utilization of maternal health services: a cross-sectional study among immigrant women in Southern Italy

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-016306.R2
Article Type:	Research
Date Submitted by the Author:	29-Jun-2017
Complete List of Authors:	Bianco, Aida; University of Catanzaro "Magna Græcia", Department of Health Sciences Larosa, Elisabetta; University of Catanzaro "Magna Græcia", Department of Health Sciences Pileggi, Claudia; University of Catanzaro "Magna Græcia", Department of Health Sciences Nobile, Carmelo; University of Catanzaro "Magna Græcia", Department of Health Sciences PAVIA, Maria; University of Catanzaro "Magna Græcia", Department of Health Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research
Keywords:	cancer screening, immigrant, Italy, maternal health, women

SCHOLARONE™  
Manuscripts

only

1  
2  
3 1 **Cervical and breast cancer screening participation and utilization of maternal**  
4 2 **health services: a cross-sectional study among immigrant women in Southern Italy**  
5  
6  
7 3  
8  
9 4  
10

11 5 Aida Bianco MD, Elisabetta Larosa MD, Claudia Pileggi MD, Carmelo G. A. Nobile MD,  
12 6 Maria Pavia MD, MPH  
13  
14  
15 7  
16  
17 8  
18  
19 9  
20  
21

22 10 Department of Health Sciences, University of Catanzaro "Magna Græcia", Campus of  
23 11 Germaneto, 88100 Catanzaro, Italy  
24  
25 12  
26  
27 13  
28  
29 14  
30  
31 15  
32  
33

34 16 Author responsible for correspondence and whom requests for reprints should be addressed:  
35  
36 17 Maria Pavia MD, MPH  
37  
38 18 Chair of Hygiene  
39  
40 19 Department of Health Sciences  
41  
42 20 Medical School  
43  
44 21 University of Catanzaro "Magna Græcia"  
45  
46 22 Via T. Campanella, 115, 88100 Catanzaro, Italy  
47  
48 23 ph +39 (0)961 712371  
49  
50 24 fax +39 (0)961 712382  
51  
52 25 e-mail [pavia@unicz.it](mailto:pavia@unicz.it)  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 26 **Abstract**

4  
5 27 **Objectives**

6  
7 28 Women make up approximately half of the world's one billion migrants. Immigrant  
8  
9 29 women tend to be one of the most vulnerable population groups with respect to  
10  
11 30 healthcare. Cancer screening (CS) and maternal and reproductive health have been  
12  
13 31 included among the ten main issues pertinent to women's health.

14  
15 32 The aim of this study is to explore breast and cervical CS participation and to acquire  
16  
17 33 information regarding access to healthcare services during pregnancy, childbirth and the  
18  
19 34 postpartum period among age eligible immigrant women in Southern Italy.

20  
21 35 **Methods**

22  
23 36 A structured questionnaire was used to collect data from each participant. Women aged  
24  
25 37 25-64 years who had not had a hysterectomy and women aged 50-69 years without  
26  
27 38 history of breast cancer were considered eligible for evaluation of cervical and breast CS  
28  
29 39 participation, respectively. Moreover, women who had delivered at least once in Italy  
30  
31 40 were enrolled to describe antenatal and post-partum care services use. All women were  
32  
33 41 recruited through the third-sector and non-profit organizations (NPOs).

34  
35 42 **Results**

36  
37 43 Rate of cervical CS among the 419 eligible women was low (39.1%), and about one third  
38  
39 44 had had a Pap-test for screening purposes within a three year period from interview  
40  
41 45 (32.8%). Regarding breast CS practices, of the 125 eligible women 45.6% had had a  
42  
43 46 mammography for control purposes, and less than one quarter (26, 20.8%) had their  
44  
45 47 mammography within the recommended time interval of two years. About 80% of the  
46  
47 48 respondents did not report difficulties of access and use of antenatal and postpartum  
48  
49 49 services.

50  
51 50 **Conclusion**

52  
53 51 This study provides currently unavailable information about adherence to CS and  
54  
55 52 maternal and child health that could encourage future research to develop and test

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

53 culturally appropriate, women-centered strategies for promoting timely and regular CS  
54 among immigrant women in Italy.

55

56 **Key words:**

57 Cancer screening, immigrant, Italy, maternal health, women.

For peer review only



1  
2  
3  
4  
58 **Strengths and limitations of this study**

- 59 ■ The high participation rate (92.3%) is extremely satisfactory and restricts one  
60 major potential source of bias in the results.
- 61 ■ Immigrants who did not speak Italian or who had low literacy levels have not  
62 been excluded from the study, helped by linguistic and cultural mediators.
- 63 ■ The sample may not be representative of all immigrants within the region, but  
64 only of those connected to non-profit organizations and with a regular stay  
65 permit.
- 66 ■ There may be an effect of recall bias on self reported information about cancer  
67 screening practices.
- 68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

1  
2  
3 **68 Cancer screening participation and utilization of maternal health services: a cross-**  
4  
5 **69 sectional study among immigrant women in Southern Italy**

6  
7 **70 Background**

8  
9 71 Estimates from the United Nations show that women make up approximately half  
10  
11 72 of the world's one billion migrants.<sup>1</sup> The effects of migration on women's health are  
12  
13 73 varied and hard to predict and may be determined by a number of factors: the conditions  
14  
15 74 under which the migration occurred; how well a particular individual has integrated in the  
16  
17 75 host society, the social status of the individual in the host country, and the health  
18  
19 76 conditions that are existent in the host country. Studies have indicated that women who  
20  
21 77 migrate tend to be one of the most vulnerable population groups with respect to  
22  
23 78 healthcare.<sup>2,3</sup> In particular, women who do not speak the host country language and do not  
24  
25 79 have a job are less likely to benefit from the health system of the host nation.<sup>4</sup> These  
26  
27 80 women are usually dependent on men and are unaware of the available health services.  
28  
29 81 Governments should ensure that appropriate health services are provided that adequately  
30  
31 82 address all aspects of women's health, particularly cancer screening (CS) and maternal  
32  
33 83 and reproductive health. These basic health care services have been included among the  
34  
35 84 ten main issues pertinent to women's health, whether it be in immigrants or native  
36  
37 85 inhabitants,<sup>5</sup> and they ought to be available to everyone in society in accordance with  
38  
39 86 social equality.

40  
41 87 Breast cancer is the most frequently diagnosed cancer and the leading cause of  
42  
43 88 cancer death among females worldwide. Previous research has shown that immigrant  
44  
45 89 status is associated with breast cancer risk through changes in reproductive factors (e.g.,  
46  
47 90 higher age at first live birth, lower breast feeding rates) and lifestyle factors (e.g., diet) but  
48  
49 91 could also indicate variations in other environmental exposures.<sup>6-8</sup> Cervical cancer is the  
50  
51 92 second most commonly diagnosed cancer and although in several western countries its  
52  
53 93 burden has decreased by as much as 65% over the past 40 years thanks to screening

1  
2  
3 94 programs,<sup>9</sup> it is still the third leading cause of cancer death in less developed countries,  
4  
5 95 and an important healthcare issue among migrant women.  
6

7 96 Detecting both these cancers early is key to keeping women alive and healthy.  
8  
9 97 Increased health risks have been noted among immigrants and ethnic minorities who also  
10  
11 98 may receive less healthcare than the native population,<sup>10,11</sup> whilst at the same time  
12  
13 99 numerous studies have documented lower participation in CS programs among various  
14  
15 100 migrant groups.<sup>12-14</sup> Furthermore ethnic minority women residing in Western countries  
16  
17 101 are more likely to be diagnosed with advanced-stage disease and hence have higher  
18  
19 102 mortality rates,<sup>15</sup> often as a result of lower utilization of timely CS services.<sup>16-18</sup>  
20

21 103 Over the course of the last century there have been many tremendous  
22  
23 104 improvements in maternal and neonatal outcomes in terms of pregnancy-related  
24  
25 105 complications, maternal and infant mortality rates.<sup>19</sup> But the benefits of these have not  
26  
27 106 extended everywhere and to everyone, since significant disparities by race and ethnicity  
28  
29 107 persist. Studies on the determinants of maternal health care delivery suggest that social,  
30  
31 108 economic, behavioral, and environmental factors explain the worse health status among  
32  
33 109 migrants<sup>20-23</sup> in terms of preterm delivery, congenital anomalies, low birth weight, fetal  
34  
35 110 growth restriction, and infant mortality<sup>24-26</sup> when compared with the native population.<sup>27</sup>  
36  
37 111 In Italy, both native and foreign women, have the right to participate free of charge in a  
38  
39 112 specific programme of care during pregnancy and up to one month following delivery.  
40

41 113 The aims of this survey were to explore breast and cervical CS participation and  
42  
43 114 to acquire information regarding access to healthcare services during pregnancy,  
44  
45 115 childbirth and the postpartum period among age eligible immigrant women in Southern  
46  
47 116 Italy.  
48

## 49 117 **Methods**

### 50 118 *Study population*

51  
52  
53 119 The survey was conducted from May 2012 until April 2013. The study  
54  
55 120 population consisted of a specific subset of immigrants. For this study, immigrants were  
56  
57  
58  
59  
60

1  
2  
3 121 defined as those from low or middle-income countries according to the classification of  
4  
5 122 the World Bank based on per capita GDP.<sup>28</sup> Tourists were excluded.  
6

7 123 Details regarding sampling of individuals for this study have been described  
8  
9 124 elsewhere.<sup>29</sup> Briefly, since probability or random sampling can not be carried out on  
10  
11 125 immigrants, a convenience sampling method was applied. Women aged 18 or more living  
12  
13 126 in Italy for at least 12 months were recruited through the third-sector and non-profit  
14  
15 127 organizations (NPOs) that provide support to immigrants and work to facilitate their  
16  
17 128 access to healthcare.

18  
19 129 In Italy, organized nationwide CS programs include personal invitations for a  
20  
21 130 Pap-test sent to women aged 25-64 years every three years and for mammography  
22  
23 131 screening to women aged 50-69 years every two years. Therefore, sexually active women  
24  
25 132 aged 25-64 years who had not had a hysterectomy and women aged 50-69 years without  
26  
27 133 previous diagnosis of invasive or in situ breast cancer were considered eligible for  
28  
29 134 evaluation of cervical and breast CS participation, respectively. Moreover, women who  
30  
31 135 had delivered at least once in Italy were enrolled to describe antenatal and post-partum  
32  
33 136 care services use.

### 34 35 137 *Survey instrument*

36  
37 138 Written consent was acquired prior to interview. A structured questionnaire  
38  
39 139 (available as supplementary file) was used to collect data from each participant.  
40  
41 140 Questionnaires were administered by physicians competent in interview methods, with  
42  
43 141 help, when necessary, from a cultural mediator. The interviews lasted ten minutes on  
44  
45 142 average.

46  
47 143 A pilot study was undertaken. Validation of the survey instrument was performed  
48  
49 144 through the assessment of internal and test-retest (external) reliability in addition to face  
50  
51 145 and content validity. Test-retest reliability was checked in the pilot study through an  
52  
53 146 additional interview of 50 women within a time interval of 20 days from the first  
54  
55 147 administration of the questionnaire. Face and content validity were examined in order to

1  
2  
3 148 assess the clarity of the wording of the items which in turn generated new items.  
4  
5 149 Modifications were made according to the comments recorded by the women in order to  
6  
7 150 clarify the content of the questionnaire and to simplify its wording.  
8

9 151 *Outcomes and covariates*

10  
11 152 Socio-demographics included information on gender, age, marital and legal  
12  
13 153 status, education level, religion, nationality, working activity, duration of residence in  
14  
15 154 Italy. The questions on lifestyle and health status included information on physical  
16  
17 155 activity, smoking habits, alcohol consumption, chronic and infectious diseases. The  
18  
19 156 questions on participation in screening programs included breast and cervical CS  
20  
21 157 practices. Uptake of cervical CS was determined by asking ‘Have you ever undergone  
22  
23 158 Pap test for control without any symptoms?’. Women who answered affirmatively were  
24  
25 159 asked ‘When was the last time you underwent Pap test?’. Women who had undergone a  
26  
27 160 Pap test within the previous three years were considered as ‘uptake’, corresponding to  
28  
29 161 women who comply with the recommended screening period. Uptake of breast CS was  
30  
31 162 determined by asking, ‘Have you ever undergone a mammography for control without  
32  
33 163 any symptoms?’. Women who answered affirmatively were asked a second question,  
34  
35 164 ‘When was the last time you had a mammography?’. Women who reported that they had  
36  
37 165 undergone their most recent mammography within the previous two years were  
38  
39 166 considered as ‘uptake’, corresponding to women who comply with the recommended  
40  
41 167 screening period.  
42

43 168 The questionnaire also contained items on services utilization during pregnancy  
44  
45 169 and childbirth. Access to antenatal and postnatal care was assessed by number and timing  
46  
47 170 of examination, such as time of first pregnancy appointment, number of prenatal visits  
48  
49 171 and ecographies, antenatal care by health-care professionals including general practitioner  
50  
51 172 (GP), gynecologist, nurse, midwife/obstetrician, or other care providers, prenatal  
52  
53 173 screening and diagnostic testing (i.e. maternal serum markers such as beta human  
54  
55 174 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis, etc.),  
56  
57  
58  
59  
60

1  
2  
3 175 smoking habits during pregnancy, counseling on infant feeding and postpartum  
4  
5 176 contraceptive methods, reasons for access to maternal and newborn healthcare services  
6  
7 177 (family planning centers and child care service centers). All information was self-  
8  
9 178 reported.

10  
11 179 The study protocol was ratified by the Institutional Ethical Committee ('Mater  
12  
13 180 Domini' Hospital of Catanzaro, Italy) (20/04/2012).

#### 14 15 181 *Statistical analysis*

16  
17 182 Descriptive analyses were used to describe demographic characteristics and  
18  
19 183 lifestyle habits of the immigrant women. Data were summarized into frequencies and  
20  
21 184 percentages. Univariate analysis was conducted by using chi-square or Fisher exact tests  
22  
23 185 to assess relationships between cervical and breast CS behavior and the respective  
24  
25 186 eligible study sub-groups.

26  
27 187 Multivariate logistic regression analysis was performed. One model was  
28  
29 188 developed in which were included those variables potentially associated with having  
30  
31 189 received cervical CS through Pap smear in the previous three years (Model 1) (0 = no, 1 =  
32  
33 190 yes). Women that had had a pap smear not for screening purposes were included in the  
34  
35 191 "no" option of the outcome variable. The model building strategy consisted of the  
36  
37 192 following steps: 1) bivariate analysis was performed for each of the potential explanatory  
38  
39 193 variables to find out which coding (categorical, ordinal, continuous) better fitted the data  
40  
41 194 and we chose that in the multivariate analysis; 2) stepwise logistic regression with  
42  
43 195 backward elimination was performed setting the significance level for variables entering  
44  
45 196 the model at 0.2 and for removal from the model at 0.4. Adjusted odds ratio (ORs) and  
46  
47 197 95% confidence intervals (CIs) were calculated; 3) on the basis of the results of the  
48  
49 198 bivariate analysis, the coding of the explanatory variables included in the model was the  
50  
51 199 following: age (continuous), marital status (1 = married, 2 = other), children (1 = no, 2 =  
52  
53 200 yes), education level (ordinal: 1 =  $\leq 7$  yrs, 2 = 8-13 yrs, 3 = university degree),  
54  
55 201 employment status (four categories: 1 = unemployed, 2 = housekeeper, caregiver, 3 =

1  
2  
3 202 manual worker; 4 = sedentary workers) included as a dummy variable with the  
4  
5 203 unemployed being the reference category, nationality (four categories: 1 = European, 2 =  
6  
7 204 African, 3 = Asian, 4 = South American) included as a dummy variable with the  
8  
9 205 European being the reference category, length of stay in Italy (ordinal: 1 = 1-2 yrs, 2 = 3-  
10  
11 206 5 yrs, 3 = 6-8 yrs, 4 =  $\geq$  9 yrs), self-reported legal status (1 = regular, 2 = irregular),  
12  
13 207 chronic diseases (1 = no, 2 = yes), physical activity (1 = no, 2 = yes), current smoker (1 =  
14  
15 208 no, 2 = yes), alcohol consumption in the previous 30 days (1 = no, 2 = yes). The data  
16  
17 209 were analyzed using the Stata software program, version 11.2.<sup>30</sup>

## 19 210 **Results**

21 211 Of the 503 immigrant women who were approached for the study, 492 met at  
22  
23 212 least one of the inclusion criteria and 464 were enrolled, giving a participation rate of  
24  
25 213 94.3%. The main characteristics of the study population were reported in Table 1. The  
26  
27 214 participants were between the ages of 18 and 70 years (mean 40.1 yrs) and only 14.6%  
28  
29 215 had obtained university degree. More than half (58.8%) of women were housekeepers or  
30  
31 216 caregivers. A low percentage (9.9%) declared to be irregular. 164 (34.5%) had been  
32  
33 217 living in Italy for 9 years or more. Paid employment was the most common reason for  
34  
35 218 migration (65.8%) among participants. Most women were from Europe (46.3%) and the  
36  
37 219 main country of origin was Ukraine (25.8%). Only 19.3% were current smokers. The vast  
38  
39 220 majority of women (71.3%) reported no alcohol drinking in the previous 30 days. About  
40  
41 221 49% of the respondents were affected by chronic diseases.

42  
43 222 Three different sub-groups were included in the final sample: sexually active  
44  
45 223 women between 25-64 years of age without hysterectomy that were eligible for  
46  
47 224 participation in cervical CS (419); women aged 50-69 years without previous diagnosis of  
48  
49 225 invasive or in situ breast cancer that were eligible for participation in breast CS (125); and  
50  
51 226 women of any age who had delivered at least once in Italy that were eligible to access  
52  
53 227 antenatal and post-partum care services (123). Seven women were part of the three sub-  
54  
55 228 groups.

1  
2  
3 229 The mean age of the population eligible for cervical CS was 41.1 years with an  
4  
5 230 age range between 25 and 64 years. More than half (58.1%) were married and 247  
6  
7 231 (58.9%) had completed high school. About 60% were housekeepers or caregivers. Rate of  
8  
9 232 cervical CS among the 419 eligible women was low (39.1%), and about one third had had  
10  
11 233 a Pap-test for screening purposes (32.8%) within a three year period from interview  
12  
13 234 (Table 2). Having had a routine pap smear in the previous three years was significantly  
14  
15 235 more likely in women with longer duration of residence in Italy (OR=1.60; 95% CI 1.29-  
16  
17 236 1.97;  $p<0.001$ ) and in South American women (OR=8.36; 95% CI 1.99-35.06;  $p=0.004$ )  
18  
19 237 compared with European female immigrants, whereas a lower probability of cervical CS  
20  
21 238 participation was found in Asian females (OR=0.41; 95% CI 0.22-0.76;  $p=0.005$ )  
22  
23 239 compared with European female immigrants (Table 3).

24  
25 240 Among the 125 women considered eligible for breast CS, 43.2% were married and 71  
26  
27 241 (56.4%) had completed high school. More than three quarter (85.7%) were practicing  
28  
29 242 Christians religion and 65.1% were from Europe. More than half (51.6%) had been living  
30  
31 243 in Italy for 9 years or more and the vast majority (86.5%) had a regular residence permit.  
32  
33 244 Regarding breast CS practices, of the 125 eligible women 45.6% had had a  
34  
35 245 mammography for control purposes, but less than one quarter (26, 20.8%) had their  
36  
37 246 mammography within the recommended time interval of two years (Table 2). Results  
38  
39 247 from univariate analysis do not show a statistically significant difference in breast CS  
40  
41 248 adherence with respect to all the selected characteristics apart from duration of stay in  
42  
43 249 Italy, ranging from 15.8% among those women having resided in the country for  $\leq 2$  years  
44  
45 250 to 58.5% among women with a length of stay  $\geq 9$  years, and among those who self-  
46  
47 251 reported an irregular legal status (17.7%) versus a regular status (50%) (Table 1).

48  
49 252 Table 4 shows main pregnancy, antenatal and post-birth care characteristics of the  
50  
51 253 eligible population. The number of immigrant women who delivered in Italy at least once  
52  
53 254 was 123. The mean age of the population eligible was 34.9 years with an age range  
54  
55 255 between 19 and 54 years. About 80% of the respondents did not report difficulties of  
56  
57  
58  
59  
60



1  
2  
3 256 access and use of prenatal and postpartum services. In terms of prenatal care, 70.9% of  
4  
5 257 immigrant women had their first pregnancy appointment within 12 weeks of pregnancy  
6  
7 258 and 84.2% had two or more prenatal visits. Only 12.9% of mothers underwent fewer than  
8  
9 259 two prenatal ultrasound checks. More than half (56.3%) of pregnant women were not  
10  
11 260 submitted to prenatal diagnostic testing (maternal serum markers such as beta human  
12  
13 261 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis) (data not  
14  
15 262 shown). Only about a third (27%) of respondents participated in prepartum  
16  
17 263 course/prenatal class, although Italian National Health Service guarantees free access to  
18  
19 264 this healthcare service. The vast majority (86%) of mothers chose a pediatrician such as  
20  
21 265 their child's physician as caregiver, whereas the remaining part of the sample preferred a  
22  
23 266 specialist or a maternal healthcare centre physician or none at all. Moreover, among  
24  
25 267 immigrant women with children living in Italy (122), 115 (94.3%) chose to immunize  
26  
27 268 their children with mandatory and recommended vaccinations for infants included in the  
28  
29 269 national programs.

## 31 270 **Discussion**

32  
33 271 The present study sought to describe CS practices, antenatal and postpartum care  
34  
35 272 services use among a sample of age eligible immigrant women in the South of Italy.

36  
37 273 The existence of a notable difference in preventive practice utilization and  
38  
39 274 motherhood protection according to immigration status has been reported in previous  
40  
41 275 studies.<sup>24, 31-33</sup> Immigrant women may not be accustomed to having regular health check-  
42  
43 276 ups in their home countries and may be less familiar with the opportunity of routine  
44  
45 277 screening to detect health problems before the onset of symptoms.<sup>34</sup> These shortcomings  
46  
47 278 may reduce the women's ability to maintain their health in specific periods during their  
48  
49 279 lifetime (e.g. during pregnancy) and to participate in preventive care.

50  
51 280 In our immigrant sample, adherence to cervical (32.8%) and breast (20.8%) CS  
52  
53 281 recommended practices is discernibly much lower than those reported in several  
54  
55 282 studies<sup>9,35</sup> and lower than those of the Italian native populations.<sup>36</sup> Indeed, the percentage

1  
2  
3 283 of Italian women who underwent routine cervical and breast CS were 77% and 71%,  
4  
5 284 respectively.<sup>36</sup> It is possible that the differences between our sample population and other  
6  
7 285 samples studies could be due to differences in cultural and socioeconomic factors.  
8  
9 286 Furthermore, one must consider that in Italy there is a geographical difference in CS  
10  
11 287 coverage, with the highest percentage of women who actually participate in them being in  
12  
13 288 the north of the country and the lowest in the south.<sup>37</sup> One reason for the low coverage for  
14  
15 289 CS in our sample may be due to the fact that in the regions in the South of the country, a  
16  
17 290 screening program has only recently been organized. In fact in our area of study, among  
18  
19 291 native citizens, CS for early detection of breast and cervical cancers has reached less than  
20  
21 292 half of the target population: regional figures have shown that cervical and breast CS  
22  
23 293 rates had decreased to 58.3%<sup>38</sup> and 49.7%<sup>39</sup>, respectively. Although these are much lower  
24  
25 294 than the national figures, nonetheless, they are still higher than those of the immigrant  
26  
27 295 women in our sample.

28  
29 296 Only less than half of the sample had received breast CS at the recommended  
30  
31 297 time intervals, and for this reason efforts should be made to emphasize that it is not  
32  
33 298 enough to get screened once or sporadically.

34  
35 299 The duration of residence in the host country may be a significant predictor of  
36  
37 300 whether an individual migrant adheres to the CS program.<sup>40</sup> The results of our study  
38  
39 301 indicate that being a recent immigrant is a barrier to receiving cervical CS. Certainly  
40  
41 302 women that have spent more time in Italy may be more likely to be integrated into the  
42  
43 303 screening program and proficient in the Italian language, and therefore feel more  
44  
45 304 confident approaching the Italian health-care system. Hence it would be prudent to  
46  
47 305 provide immigrants with culturally sensitive and specific information to overcome any  
48  
49 306 barriers. Organized screening programs may help to reduce “ethnic” disparities by  
50  
51 307 offering a systematic (and free) examination to all the women of the target age groups,  
52  
53 308 and by using specific strategies to reach the most underserved women. Longer duration of  
54  
55 309 stay in Italy could also reflect probability of receiving a personal invitation. The

1  
2  
3 310 importance of invitation letters has been mentioned,<sup>41,42</sup> and one way of overcoming a  
4  
5 311 language barrier is to send the letter written in the language of the individual migrant as  
6  
7 312 well as that of the country in which they reside.

8  
9 313 Our study showed that Asian immigrant women had a lower rate of Pap testing  
10  
11 314 when compared with European immigrant women. The Pap smear is a more personal and  
12  
13 315 invasive procedure that may pose particular cultural barriers and thus can hinder these  
14  
15 316 women from obtaining the appropriate services.<sup>43</sup> Culturally tailored messages are  
16  
17 317 important to promote screening in specific ethnic groups to enable the identification of  
18  
19 318 the target group with these messages. The message must reflect the same values and  
20  
21 319 beliefs of the target group, and it should accommodate literacy levels to ensure  
22  
23 320 comprehension. Working closely with the target group is also crucial to ensure screening  
24  
25 321 participation. It would be important for program developers to contact ethnic group  
26  
27 322 gatekeepers, such as key religious or community leaders.

28  
29 323 Immigrant women in our study have experienced an acceptable level of care  
30  
31 324 during pregnancy and childbirth. We also found that education and advice for  
32  
33 325 breastfeeding and newborn care could be improved in our sample.

34  
35 326 In general, one way of reducing barriers for participation would be for health-care  
36  
37 327 professionals to introduce immigrant women to preventive care. In particular, GPs could  
38  
39 328 play an important role in this respect, especially when one takes into account that a  
40  
41 329 survey conducted among immigrant populations in the same area showed that 85% of the  
42  
43 330 sample had access to a GP at least once, indicating that immigrants in our area of study  
44  
45 331 had adequate access to primary care.<sup>29</sup> As a result, the acculturation process into the  
46  
47 332 health-care system could be shortened.

48  
49 333 *Strength and limitations of the study*

50  
51 334 The strengths of the study lie in the enrolment technique and the high  
52  
53 335 participation rate. A physician not involved in providing health care to the migrants was  
54  
55 336 chosen to complete the questionnaire as it was our belief that this would make the

1  
2  
3 337 participants more confident in reporting all aspects of health care they had received.  
4  
5 338 Furthermore, the physician was supported by linguistic and cultural mediators to help  
6  
7 339 those who could not speak Italian or with low literacy skills. Moreover, the 92.3%  
8  
9 340 participation rate is very satisfactory, reducing a major source of bias, and we believe this  
10  
11 341 is related to the great efforts of the survey researchers in promoting migrant involvement  
12  
13 342 in the study.

14  
15 343 Our findings are subject to some limitations. First, we used a convenience  
16  
17 344 sampling method, and this factor limits the generalizability of the results. Furthermore,  
18  
19 345 we chose locations of focus due to logistical constraints, and, therefore, the study sample  
20  
21 346 was composed of people connected to NPOs that assist migrant population and also  
22  
23 347 mediated healthcare encounters. Therefore the views expressed may be different from  
24  
25 348 migrants who have no such connection to those organizations. Furthermore, a large  
26  
27 349 proportion of our migrant participants had a regular residence permit which carries with it  
28  
29 350 health insurance cover, which again is not the case with irregular immigrants. Therefore,  
30  
31 351 the sample may not be representative of all immigrants within the region, but only of  
32  
33 352 those connected to NPOs and with a regular stay permit.

34  
35 353 Moreover, the cross-sectional design of our study could not capture temporal  
36  
37 354 changes in the ability of immigrants to use and access health services. There may be an  
38  
39 355 effect of recall bias on self reported information about CS practices: patients frequently  
40  
41 356 tend to over-report their use of Pap test or mammogram and underreport the time lapse  
42  
43 357 since their last screening. We have attempted to minimize these biases by conducting the  
44  
45 358 survey with the use of access measures that are less subjective and measure patient  
46  
47 359 experience, not simply satisfaction. Moreover, there may be women who were pregnant  
48  
49 360 in Italy some years ago and, unintentionally, gave incorrect information due to poor or  
50  
51 361 incomplete memory recall. However, given that the mean age of women in this subgroup  
52  
53 362 is 34.9 years, it is likely that the mean time from pregnancy would have been within an  
54  
55 363 acceptable time range thus minimizing recall bias.

1  
2  
3 364 **Conclusion**  
4

5 365 Even with these potential limitations, this study provides currently unavailable  
6  
7 366 information about preventive care utilization among immigrant women in Italy that could  
8  
9 367 encourage future research to develop and test culturally appropriate, women-centered  
10  
11 368 strategies for promoting timely and regular CS and to better understand the factors that  
12  
13 369 predict maternal and child health services utilization and identify potential targets for  
14  
15 370 intervention among immigrant women.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 371 **List of abbreviations**

4  
5 372 CS: cancer screening; GP: general practitioner; OR: odds ratio; CI: confidence interval;  
6  
7 373 NPO: non-profit organization.

8  
9 374 **Acknowledgements**

10  
11 375 The authors would like to give thanks to all cultural and linguistic mediators and to the  
12  
13 376 staff at non-profit organizations who contributed to the survey, as well as special thanks  
14  
15 377 to all of the study participants.

16  
17 378 **Authors' contributions**

18  
19 379 AB, CGAN, EL and CP collected the data, and contributed to the data analysis and  
20  
21 380 interpretation. AB and MP designed the study, were responsible for the data analysis and  
22  
23 381 interpretation, and wrote the article. AB and MP are guarantors for the study.

24  
25 382 **Funding**

26  
27 383 This research did not receive any specific grant from funding agencies in the public,  
28  
29 384 commercial, or not-for-profit sectors.

30  
31 385 **Competing interests**

32  
33 386 All authors have completed the ICMJE uniform disclosure form at  
34  
35 387 [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for the  
36  
37 388 submitted work; no financial relationships with any organisations that might have an  
38  
39 389 interest in the submitted work in the previous three years; no other relationships or  
40  
41 390 activities that could appear to have influenced the submitted work.

42  
43 391 **Data sharing statement**

44  
45 392 Survey data was not included in the present article and are available from the authors.  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

393 **References**

- 394 1. United Nations, Population Division, Department of Economic and Social Affairs  
395 (UN DESA) – Trends in International Migrants Stock: The 2015 Revision  
396 (POP/DB/MIG/Stock/Rev.2015, Table  
397 1).[http://www.un.org/en/development/desa/population/migration/data/estimates2/data/  
398 UN\\_MigrantStockTotal\\_201](http://www.un.org/en/development/desa/population/migration/data/estimates2/data/UN_MigrantStockTotal_201). Accessed December 6, 2016.
- 399 2. Llacer A, Zunzunegui MV, del Amo J, Mazarrasa L, Bolumar F. The contribution of  
400 a gender perspective to the understanding of migrants' health. *J Epidemiol Community  
401 Health* 2007;61:4–10.
- 402 3. Almeida LM, Caldas JP, Ayres-de-Campos D, Dias S. Assessing maternal healthcare  
403 inequities among migrants: a qualitative study. *Cad Saude Publica* 2014;30:333-40.  
404 doi: 10.1590/0102-311X00060513
- 405 4. Bollini P, Stotzer U, Wanner P. Pregnancy outcomes and migration in Switzerland:  
406 results from a focus group study. *Int J Public Health* 2007;52:78-86
- 407 5. Bustreo F. Promoting health through the life-course. Ten top issues for women's  
408 health. World Health Organization. [http://www.who.int/life-  
409 course/news/commentaries/2015-intl-womens-day/en/](http://www.who.int/life-course/news/commentaries/2015-intl-womens-day/en/). Accessed November  
410 22, 2016
- 411 6. Nelson NJ. Migrant studies aid the search for factors linked to breast cancer  
412 risk. *J Natl Cancer Inst* 2006;98:436–8
- 413 7. Bobby D, Olopade OI. Race, Ethnicity, and the Diagnosis of Breast Cancer.  
414 *JAMA* 2015; 313:141–2. doi:10.1001/jama.2014.17323
- 415 8. Roberts D. Debating the cause of health disparities - implications for bioethics  
416 and racial equality. *Camb Q Healthc Ethics* 2012;21:332-41. doi:  
417 10.1017/S0963180112000059

- 1  
2  
3 418 9. Torre LA, Siegel RL, Ward EM, Jemal A. Global Cancer Incidence and Mortality  
4  
5 419 Rates and Trends-An Update. *Cancer Epidemiol Biomarkers Prev* 2016;25:16-27. doi:  
6  
7 420 10.1158/1055-9965.EPI-15-0578  
8  
9  
10 421 10. Harcourt N, Ghebre RG, Whembolua GL, Zhang Y, Warfa Osman S, Okuyemi KS.  
11  
12 422 Factors associated with breast and cervical cancer screening behavior among African  
13  
14 423 immigrant women in Minnesota. *J Immigr Minor Health* 2014;16:450-6. doi:  
15  
16 424 10.1007/s10903-012-9766-4  
17  
18 425 11. Grillo F, Valle'e J, Chauvin P. Inequalities in cervical cancer screening for women  
19  
20 426 with or without a regular consulting in primary care for gynaecological health, in  
21  
22 427 Paris, France. *Prev Med* 2012;54:259-65. doi:10.1016/j.ypmed.2012.01.013  
23  
24 428 12. Norredam M, Nielsen SS, Krasnik A. Migrants' utilization of somatic healthcare  
25  
26 429 services in Europe—a systematic review. *Eur J Public Health* 2010;20:555-63. doi:  
27  
28 430 10.1093/eurpub/ckp195  
29  
30  
31 431 13. Schueler KM, Chu PW, Smith-Bindman R. Factors associated with mammography  
32  
33 432 utilization: a systematic quantitative review of the literature. *J Womens Health*  
34  
35 433 (Larchmt) 2008;17:1477-98. doi: 10.1089/jwh.2007.0603  
36  
37 434 14. Kristiansen M, Thorsted BL, Krasnik A, von Euler-Chelpin M. Participation in  
38  
39 435 mammography screening among migrants and non-migrants in Denmark. *Acta Oncol*  
40  
41 436 2012;51:28-36. doi: 10.3109/0284186X.2011.626447  
42  
43  
44 437 15. Ghafoor A, Jemal A, Ward E, Cokkinides V, Smith R, Thun M. Trends in breast  
45  
46 438 cancer by race and ethnicity. *CA Cancer J Clin* 2003;53:342-55. doi:  
47  
48 439 10.3322/canjclin.53.6.342  
49  
50  
51 440 16. Nerbs MV, Mark HF. Breast cancer among Asian women. *Med Health RI*  
52  
53 441 1996;79:388-91.  
54  
55 442 17. O'Malley MS, Earp JA, Hawley ST, Chell MI, Mathews HF, Mitchell J. The  
56  
57 443 association of race/ethnicity, socioeconomic status, and physician recommendation for  
58  
59  
60



- 1  
2  
3 444 mammography: Who gets the message about breast cancer screening? *Am J Public*  
4  
5 445 *Health* 2001;91:49-54.  
6  
7 446 18. Frisby CM. Messages of hope: Health communications strategies that address barriers  
8  
9 447 preventing black women from screening for breast cancer. *J Black Stud* 2002;32:489-  
10  
11 448 505. <http://www.jstor.org/stable/3180949>. Accessed December 4, 2016.  
12  
13 449 19. Centers for Disease Control and Prevention. Achievements in public health, 1900–  
14  
15 450 1999: Healthier mothers and babies. *MMWR* 1999;48:849-58.  
16  
17 451 20. Yuan B, Qian X, Thomsen S. Disadvantaged populations in maternal health in China  
18  
19 452 who and why? *Glob Health Action* 2013;6:19542. doi: 10.3402/gha.v6i0.19542  
20  
21 453 21. Kusuma YS, Kumari R, Kaushal S. Migration and access to maternal healthcare:  
22  
23 454 determinants of adequate antenatal care and institutional delivery among socio-  
24  
25 455 economically disadvantaged migrants in Delhi, India. *Trop Med Int Health*  
26  
27 456 2013;18:1202-10. doi: 10.1111/tmi.12166  
28  
29 457 22. Lauria L, Bonciani M, Spinelli A, Grandolfo ME. Inequalities in maternal care in  
30  
31 458 Italy: the role of socioeconomic and migrant status. *Ann Ist Super Sanita* 2013;49:209-  
32  
33 459 18. doi: 10.4415/ANN\_13\_02\_12  
34  
35 460 23. Singh PK, Rai RK, Singh L. Examining the effect of household wealth and migration  
36  
37 461 status on safe delivery care in urban India, 1992–2006. *PLoS One* 2012;7:e44901. doi:  
38  
39 462 10.1371/journal.pone.0044901  
40  
41 463 24. Bollini P, Pampallona S, Wanner P, Kupelnick B. Pregnancy outcome of migrant  
42  
43 464 women and integration policy: a systematic review of the international literature. *Soc*  
44  
45 465 *Sci Med* 2009;68:452-61. doi: 10.1016/j.socscimed.2008.10.018  
46  
47 466 25. Gissler M, Alexander S, Macfarlane A, et al. Stillbirths and infant deaths among  
48  
49 467 migrants in industrialized countries. *Acta Obstet Gynecol Scand* 2009;88:134-48. doi:  
50  
51 468 10.1080/00016340802603805  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 469 26. Balaam MC, Akerjordet K, Lyberg A, et al. A qualitative review of migrant women's  
4 470 perceptions of their needs and experiences related to pregnancy and childbirth. *J Adv*  
5 471 *Nur* 2013;69:1919-30. doi: 10.1111/jan.12139  
6  
7  
8  
9  
10 472 27. Gibson-Helm ME, Teede HJ, Cheng IH, et al. Maternal health and pregnancy  
11 473 outcomes comparing migrant women born in humanitarian and non humanitarian  
12 474 source countries: a retrospective, observational study. *Birth* 2015;42:116-24. doi:  
13 475 10.1111/birt.12159  
14  
15  
16  
17  
18 476 28. The World Bank. 2011. The World Bank. <http://data.worldbank.org/>. Accessed July  
19 477 22, 2014.  
20  
21  
22 478 29. Bianco A, Larosa E, Pileggi C, Nobile CG, Pavia M. Utilization of health-care  
23 479 services among immigrants recruited through non-profit organizations in southern  
24 480 Italy. *Int J Public Health* 2016;61:673-82. doi: 10.1007/s00038-016-0820-1  
25  
26  
27  
28 481 30. StataCorp. Stata: Release 11. Statistical Software. 2009, College Station, TX:  
29 482 StataCorp LP.  
30  
31  
32 483 31. Ricardo-Rodrigues I, Jiménez-García R, Hernández-Barrera V, Carrasco-Garrido P,  
33 484 Jiménez-Trujillo I, López de Andrés A. Social disparities in access to breast and  
34 485 cervical cancer screening by women living in Spain. *Public Health* 2015;129:881-8.  
35 486 doi: 10.1016/j.puhe.2015.02.021  
36  
37  
38  
39 487 32. Rondet C, Lapostolle A, Soler M, Grillo F, Parizot I, Chauvin P. Are immigrants and  
40 488 nationals born to immigrants at higher risk for delayed or no lifetime breast and  
41 489 cervical cancer screening? The results from a population-based survey in Paris  
42 490 metropolitan area in 2010. *PLoS One* 2014;9:e87046; doi:  
43 491 10.1371/journal.pone.0087046. eCollection 2014.  
44  
45  
46  
47  
48  
49  
50 492 33. Almeida LM, Caldas J, Ayres-de-Campos D, Salcedo-Barrientos D, Dias S. Maternal  
51 493 healthcare in migrants: a systematic review. *Matern Child Health J* 2013;17:1346-54.  
52 494 doi: 10.1007/s10995-012-1149-x  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 495 34. Grandahl M, Tydén T, Gottvall M, Westerling R, Oscarsson M. Immigrant women's  
4 496 experiences and views on the prevention of cervical cancer: a qualitative study. Health  
5 497 Expect 2015;18:344-54. doi: 10.1111/hex.12034  
6  
7  
8 498 35. Hasnain M, Menon U, Ferrans CE, Szalacha L. Breast cancer screening practices  
9 499 among first-generation immigrant muslim women. J Womens Health (Larchmt)  
10 500 2014;23:602-12. doi: 10.1089/jwh.2013.4569  
11  
12 501 36. Campostrini S, Carrozzi G, Salmaso S, Severoni S. (Ed.) Malattie croniche e migranti  
13 502 in Italia. Rapporto sui comportamenti a rischio, prevenzione e diseguaglianze di  
14 503 salute, Organizzazione Mondiale della Sanità - Istituto Superiore della Sanità -  
15 504 Università Ca' Foscari, Venezia, 2015.  
16  
17 505 37. The National Centre for Screening Monitoring Tenth Report. Epidemiol Prev  
18 506 2012;36:1-96.  
19 507 <http://www.osservatorionazionalecreening.it/sites/default/files/allegati/EPv36i6s1.pdf>  
20 508 . Accessed December 2, 2016.  
21  
22 509 38. La sorveglianza PASSI. Screening mammografico 2012-2015.  
23 510 <http://www.epicentro.iss.it/passi/dati/ScreeningCervicale.asp>. Accessed April 10,  
24 511 2017.  
25  
26 512 39. La sorveglianza PASSI. Screening cervicale 2012-2015.  
27 513 <http://www.epicentro.iss.it/passi/dati/ScreeningMammografico.asp>. Accessed April  
28 514 10, 2017.  
29  
30 515 40. Vahabi M, Lofters A, Kumar M, Glazier RH. Breast cancer screening disparities  
31 516 among urban immigrants: a population-based study in Ontario, Canada. BMC Public  
32 517 Health 2015;15:679. doi: 10.1186/s12889-015-2050-5  
33  
34 518 41. Blomberg K, Tishelman C, Ternstedt BM, Tornberg S, Leval A, Widmark C. How  
35 519 can young women be encouraged to attend cervical cancer screening? Suggestions  
36 520 from face-to-face and internet focus group discussions with 30-year-old women in

- 1  
2  
3 521 Stockholm. Sweden Acta Oncologica 2011;50:112-20. doi:  
4  
5 522 10.3109/0284186X.2010.528790  
6  
7 523 42. Everett T, Bryant A, Griffin MF, Martin-Hirsch PP, Forbes CA, Jepson RG.  
8  
9 524 Interventions targeted at women to encourage the uptake of cervical screening.  
10  
11 525 Cochrane Database of Systematic Reviews 2011;5:CD002834. doi:  
12  
13 526 10.1002/14651858.CD002834.pub2  
14  
15 527 43. Abdullahi A. Cervical screening: perceptions and barriers to uptake among Somali  
16  
17 528 women in Camden. Public Health 2009;123:680-5. doi: 10.1016/j.puhe.2009.09.011  
18  
19 529

530 **Table 1. Cervical and breast cancer screening (CS) practices according to selected**  
 531 **characteristics of immigrant women**

Characteristic	Total (464)		Cervical CS (419)		Breast CS (125)	
	No.	%	No.	%	No.	%
<i>Age, years</i>						
18-30	92	19.8	28	33.3	-	-
31-40	141	30.4	42	33.1	-	-
41-50	117	25.2	53	46.9	7	58.3
≥51	114	24.6	41	43.2	50	44.2
			Trend $\chi^2=6.64$ , 3 df, p=0.084		Trend $\chi^2=0.86$ , 1 df, p=0.353	
<i>Education level, years</i>						
≤7	121	26.1	48	42.9	13	48.2
8-13	275	59.3	86	34.8	29	41.4
>13, with university degree	68	14.6	30	50	15	53.6
			$\chi^2=5.56$ , 2 df, p=0.062		$\chi^2=1.28$ , 2 df, p=0.528	
<i>Marital status*</i>						
Married	260	56.3	99	40.7	25	46.3

1							
2							
3							
4	Other	202	43.7	54	36.6	31	44.3
5							
6							
7				$\chi^2=0.74, 1 \text{ df},$		$\chi^2=0.05, 1 \text{ df},$	
8							
9				$p=0.389$		$p=0.823$	
10							
11	<i>Children</i>						
12							
13							
14	No	115	24.8	30	30.6	7	41.2
15							
16							
17	Yes	349	75.2	134	41.7	50	46.3
18							
19							
20				$\chi^2=3.91, 1 \text{ df},$		$\chi^2=0.16, 1 \text{ df},$	
21							
22				$p=0.048$		$p=0.694$	
23							
24							
25	<i>Employment status</i>						
26							
27							
28	Unemployed	147	31.7	55	42.6	14	46.7
29							
30							
31	Housekeeper, caregiver	273	58.8	90	35.3	40	47.1
32							
33							
34	Manual worker	24	5.2	8	50	1	14.3
35							
36							
37	Sedentary worker	20	4.3	11	57.9	2	66.7
38							
39				$\chi^2=5.84, 3 \text{ df},$		Fisher's exact=3.36,	
40							
41				$p=0.120$		$p=0.339$	
42							
43							
44	<i>Nationality</i>						
45							
46							
47	European	215	46.3	76	38.6	35	43.2
48							
49							
50	African	138	29.8	55	44.7	9	47.4
51							
52							
53	Asian	98	21.1	23	26.7	12	50
54							
55							
56							
57							
58							
59							
60							

American	13	2.8	10	76.9	1	100
				$\chi^2=14.97, 3 \text{ df},$		Fisher's exact=1.59,
				p=0.002		p=0.661
<i>Self-reported legal status</i>						
Regular	418	90.1	154	41.1	54	50
Irregular	46	9.9	10	22.7	3	17.7
				$\chi^2=5.56, 1 \text{ df},$		Fisher's exact=6.20,
				p=0.018		p=0.013
<i>Length of stay in Italy, years</i>						
1-2	83	17.9	16	21.6	3	15.8
3-5	124	26.7	24	22.2	6	30
6-8	97	20.9	45	47.4	10	47.6
$\geq 9$	160	34.5	79	55.6	38	58.5
				Trend $\chi^2=41.33, 3 \text{ df},$		Trend $\chi^2=13.03, 3 \text{ df},$
				p<0.001		p=0.005
<i>Physical activity*</i>						
No	157	34.9	57	41	18	40.9
Yes	293	65.1	102	38.2	39	48.2
				$\chi^2=0.30, 1 \text{ df},$		$\chi^2=0.60, 1 \text{ df},$
				p=0.583		p=0.438

Alcohol consumption in the  
previous 30 days\*

No	321	71.3	113	39.2	38	46.9
Yes	129	28.7	46	39	19	43.2

$\chi^2=0.00$ , 1 df,  $\chi^2=0.16$ , 1 df,  
p=0.962 p=0.689

Current smoker\*

No	363	80.7	127	39.2	45	47.4
Yes	87	19.3	32	39	12	40

$\chi^2=0.00$ , 1 df,  $\chi^2=0.50$ , 1 df,  
p=0.977 p=0.480

Chronic diseases\*

No	227	50.8	64	31.8	12	41.4
Yes	220	49.2	94	46.5	45	46.9

$\chi^2=9.13$ , 1 df,  $\chi^2=0.27$ , 1 df,  
p=0.003 p=0.603

532 \*Total may not be equal to *n* because of missing values.

533



534 **Table 2. Cervical and breast cancers screening practice**

<b>Cancer screening services</b>	<b>No.</b>	<b>Percent</b>
<b>Cervix<sup>†</sup></b>		
<b>Having received cervical cancer screening through Pap smear (419)</b>		
No	247	59
Yes, for control	164	39.1
Yes, I had problems	8	1.9
<b>Time since last pap test, years (419)</b>		
≤ 3	135	32.8
> 3 or never	283	67.5
<b>Breast<sup>#</sup></b>		
<b>Having received breast cancer screening through mammography (125)</b>		
No	61	48.8
Yes, for control	57	45.6
Yes, I had problems	7	5.6
<b>Time since last mammogram, years (125)</b>		
≤ 2	26	20.8
> 2 or never	99	79.2

535 <sup>†</sup> All sexually active women aged 25-64 years and having an intact uterus were eligible536 <sup>#</sup> Women aged 50-69 years were eligible

537 **Table 3. Multiple logistic regression analysis between variables potentially associated with**  
 538 **having received a Pap smear in the previous three years**

Variable	OR	SE	95% CI	P value
<i>Model Outcome: Pap smear for screening purposes in the previous three years</i>				
<i>Log-likelihood = -227.53, <math>\chi^2 = 50.97</math>, P value &lt; 0.0001, No. of obs. = 402<sup>s</sup></i>				
Length of stay in Italy, ordinal	1.64	0.21	1.28-2.1	<0.001
Nationality				
European*	1.00	-	-	-
South American	7.87	6.14	1.7-36.32	0.008
Asian	0.35	0.13	0.17-0.72	0.004
African	0.74	0.27	0.36-1.51	0.411
Employment status				
Unemployed*	1.00	-	-	-
Housekeeper, caregiver	0.7	0.19	0.4-1.2	0.198
Manual workers	0.58	0.36	0.17-1.95	0.374
Sedentary workers	0.85	0.53	0.25-2.87	0.798
Chronic diseases	1.37	0.34	0.84-2.21	0.204
Not married	0.73	0.19	0.44-1.22	0.228
Alcohol consumption in the previous 30 days	0.75	0.22	0.42-1.32	0.312
Physical activity	0.83	0.21	0.5-1.36	0.457
Current smoker	0.83	0.26	0.45-1.55	0.564
Children	0.83	0.26	0.45-1.53	0.555
Age	1.07	0.14	0.83-1.39	0.601
Self-reported legal status	1.18	0.52	0.5-2.79	0.704

1  
2  
3  
4  
5  
6 Education level 0.97 0.2 0.67-1.46 0.867  
7

8 539 \* reference category  
9

10 540 § the observations do not sum to N (419) due to missing values  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

541 **Table 4. Pregnancy, antenatal and post-partum care characteristics of the eligible women and**  
 542 **comparison with Italian population**

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
<b>Age, years</b>		34.9±8.9	32
<b>Pregnancies in Italy (123)</b>			
1	90 (73.2)		(53.9)
≥2	33 (26.8)		(46.1)
<b>Smoking status (123)</b>			
Nonsmoker	98 (79.7)		(68.1)
Smoker before pregnancy	14 (11.4)		(24.4)
Smoker	11 (8.9)		(7.5)
<b>Prepartum course participation (122)</b>			
No	89 (73)		(60.5)
Yes	33 (27)		(39.5)
<b>Visit after delivery (within 12 months) (119)</b>			
Yes	95 (79.8)		/
No	24 (20.2)		/
<b>Counseling on postpartum contraceptive methods (122)</b>			
No	66 (54.1)		(40.9)
Yes	56 (45.9)		(59.1)
<b>Infant feeding (122)</b>			
Breastfeeding only	85 (69.6)		(88.5)
Breastfeeding and bottle-feeding	24 (19.7)		
Bottle-feeding only	13 (10.7)		(11.5)
<b>Utilization of family planning clinic (121)</b>			
Yes	66 (54.5)		(27.9)

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
No	55 (45.5)		(72.1)

543 The number of participants responding to the questions is indicated in brackets

For peer review only



**UNIVERSITY OF CATANZARO "MAGNA GRÆCIA"**  
**DEPARTMENT OF HEALTH SCIENCES**  
**MEDICAL SCHOOL**  
**CHAIR OF HYGIENE**

**CERVICAL AND BREAST CANCER SCREENING PARTICIPATION AND UTILIZATION OF  
MATERNAL HEALTH SERVICES AMONG IMMIGRANT WOMEN IN SOUTHERN ITALY**

*Questionnaire used in the survey*

Date of interview \_\_\_/\_\_\_/\_\_\_

No. \_\_\_\_\_

**A) Demographic characteristics**

**A.1. How old were you on your last birthday?** (years) \_\_\_\_\_

**A.2. What is your marital status?**  Single  Married with husband in Italy  Married without husband in Italy  
 Divorced  Widowed  Other (please, specify \_\_\_\_\_)

**A.3.1. Do you have any children?**  No (→A.4.)  Yes (n° \_\_\_\_\_) **A.3.2. Are they living in Italy?**  No  Yes (n° \_\_\_\_\_)

**A.3.3. How old were they on their last birthday? What is their sex?**

I. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VI. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
II. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
III. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VIII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
IV. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	IX. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
V. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	X. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F

**A.4. What is the highest level of education that you have completed?** (years)

< 5  5 – 7  8 – 12  ≥13, without university degree  
 ≥13, with university degree (please, specify \_\_\_\_\_)

**A.5. What is your occupation?**  None  Student  Housewife  
 Housekeeper, caregiver  Peddler  Farmer  Manual worker  
 Professional employed  Other (spec. \_\_\_\_\_)

**A.6. What is your religion?**  None  Catholic Christian  Orthodox Christian  
 Jewish  Islamic  Buddhist  Hindu  Other (spec. \_\_\_\_\_)

**A.7. What is your country of origin?** \_\_\_\_\_

**A.8. From what country did you arrive in**  Country of origin  Other country (please, specify \_\_\_\_\_)  
Italy?

**A.9. How long have you lived in Italy?** (years) \_\_\_\_\_ (if less than 1 year, end interview.)

**A.10. What is your legal immigration status?**  Regular  Irregular  Asylum seeker

**B) General health conditions**

**B.1. Do you suffer from any of the following chronic diseases?** (please, if yes, specify one or more of the following diseases)

No/I don't know

Cardiovascular diseases (eg. hypertension, hypercholesterolemia, etc.) \_\_\_\_\_

Respiratory diseases (eg. asthma, chronic obstructive pulmonary disease, etc.) \_\_\_\_\_

Gastrointestinal diseases (eg. gastroenteritis, esophagitis, celiac disease, etc.) \_\_\_\_\_

Musculoskeletal diseases (eg. osteoarthritis, osteoporosis, carpal tunnel syndrome, etc.) \_\_\_\_\_

Oral diseases (dental caries, gingivitis, stomatitis, malocclusion, etc.) \_\_\_\_\_

Genitourinary diseases (calculi, erectile dysfunction, prostatitis, etc.) \_\_\_\_\_

Psychiatric disorders (depression, schizophrenia, eating disorders) \_\_\_\_\_

Metabolic diseases (eg. chronic renal failure, liver cirrhosis, diabetes, thyroid disease, etc.) \_\_\_\_\_

Autoimmune disorders (eg. SLE, psoriasis, inflammatory bowel diseases, ecc.) \_\_\_\_\_

Other (please, specify \_\_\_\_\_)

**B.2. Are you affected by any of the following infectious diseases?**  No/I don't know  HIV  Hepatitis B

Hepatitis C     Tuberculosis     Parasitosis (es. malaria, toxoplasmosis, giardia, schistosomiasis, taenia, ecc.)  
 STD (eg. syphilis, gonorrhoea, HSV, etc.)     Other (please, specify \_\_\_\_\_)

**C) Health risk habits**

**C.1. Tobacco use**  
 C.1.1 Have you smoked at least 100 cigarettes in your entire life?     No (→C.2.1.)     Yes  
 C.1.2. Do you now smoke cigarettes:     Some days (specify n° \_\_\_\_\_)     Every day (specify n° \_\_\_\_\_)     Never (→C.2.1.)  
 C.1.3. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?     No     Yes  
**C.2. Alcohol consumption**  
 C.2.1. During the past 30 days, did you have at least one drink of any alcoholic beverage such as beer, wine or liquor?     No (→D.1.)     Yes  
 C.2.2. During the past 30 days, how many days per month did you have at least one drink of any alcoholic beverage?    \_\_\_\_\_  
 C.2.3. During the past 30 days, on the days when you drank, approximately how many drinks did you drink on average?  
 Wine    \_\_\_\_\_    Beer    \_\_\_\_\_    Liquor    \_\_\_\_\_

**D) Prevention and screening**

**D.1. Immunization**  
**D.1.1. Which of the following vaccinations have you had? (more than one option allowed)**  
 Diphtheria     Tetanus     Pertussis     Polio  
 Hepatitis B     Mumps     Rubella     Measles  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)  
 (If participant answered Yes to the question A.3.2. skip to question D.1.2.. If participant answered No to the question A.3.2. skip to question D.2.1.)  
**D.1.2. Have your children received vaccinations included in the national programs?**     No     I don't remember     Yes (→D.1.4.)  
**D.1.3. Why have they not received children's vaccinations? (more than one option allowed)**  
 I was not aware of their availability     Vaccinations are not useful     Vaccinations are dangerous  
 Religious reasons     Lack of time     Other (please, specify \_\_\_\_\_)  
**D.1.4. Do you remember which of the following vaccinations your children have had?**  
 Mandatory vaccinations (diphtheria, tetanus, polio, hepatitis B)     Pertussis     Measles, mumps and rubella  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)  
**D.2. Screening**  
**D.2.1. Have you ever had Pap test?**  
 No     Yes, for control     Yes, for problems  
**D.2.2. When was the last time you had a Pap test? (years)**  
 <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago  
**D.2.3. Have you had a hysterectomy?**     No     Yes  
**D.2.4. Have you ever had a mammography?**  
 No     Yes, for control     Yes, for problems  
**D.2.5. When was the last time you had a mammography? (years)**  
 <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago

**E) Utilization of maternal health services**

(If participant answered Yes to question A.3.1. skip to question E.1. If participant answered No to question A.4.1. end interview.)  
**E.1. How many times have you given birth since you've been in Italy?**     None     (spec. n°) \_\_\_\_\_  
**E.2. How many times have you had a miscarriage?**     None     I don't remember     (spec. n°) \_\_\_\_\_  
**E.3. How many times have you had an abortion?**     None     I don't remember     (spec. n°) \_\_\_\_\_  
 (If participant answered None to question E.1. end interview. Otherwise, complete interview with all following questions referred to last pregnancy.)  
**E.4. Who was mainly monitoring your pregnancy/ies?**     None     General practitioner  
 Gynecologist     Midwife     Other (please, specify \_\_\_\_\_)  
**E.5. How many prenatal visits did you attend during each pregnancy?**

- None  1  >1 (*spec. n°*)
- 1 E.6. When did you receive your first pregnancy appointment?  I don't remember  (*please, specify weeks of pregnancy*)
- 2 E.7.1. How many prenatal ultrasound checks did you have during your pregnancy? (*spec. n°*)
- 3 E.7.2. Do you remember in which weeks of pregnancy you had these prenatal ultrasound checks? (*more than one option*)  None
- 4 allowed)
- 5  <8  8-12  13-16  17-20  21-24  25-28  29-32  ≥33
- 6 E.8. Did you know that prenatal visits and ultrasound checks are free?  No  Yes
- 7 E.9. Did you have any prenatal diagnostic testing? (*max. 4 options*)  No  Yes, maternal serum markers
- 8  Yes, chorionic villus sampling  Yes, amniocentesis  Yes, nuchal translucency  Other (*please, specify* \_\_\_\_\_)
- 9 E.10. Have you ever participated in a prepartum course/prenatal class?  No  Yes
- 10 E.11. Overall, do you believe you have had difficulties of access to and use of prenatal services during your pregnancy? (*max. 3 options*)  No
- 11  Yes, I don't know system's organization  Yes, for language barriers  Yes, for long waiting times for access to health-care services
- 12  Yes, lack of time  Yes, for my poor socioeconomic situation  Other (*please, specify* \_\_\_\_\_)
- 13 E.12. Did you ever smoke during pregnancy?  No, I don't smoke  No, I stopped
- 14  Yes, I continued to smoke the same number of cigarettes  Yes, but I decreased the number of cigarettes
- 15 E.13. Did you have a postnatal visit within 12 months after delivery?  No  Yes
- 16 E.14. What was your chosen infant feeding method?  Breastfeeding only (→E.17.)  Bottle-feeding only
- 17  Breastfeeding and other (water, tisane, or other infusion)  Breastfeeding and bottle-feeding
- 18 E.15. Who advised you regarding the formula milk?  Nobody, I decided  Pediatrician
- 19  Family/Friends  Physician of hospital ward  Other (*please, specify* \_\_\_\_\_)
- 20 E.16. What is the reason for the formula milk? (*max. 3 options*)  I don't have enough milk  I stopped breastfeeding
- 21  The baby was not gains weight  The baby couldn't latch on well
- 22  I had painful nipples, and/or mastitis  I had acute health problems  My child had acute health problems
- 23  I had to resume work shortly  I had to moved my child abroad  I was tired
- 24  I took some drugs (*please, specify* \_\_\_\_\_)  Other (*please, specify* \_\_\_\_\_)
- 25 E.17. Who gave you information about infant feeding?  None  I know
- 26  Midwife of hospital ward  Midwife of family planning center  Pediatrician  Family/Friends
- 27  Other (*please, specify* \_\_\_\_\_)
- 28 E.18. Do you believe it is possible to get pregnant during the period of breastfeeding?
- 29  No, it's not possible  I don't know  Yes, it's possible
- 30 E.19. Who counseled you on postpartum contraceptive methods?
- 31  None (→E.21.)  Family/Friends  General practitioner
- 32  Specialist  Midwife of family planning center  Other (*please, specify* \_\_\_\_\_)
- 33 E.20. Do you believe this counseling has been sufficient?
- 34  Yes, I believe it has  No, I would like to know more
- 35 E.21. At the resumption of sexual relations, are you thinking of using contraception?
- 36  No  I don't know yet  Yes (*please, specify* \_\_\_\_\_)
- 37 E.22. Do you know a family planning center?
- 38  No (→E.24.)  Yes, but I never used it  Yes, I have used it (→ E.24.)
- 39 E.23. Why have you never used a family planning center? (*please, specify one or more reason*) \_\_\_\_\_
- 40 E.24. Are you accessing any healthcare services since discharge?  No (→E.26.)  Yes
- 41 E.25. Please, specify one or more of following healthcare services:
- 42  Pediatric planning center  Family planning center  Advice center  Specialist clinic
- 43  Emergency Department  Hospital  Other (*please, specify* \_\_\_\_\_)
- 44 E.26. Whom have you selected as the child's physician?  None  Specialist
- 45  Physician of family planning center  Physician of hospital ward  Pediatrician  Other (*please, specify* \_\_\_\_\_)



STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item N <sup>o</sup>	Recommendation	Page
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6,7
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7,8
Bias	9	Describe any efforts to address potential sources of bias	13
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9,10
		(b) Indicate number of participants with missing data for each variable of interest	21,23

Outcome data	15*	Report numbers of outcome events or summary measures	9,10; 21-23
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9,10; 21-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	10-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	10-14
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

## Cervical and breast cancer screening participation and utilization of maternal health services: a cross-sectional study among immigrant women in Southern Italy

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-016306.R3
Article Type:	Research
Date Submitted by the Author:	18-Jul-2017
Complete List of Authors:	Bianco, Aida; University of Catanzaro "Magna Græcia", Department of Health Sciences Larosa, Elisabetta; University of Catanzaro "Magna Græcia", Department of Health Sciences Pileggi, Claudia; University of Catanzaro "Magna Græcia", Department of Health Sciences Nobile, Carmelo; University of Catanzaro "Magna Græcia", Department of Health Sciences PAVIA, Maria; University of Catanzaro "Magna Græcia", Department of Health Sciences
<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Health services research
Keywords:	cancer screening, immigrant, Italy, maternal health, women

SCHOLARONE™  
Manuscripts

only

1  
2  
3 1 **Cervical and breast cancer screening participation and utilization of maternal**  
4 2 **health services: a cross-sectional study among immigrant women in Southern Italy**

5  
6  
7 3

8  
9 4

10  
11 5 Aida Bianco MD, Elisabetta Larosa MD, Claudia Pileggi MD, Carmelo G. A. Nobile MD,  
12 6 Maria Pavia MD, MPH

13  
14  
15 7

16  
17 8

18  
19 9

20  
21  
22 10 Department of Health Sciences, University of Catanzaro "Magna Græcia", Campus of  
23 11 Germaneto, 88100 Catanzaro, Italy

24  
25 12

26  
27 13

28  
29 14

30  
31 15

32  
33  
34 16 Author responsible for correspondence and whom requests for reprints should be addressed:

35 17 Maria Pavia MD, MPH

36 18 Chair of Hygiene

37 19 Department of Health Sciences

38 20 Medical School

39 21 University of Catanzaro "Magna Græcia"

40 22 Via T. Campanella, 115, 88100 Catanzaro, Italy

41 23 ph +39 (0)961 712371

42 24 fax +39 (0)961 712382

43 25 e-mail [pavia@unicz.it](mailto:pavia@unicz.it)

1  
2  
3 **26 Abstract**

4  
5 **27 Objectives**

6  
7 Women make up approximately half of the world's one billion migrants. Immigrant  
8  
9 women tend to be one of the most vulnerable population groups with respect to  
10  
11 healthcare. Cancer screening (CS) and maternal and reproductive health have been  
12  
13 included among the ten main issues pertinent to women's health.

14  
15 The aim of this study is to explore breast and cervical CS participation and to acquire  
16  
17 information regarding access to healthcare services during pregnancy, childbirth and the  
18  
19 postpartum period among age eligible immigrant women in Southern Italy.

20  
21 **35 Methods**

22  
23 A structured questionnaire was used to collect data from each participant. Women aged  
24  
25 25-64 years who had not had a hysterectomy and women aged 50-69 years without  
26  
27 history of breast cancer were considered eligible for evaluation of cervical and breast CS  
28  
29 participation, respectively. Moreover, women who had delivered at least once in Italy  
30  
31 were enrolled to describe antenatal and post-partum care services use. All women were  
32  
33 recruited through the third-sector and non-profit organizations (NPOs).

34  
35 **42 Results**

36  
37 Rate of cervical CS among the 419 eligible women was low (39.1%), and about one third  
38  
39 had had a Pap-test for screening purposes within a three year period from interview  
40  
41 (32.8%). Regarding breast CS practices, of the 125 eligible women 45.6% had had a  
42  
43 mammography for control purposes, and less than one quarter (26, 20.8%) had their  
44  
45 mammography within the recommended time interval of two years. About 80% of the  
46  
47 respondents did not report difficulties of access and use of antenatal and postpartum  
48  
49 services.

50  
51 **50 Conclusion**

52  
53 This study provides currently unavailable information about adherence to CS and  
54  
55 maternal and child health that could encourage future research to develop and test  
56  
57

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

53 culturally appropriate, women-centered strategies for promoting timely and regular CS  
54 among immigrant women in Italy.

55

56 **Key words:**

57 Cancer screening, immigrant, Italy, maternal health, women.

For peer review only

1  
2  
3  
4  
58 **Strengths and limitations of this study**

- 59 ■ The high participation rate (92.3%) is extremely satisfactory and restricts one  
60 major potential source of bias in the results.
- 61 ■ Immigrants who did not speak Italian or who had low literacy levels have not  
62 been excluded from the study, helped by linguistic and cultural mediators.
- 63 ■ The sample may not be representative of all immigrants within the region, but  
64 only of those connected to non-profit organizations and with a regular stay  
65 permit.
- 66 ■ There may be an effect of recall bias on self reported information about cancer  
67 screening practices.
- 68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

1  
2  
3 68 **Cancer screening participation and utilization of maternal health services: a cross-**  
4  
5 69 **sectional study among immigrant women in Southern Italy**

6  
7 70 **Background**

8  
9 71 Estimates from the United Nations show that women make up approximately half  
10  
11 72 of the world's one billion migrants.<sup>1</sup> The effects of migration on women's health are  
12  
13 73 varied and hard to predict and may be determined by a number of factors: the conditions  
14  
15 74 under which the migration occurred; how well a particular individual has integrated in the  
16  
17 75 host society, the social status of the individual in the host country, and the health  
18  
19 76 conditions that are existent in the host country. Studies have indicated that women who  
20  
21 77 migrate tend to be one of the most vulnerable population groups with respect to  
22  
23 78 healthcare.<sup>2,3</sup> In particular, women who do not speak the host country language and do not  
24  
25 79 have a job are less likely to benefit from the health system of the host nation.<sup>4</sup> These  
26  
27 80 women are usually dependent on men and are unaware of the available health services.  
28  
29 81 Governments should ensure that appropriate health services are provided that adequately  
30  
31 82 address all aspects of women's health, particularly cancer screening (CS) and maternal  
32  
33 83 and reproductive health. These basic health care services have been included among the  
34  
35 84 ten main issues pertinent to women's health, whether it be in immigrants or native  
36  
37 85 inhabitants,<sup>5</sup> and they ought to be available to everyone in society in accordance with  
38  
39 86 social equality.

40  
41 87 Breast cancer is the most frequently diagnosed cancer and the leading cause of  
42  
43 88 cancer death among females worldwide. Previous research has shown that immigrant  
44  
45 89 status is associated with breast cancer risk through changes in reproductive factors (e.g.,  
46  
47 90 higher age at first live birth, lower breast feeding rates) and lifestyle factors (e.g., diet) but  
48  
49 91 could also indicate variations in other environmental exposures.<sup>6-8</sup> Cervical cancer is the  
50  
51 92 second most commonly diagnosed cancer and although in several western countries its  
52  
53 93 burden has decreased by as much as 65% over the past 40 years thanks to screening



1  
2  
3 94 programs,<sup>9</sup> it is still the third leading cause of cancer death in less developed countries,  
4  
5 95 and an important healthcare issue among migrant women.  
6

7 96 Detecting both these cancers early is key to keeping women alive and healthy.  
8  
9 97 Increased health risks have been noted among immigrants and ethnic minorities who also  
10  
11 98 may receive less healthcare than the native population,<sup>10,11</sup> whilst at the same time  
12  
13 99 numerous studies have documented lower participation in CS programs among various  
14  
15 100 migrant groups.<sup>12-14</sup> Furthermore ethnic minority women residing in Western countries  
16  
17 101 are more likely to be diagnosed with advanced-stage disease and hence have higher  
18  
19 102 mortality rates,<sup>15</sup> often as a result of lower utilization of timely CS services.<sup>16-18</sup>  
20

21 103 Over the course of the last century there have been many tremendous  
22  
23 104 improvements in maternal and neonatal outcomes in terms of pregnancy-related  
24  
25 105 complications, maternal and infant mortality rates.<sup>19</sup> But the benefits of these have not  
26  
27 106 extended everywhere and to everyone, since significant disparities by race and ethnicity  
28  
29 107 persist. Studies on the determinants of maternal health care delivery suggest that social,  
30  
31 108 economic, behavioral, and environmental factors explain the worse health status among  
32  
33 109 migrants<sup>20-23</sup> in terms of preterm delivery, congenital anomalies, low birth weight, fetal  
34  
35 110 growth restriction, and infant mortality<sup>24-26</sup> when compared with the native population.<sup>27</sup>  
36  
37 111 In Italy, both native and foreign women, have the right to participate free of charge in a  
38  
39 112 specific programme of care during pregnancy and up to one month following delivery.  
40

41 113 The aims of this survey were to explore breast and cervical CS participation and  
42  
43 114 to acquire information regarding access to healthcare services during pregnancy,  
44  
45 115 childbirth and the postpartum period among age eligible immigrant women in Southern  
46  
47 116 Italy.  
48

## 49 117 **Methods**

### 50 118 *Study population*

51  
52  
53 119 The survey was conducted from May 2012 until April 2013. The study  
54  
55 120 population consisted of a specific subset of immigrants. For this study, immigrants were  
56  
57  
58  
59  
60

1  
2  
3 121 defined as those from low or middle-income countries according to the classification of  
4  
5 122 the World Bank based on per capita GDP.<sup>28</sup> Tourists were excluded.  
6

7 123 Details regarding sampling of individuals for this study have been described  
8  
9 124 elsewhere.<sup>29</sup> Briefly, since probability or random sampling can not be carried out on  
10  
11 125 immigrants, a convenience sampling method was applied. Women aged 18 or more living  
12  
13 126 in Italy for at least 12 months were recruited through the third-sector and non-profit  
14  
15 127 organizations (NPOs) that provide support to immigrants and work to facilitate their  
16  
17 128 access to healthcare.

18  
19 129 In Italy, organized nationwide CS programs include personal invitations for a  
20  
21 130 Pap-test sent to women aged 25-64 years every three years and for mammography  
22  
23 131 screening to women aged 50-69 years every two years. Therefore, sexually active women  
24  
25 132 aged 25-64 years who had not had a hysterectomy and women aged 50-69 years without  
26  
27 133 previous diagnosis of invasive or in situ breast cancer were considered eligible for  
28  
29 134 evaluation of cervical and breast CS participation, respectively. Moreover, women who  
30  
31 135 had delivered at least once in Italy were enrolled to describe antenatal and post-partum  
32  
33 136 care services use.

34  
35 137 *Survey instrument*

36  
37 138 Written consent was acquired prior to interview. A structured questionnaire  
38  
39 139 (available as supplementary file) was used to collect data from each participant.  
40  
41 140 Questionnaires were administered by physicians competent in interview methods, with  
42  
43 141 help, when necessary, from a cultural mediator. The interviews lasted ten minutes on  
44  
45 142 average.

46  
47 143 A pilot study was undertaken. Validation of the survey instrument was performed  
48  
49 144 through the assessment of internal and test-retest (external) reliability in addition to face  
50  
51 145 and content validity. Test-retest reliability was checked in the pilot study through an  
52  
53 146 additional interview of 50 women within a time interval of 20 days from the first  
54  
55 147 administration of the questionnaire. Face and content validity were examined in order to

1  
2  
3 148 assess the clarity of the wording of the items which in turn generated new items.  
4  
5 149 Modifications were made according to the comments recorded by the women in order to  
6  
7 150 clarify the content of the questionnaire and to simplify its wording.  
8

9 151 *Outcomes and covariates*

10  
11 152 Socio-demographics included information on gender, age, marital and legal  
12  
13 153 status, education level, religion, nationality, working activity, duration of residence in  
14  
15 154 Italy. The questions on lifestyle and health status included information on physical  
16  
17 155 activity, smoking habits, alcohol consumption, chronic and infectious diseases. The  
18  
19 156 questions on participation in screening programs included breast and cervical CS  
20  
21 157 practices. Uptake of cervical CS was determined by asking ‘Have you ever undergone  
22  
23 158 Pap test for control without any symptoms?’. Women who answered affirmatively were  
24  
25 159 asked ‘When was the last time you underwent Pap test?’. Women who had undergone a  
26  
27 160 Pap test within the previous three years were considered as ‘uptake’, corresponding to  
28  
29 161 women who comply with the recommended screening period. Uptake of breast CS was  
30  
31 162 determined by asking, ‘Have you ever undergone a mammography for control without  
32  
33 163 any symptoms?’. Women who answered affirmatively were asked a second question,  
34  
35 164 ‘When was the last time you had a mammography?’. Women who reported that they had  
36  
37 165 undergone their most recent mammography within the previous two years were  
38  
39 166 considered as ‘uptake’, corresponding to women who comply with the recommended  
40  
41 167 screening period.  
42

43 168 The questionnaire also contained items on services utilization during pregnancy  
44  
45 169 and childbirth. Access to antenatal and postnatal care was assessed by number and timing  
46  
47 170 of examination, such as time of first pregnancy appointment, number of prenatal visits  
48  
49 171 and echographies, antenatal care by health-care professionals including general  
50  
51 172 practitioner (GP), gynecologist, nurse, midwife/obstetrician, or other care providers,  
52  
53 173 prenatal screening and diagnostic testing (i.e. maternal serum markers such as beta human  
54  
55 174 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis, etc.),  
56  
57  
58  
59  
60

1  
2  
3 175 smoking habits during pregnancy, counseling on infant feeding and postpartum  
4  
5 176 contraceptive methods, reasons for access to maternal and newborn healthcare services  
6  
7 177 (family planning centers and child care service centers). All information was self-  
8  
9 178 reported.

10  
11 179 The study protocol was ratified by the Institutional Ethical Committee ('Mater  
12  
13 180 Domini' Hospital of Catanzaro, Italy) (20/04/2012).

#### 14 15 181 *Statistical analysis*

16  
17 182 Descriptive analyses were used to describe demographic characteristics and  
18  
19 183 lifestyle habits of the immigrant women. Data were summarized into frequencies and  
20  
21 184 percentages. Univariate analysis was conducted by using chi-square or Fisher exact tests  
22  
23 185 to assess relationships between cervical and breast CS behavior and the respective  
24  
25 186 eligible study sub-groups.

26  
27 187 Multivariate logistic regression analysis was performed. One model was  
28  
29 188 developed in which were included those variables potentially associated with having  
30  
31 189 received cervical CS through Pap smear in the previous three years (Model 1) (0 = no, 1 =  
32  
33 190 yes). Women that had had a pap smear not for screening purposes were included in the  
34  
35 191 "no" option of the outcome variable. The model building strategy consisted of the  
36  
37 192 following steps: 1) bivariate analysis was performed for each of the potential explanatory  
38  
39 193 variables to find out which coding (categorical, ordinal, continuous) better fitted the data  
40  
41 194 and we chose that in the multivariate analysis; 2) multiple logistic regression was  
42  
43 195 performed. Adjusted odds ratio (ORs) and 95% confidence intervals (CIs) were  
44  
45 196 calculated; 3) on the basis of the results of the bivariate analysis, the coding of the  
46  
47 197 explanatory variables included in the model was the following: age (continuous), marital  
48  
49 198 status (1 = married, 2 = other), children (1 = no, 2 = yes), education level (ordinal: 1 =  $\leq 7$   
50  
51 199 yrs, 2 = 8-13 yrs, 3 = university degree), employment status (four categories: 1 =  
52  
53 200 unemployed, 2 = housekeeper, caregiver, 3 = manual worker; 4 = sedentary workers)  
54  
55 201 included as a dummy variable with the unemployed being the reference category,  
56  
57  
58  
59  
60

1  
2  
3 202 nationality (four categories: 1 = European, 2 = African, 3 = Asian, 4 = South American)  
4  
5 203 included as a dummy variable with the European being the reference category, length of  
6  
7 204 stay in Italy (ordinal: 1 = 1-2 yrs, 2 = 3-5 yrs, 3 = 6-8 yrs, 4 =  $\geq$  9 yrs), self-reported legal  
8  
9 205 status (1 = regular, 2 = irregular), chronic diseases (1 = no, 2 = yes), physical activity (1 =  
10  
11 206 no, 2 = yes), current smoker (1 = no, 2 = yes), alcohol consumption in the previous 30  
12  
13 207 days (1 = no, 2 = yes). The data were analyzed using the Stata software program, version  
14  
15 208 11.2.<sup>30</sup>

## 17 209 **Results**

19 210 Of the 503 immigrant women who were approached for the study, 492 met at  
20  
21 211 least one of the inclusion criteria and 464 were enrolled, giving a participation rate of  
22  
23 212 94.3%. The main characteristics of the study population were reported in Table 1. The  
24  
25 213 participants were between the ages of 18 and 70 years (mean 40.1 yrs) and only 14.6%  
26  
27 214 had obtained university degree. More than half (58.8%) of women were housekeepers or  
28  
29 215 caregivers. A low percentage (9.9%) declared to be irregular. 164 (34.5%) had been  
30  
31 216 living in Italy for 9 years or more. Paid employment was the most common reason for  
32  
33 217 migration (65.8%) among participants. Most women were from Europe (46.3%) and the  
34  
35 218 main country of origin was Ukraine (25.8%). Only 19.3% were current smokers. The vast  
36  
37 219 majority of women (71.3%) reported no alcohol drinking in the previous 30 days. About  
38  
39 220 49% of the respondents were affected by chronic diseases.

41 221 Three different sub-groups were included in the final sample: sexually active  
42  
43 222 women between 25-64 years of age without hysterectomy that were eligible for  
44  
45 223 participation in cervical CS (419); women aged 50-69 years without previous diagnosis of  
46  
47 224 invasive or in situ breast cancer that were eligible for participation in breast CS (125); and  
48  
49 225 women of any age who had delivered at least once in Italy that were eligible to access  
50  
51 226 antenatal and post-partum care services (123). Seven women were part of the three sub-  
52  
53 227 groups.

1  
2  
3 228 The mean age of the population eligible for cervical CS was 41.1 years with an  
4  
5 229 age range between 25 and 64 years. More than half (58.1%) were married and 247  
6  
7 230 (58.9%) had completed high school. About 60% were housekeepers or caregivers. Rate of  
8  
9 231 cervical CS among the 419 eligible women was low (39.1%), and about one third had had  
10  
11 232 a Pap-test for screening purposes (32.8%) within a three year period from interview  
12  
13 233 (Table 2). Having had a routine pap smear in the previous three years was significantly  
14  
15 234 more likely in women with longer duration of residence in Italy (OR=1.60; 95% CI 1.29-  
16  
17 235 1.97;  $p<0.001$ ) and in South American women (OR=8.36; 95% CI 1.99-35.06;  $p=0.004$ )  
18  
19 236 compared with European female immigrants, whereas a lower probability of cervical CS  
20  
21 237 participation was found in Asian females (OR=0.41; 95% CI 0.22-0.76;  $p=0.005$ )  
22  
23 238 compared with European female immigrants (Table 3).

24  
25 239 Among the 125 women considered eligible for breast CS, 43.2% were married and 71  
26  
27 240 (56.4%) had completed high school. More than three quarter (85.7%) were practicing  
28  
29 241 Christians religion and 65.1% were from Europe. More than half (51.6%) had been living  
30  
31 242 in Italy for 9 years or more and the vast majority (86.5%) had a regular residence permit.  
32  
33 243 Regarding breast CS practices, of the 125 eligible women 45.6% had had a  
34  
35 244 mammography for control purposes, but less than one quarter (26, 20.8%) had their  
36  
37 245 mammography within the recommended time interval of two years (Table 2). Results  
38  
39 246 from univariate analysis do not show a statistically significant difference in breast CS  
40  
41 247 adherence with respect to all the selected characteristics apart from duration of stay in  
42  
43 248 Italy, ranging from 15.8% among those women having resided in the country for  $\leq 2$  years  
44  
45 249 to 58.5% among women with a length of stay  $\geq 9$  years, and among those who self-  
46  
47 250 reported an irregular legal status (17.7%) versus a regular status (50%) (Table 1).

48  
49 251 Table 4 shows main pregnancy, antenatal and post-birth care characteristics of the  
50  
51 252 eligible population. The number of immigrant women who delivered in Italy at least once  
52  
53 253 was 123. The mean age of the population eligible was 34.9 years with an age range  
54  
55 254 between 19 and 54 years. About 80% of the respondents did not report difficulties of  
56  
57  
58  
59  
60

1  
2  
3 255 access and use of prenatal and postpartum services. In terms of prenatal care, 70.9% of  
4  
5 256 immigrant women had their first pregnancy appointment within 12 weeks of pregnancy  
6  
7 257 and 84.2% had two or more prenatal visits. Only 12.9% of mothers underwent fewer than  
8  
9 258 two prenatal ultrasound checks. More than half (56.3%) of pregnant women were not  
10  
11 259 submitted to prenatal diagnostic testing (maternal serum markers such as beta human  
12  
13 260 chorionic gonadotropin, pregnancy-associated plasma protein A, amniocentesis) (data not  
14  
15 261 shown). Only about a third (27%) of respondents participated in prepartum  
16  
17 262 course/prenatal class, although Italian National Health Service guarantees free access to  
18  
19 263 this healthcare service. The vast majority (86%) of mothers chose a pediatrician such as  
20  
21 264 their child's physician as caregiver, whereas the remaining part of the sample preferred a  
22  
23 265 specialist or a maternal healthcare centre physician or none at all. Moreover, among  
24  
25 266 immigrant women with children living in Italy (122), 115 (94.3%) chose to immunize  
26  
27 267 their children with mandatory and recommended vaccinations for infants included in the  
28  
29 268 national programs.

## 31 **Discussion**

32  
33 270 The present study sought to describe CS practices, antenatal and postpartum care  
34  
35 271 services use among a sample of age eligible immigrant women in the South of Italy.

36  
37 272 The existence of a notable difference in preventive practice utilization and  
38  
39 273 motherhood protection according to immigration status has been reported in previous  
40  
41 274 studies.<sup>24, 31-33</sup> Immigrant women may not be accustomed to having regular health check-  
42  
43 275 ups in their home countries and may be less familiar with the opportunity of routine  
44  
45 276 screening to detect health problems before the onset of symptoms.<sup>34</sup> These shortcomings  
46  
47 277 may reduce the women's ability to maintain their health in specific periods during their  
48  
49 278 lifetime (e.g. during pregnancy) and to participate in preventive care.

50  
51 279 In our immigrant sample, adherence to cervical (32.8%) and breast (20.8%) CS  
52  
53 280 recommended practices is discernibly much lower than those reported in several  
54  
55 281 studies<sup>9,35</sup> and lower than those of the Italian native populations.<sup>36</sup> Indeed, the percentage

1  
2  
3 282 of Italian women who underwent routine cervical and breast CS were 77% and 71%,  
4  
5 283 respectively.<sup>36</sup> It is possible that the differences between our sample population and other  
6  
7 284 samples studies could be due to differences in cultural and socioeconomic factors.  
8  
9 285 Furthermore, one must consider that in Italy there is a geographical difference in CS  
10  
11 286 coverage, with the highest percentage of women who actually participate in them being in  
12  
13 287 the north of the country and the lowest in the south.<sup>37</sup> One reason for the low coverage for  
14  
15 288 CS in our sample may be due to the fact that in the regions in the South of the country, a  
16  
17 289 screening program has only recently been organized. In fact in our area of study, among  
18  
19 290 native citizens, CS for early detection of breast and cervical cancers has reached less than  
20  
21 291 half of the target population: regional figures have shown that cervical and breast CS  
22  
23 292 rates had decreased to 58.3%<sup>38</sup> and 49.7%<sup>39</sup>, respectively. Although these are much lower  
24  
25 293 than the national figures, nonetheless, they are still higher than those of the immigrant  
26  
27 294 women in our sample.

28  
29 295 Only less than a quarter of the sample had received breast CS at the  
30  
31 296 recommended time intervals, and for this reason efforts should be made to emphasize that  
32  
33 297 it is not enough to get screened once or sporadically.

34  
35 298 The duration of residence in the host country may be a significant predictor of  
36  
37 299 whether an individual migrant adheres to the CS program.<sup>40</sup> The results of our study  
38  
39 300 indicate that being a recent immigrant is a barrier to receiving cervical CS. Certainly  
40  
41 301 women that have spent more time in Italy may be more likely to be integrated into the  
42  
43 302 screening program and proficient in the Italian language, and therefore feel more  
44  
45 303 confident approaching the Italian health-care system. Hence it would be prudent to  
46  
47 304 provide immigrants with culturally sensitive and specific information to overcome any  
48  
49 305 barriers. Organized screening programs may help to reduce “ethnic” disparities by  
50  
51 306 offering a systematic (and free) examination to all the women of the target age groups,  
52  
53 307 and by using specific strategies to reach the most underserved women. Longer duration of  
54  
55 308 stay in Italy could also reflect probability of receiving a personal invitation. The



1  
2  
3 309 importance of invitation letters has been mentioned,<sup>41,42</sup> and one way of overcoming a  
4  
5 310 language barrier is to send the letter written in the language of the individual migrant as  
6  
7 311 well as that of the country in which they reside.

8  
9 312 Our study showed that Asian immigrant women had a lower rate of Pap testing  
10  
11 313 when compared with European immigrant women. The Pap smear is a more personal and  
12  
13 314 invasive procedure that may pose particular cultural barriers and thus can hinder these  
14  
15 315 women from obtaining the appropriate services.<sup>43</sup> Culturally tailored messages are  
16  
17 316 important to promote screening in specific ethnic groups to enable the identification of  
18  
19 317 the target group with these messages. The message must reflect the same values and  
20  
21 318 beliefs of the target group, and it should accommodate literacy levels to ensure  
22  
23 319 comprehension. Working closely with the target group is also crucial to ensure screening  
24  
25 320 participation. It would be important for program developers to contact ethnic group  
26  
27 321 gatekeepers, such as key religious or community leaders.

28  
29 322 Immigrant women in our study have experienced an acceptable level of care  
30  
31 323 during pregnancy and childbirth. We also found that education and advice for  
32  
33 324 breastfeeding and newborn care could be improved in our sample.

34  
35 325 In general, one way of reducing barriers for participation would be for health-care  
36  
37 326 professionals to introduce immigrant women to preventive care. In particular, GPs could  
38  
39 327 play an important role in this respect, especially when one takes into account that a  
40  
41 328 survey conducted among immigrant populations in the same area showed that 85% of the  
42  
43 329 sample had access to a GP at least once, indicating that immigrants in our area of study  
44  
45 330 had adequate access to primary care.<sup>29</sup> As a result, the acculturation process into the  
46  
47 331 health-care system could be shortened.

48  
49  
50 332 *Strength and limitations of the study*

51  
52 333 The strengths of the study lie in the enrolment technique and the high  
53  
54 334 participation rate. A physician not involved in providing health care to the migrants was  
55  
56 335 chosen to complete the questionnaire as it was our belief that this would make the

1  
2  
3 336 participants more confident in reporting all aspects of health care they had received.  
4  
5 337 Furthermore, the physician was supported by linguistic and cultural mediators to help  
6  
7 338 those who could not speak Italian or with low literacy skills. Moreover, the 94.3%  
8  
9 339 participation rate is very satisfactory, reducing a major source of bias, and we believe this  
10  
11 340 is related to the great efforts of the survey researchers in promoting migrant involvement  
12  
13 341 in the study.

14  
15 342 Our findings are subject to some limitations. First, we used a convenience  
16  
17 343 sampling method, and this factor limits the generalizability of the results. Furthermore,  
18  
19 344 we chose locations of focus due to logistical constraints, and, therefore, the study sample  
20  
21 345 was composed of people connected to NPOs that assist migrant population and also  
22  
23 346 mediated healthcare encounters. Therefore the views expressed may be different from  
24  
25 347 migrants who have no such connection to those organizations. Furthermore, a large  
26  
27 348 proportion of our migrant participants had a regular residence permit which carries with it  
28  
29 349 health insurance cover, which again is not the case with irregular immigrants. Therefore,  
30  
31 350 the sample may not be representative of all immigrants within the region, but only of  
32  
33 351 those connected to NPOs and with a regular stay permit.

34  
35 352 Moreover, the cross-sectional design of our study could not capture temporal  
36  
37 353 changes in the ability of immigrants to use and access health services. There may be an  
38  
39 354 effect of recall bias on self reported information about CS practices: patients frequently  
40  
41 355 tend to over-report their use of Pap test or mammogram and underreport the time lapse  
42  
43 356 since their last screening. We have attempted to minimize these biases by conducting the  
44  
45 357 survey with the use of access measures that are less subjective and measure patient  
46  
47 358 experience, not simply satisfaction. Moreover, there may be women who were pregnant  
48  
49 359 in Italy some years ago and, unintentionally, gave incorrect information due to poor or  
50  
51 360 incomplete memory recall. However, given that the mean age of women in this subgroup  
52  
53 361 is 34.9 years, it is likely that the mean time from pregnancy would have been within an  
54  
55 362 acceptable time range thus minimizing recall bias.

1  
2  
3 363 **Conclusion**  
4

5 364 Even with these potential limitations, this study provides currently unavailable  
6  
7 365 information about preventive care utilization among immigrant women in Italy that could  
8  
9 366 encourage future research to develop and test culturally appropriate, women-centered  
10  
11 367 strategies for promoting timely and regular CS and to better understand the factors that  
12  
13 368 predict maternal and child health services utilization and identify potential targets for  
14  
15 369 intervention among immigrant women.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 370 **List of abbreviations**

4  
5 371 CS: cancer screening; GP: general practitioner; OR: odds ratio; CI: confidence interval;  
6  
7 372 NPO: non-profit organization.

8  
9 373 **Acknowledgements**

10  
11 374 The authors would like to give thanks to all cultural and linguistic mediators and to the  
12  
13 375 staff at non-profit organizations who contributed to the survey, as well as special thanks  
14  
15 376 to all of the study participants.

16  
17 377 **Authors' contributions**

18  
19 378 AB, CGAN, EL and CP collected the data, and contributed to the data analysis and  
20  
21 379 interpretation. AB and MP designed the study, were responsible for the data analysis and  
22  
23 380 interpretation, and wrote the article. AB and MP are guarantors for the study.

24  
25 381 **Funding**

26  
27 382 This research did not receive any specific grant from funding agencies in the public,  
28  
29 383 commercial, or not-for-profit sectors.

30  
31 384 **Competing interests**

32  
33 385 All authors have completed the ICMJE uniform disclosure form at  
34  
35 386 [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for the  
36  
37 387 submitted work; no financial relationships with any organisations that might have an  
38  
39 388 interest in the submitted work in the previous three years; no other relationships or  
40  
41 389 activities that could appear to have influenced the submitted work.

42  
43 390 **Data sharing statement**

44  
45 391 Survey data was not included in the present article and are available from the authors.  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

392 **References**

- 393 1. United Nations, Population Division, Department of Economic and Social Affairs  
394 (UN DESA) – Trends in International Migrants Stock: The 2015 Revision  
395 (POP/DB/MIG/Stock/Rev.2015, Table  
396 1).[http://www.un.org/en/development/desa/population/migration/data/estimates2/data/  
397 UN\\_MigrantStockTotal\\_201](http://www.un.org/en/development/desa/population/migration/data/estimates2/data/UN_MigrantStockTotal_201). Accessed December 6, 2016.
- 398 2. Llacer A, Zunzunegui MV, del Amo J, Mazarrasa L, Bolumar F. The contribution of  
399 a gender perspective to the understanding of migrants' health. *J Epidemiol Community  
400 Health* 2007;61:4–10.
- 401 3. Almeida LM, Caldas JP, Ayres-de-Campos D, Dias S. Assessing maternal healthcare  
402 inequities among migrants: a qualitative study. *Cad Saude Publica* 2014;30:333-40.  
403 doi: 10.1590/0102-311X00060513
- 404 4. Bollini P, Stotzer U, Wanner P. Pregnancy outcomes and migration in Switzerland:  
405 results from a focus group study. *Int J Public Health* 2007;52:78-86
- 406 5. Bustreo F. Promoting health through the life-course. Ten top issues for women's  
407 health. World Health Organization. [http://www.who.int/life-  
408 course/news/commentaries/2015-intl-womens-day/en/](http://www.who.int/life-course/news/commentaries/2015-intl-womens-day/en/). Accessed November  
409 22, 2016
- 410 6. Nelson NJ. Migrant studies aid the search for factors linked to breast cancer  
411 risk. *J Natl Cancer Inst* 2006;98:436–8
- 412 7. Bobby D, Olopade OI. Race, Ethnicity, and the Diagnosis of Breast Cancer.  
413 *JAMA* 2015; 313:141–2. doi:10.1001/jama.2014.17323
- 414 8. Roberts D. Debating the cause of health disparities - implications for bioethics  
415 and racial equality. *Camb Q Healthc Ethics* 2012;21:332-41. doi:  
416 10.1017/S0963180112000059

- 1  
2  
3 417 9. Torre LA, Siegel RL, Ward EM, Jemal A. Global Cancer Incidence and Mortality  
4  
5 418 Rates and Trends-An Update. *Cancer Epidemiol Biomarkers Prev* 2016;25:16-27. doi:  
6  
7 419 10.1158/1055-9965.EPI-15-0578  
8  
9  
10 420 10. Harcourt N, Ghebre RG, Whembolua GL, Zhang Y, Warfa Osman S, Okuyemi KS.  
11  
12 421 Factors associated with breast and cervical cancer screening behavior among African  
13  
14 422 immigrant women in Minnesota. *J Immigr Minor Health* 2014;16:450-6. doi:  
15  
16 423 10.1007/s10903-012-9766-4  
17  
18 424 11. Grillo F, Valle'e J, Chauvin P. Inequalities in cervical cancer screening for women  
19  
20 425 with or without a regular consulting in primary care for gynaecological health, in  
21  
22 426 Paris, France. *Prev Med* 2012;54:259-65. doi:10.1016/j.ypmed.2012.01.013  
23  
24 427 12. Norredam M, Nielsen SS, Krasnik A. Migrants' utilization of somatic healthcare  
25  
26 428 services in Europe—a systematic review. *Eur J Public Health* 2010;20:555-63. doi:  
27  
28 429 10.1093/eurpub/ckp195  
29  
30  
31 430 13. Schueler KM, Chu PW, Smith-Bindman R. Factors associated with mammography  
32  
33 431 utilization: a systematic quantitative review of the literature. *J Womens Health*  
34  
35 432 (Larchmt) 2008;17:1477-98. doi: 10.1089/jwh.2007.0603  
36  
37  
38 433 14. Kristiansen M, Thorsted BL, Krasnik A, von Euler-Chelpin M. Participation in  
39  
40 434 mammography screening among migrants and non-migrants in Denmark. *Acta Oncol*  
41  
42 435 2012;51:28-36. doi: 10.3109/0284186X.2011.626447  
43  
44 436 15. Ghafoor A, Jemal A, Ward E, Cokkinides V, Smith R, Thun M. Trends in breast  
45  
46 437 cancer by race and ethnicity. *CA Cancer J Clin* 2003;53:342-55. doi:  
47  
48 438 10.3322/canjclin.53.6.342  
49  
50  
51 439 16. Nerbs MV, Mark HF. Breast cancer among Asian women. *Med Health RI*  
52  
53 440 1996;79:388-91.  
54  
55 441 17. O'Malley MS, Earp JA, Hawley ST, Chell MI, Mathews HF, Mitchell J. The  
56  
57 442 association of race/ethnicity, socioeconomic status, and physician recommendation for  
58  
59  
60

- 1  
2  
3 443 mammography: Who gets the message about breast cancer screening? *Am J Public*  
4  
5 444 *Health* 2001;91:49-54.  
6  
7 445 18. Frisby CM. Messages of hope: Health communications strategies that address barriers  
8  
9 446 preventing black women from screening for breast cancer. *J Black Stud* 2002;32:489-  
10  
11 447 505. <http://www.jstor.org/stable/3180949>. Accessed December 4, 2016.  
12  
13 448 19. Centers for Disease Control and Prevention. Achievements in public health, 1900–  
14  
15 449 1999: Healthier mothers and babies. *MMWR* 1999;48:849-58.  
16  
17  
18 450 20. Yuan B, Qian X, Thomsen S. Disadvantaged populations in maternal health in China  
19  
20 451 who and why? *Glob Health Action* 2013;6:19542. doi: 10.3402/gha.v6i0.19542  
21  
22 452 21. Kusuma YS, Kumari R, Kaushal S. Migration and access to maternal healthcare:  
23  
24 453 determinants of adequate antenatal care and institutional delivery among socio-  
25  
26 454 economically disadvantaged migrants in Delhi, India. *Trop Med Int Health*  
27  
28 455 2013;18:1202-10. doi: 10.1111/tmi.12166  
29  
30  
31 456 22. Lauria L, Bonciani M, Spinelli A, Grandolfo ME. Inequalities in maternal care in  
32  
33 457 Italy: the role of socioeconomic and migrant status. *Ann Ist Super Sanita* 2013;49:209-  
34  
35 458 18. doi: 10.4415/ANN\_13\_02\_12  
36  
37  
38 459 23. Singh PK, Rai RK, Singh L. Examining the effect of household wealth and migration  
39  
40 460 status on safe delivery care in urban India, 1992–2006. *PLoS One* 2012;7:e44901. doi:  
41  
42 461 10.1371/journal.pone.0044901  
43  
44 462 24. Bollini P, Pampallona S, Wanner P, Kupelnick B. Pregnancy outcome of migrant  
45  
46 463 women and integration policy: a systematic review of the international literature. *Soc*  
47  
48 464 *Sci Med* 2009;68:452-61. doi: 10.1016/j.socscimed.2008.10.018  
49  
50  
51 465 25. Gissler M, Alexander S, Macfarlane A, et al. Stillbirths and infant deaths among  
52  
53 466 migrants in industrialized countries. *Acta Obstet Gynecol Scand* 2009;88:134-48. doi:  
54  
55 467 10.1080/00016340802603805  
56  
57  
58  
59  
60

- 1  
2  
3 468 26. Balaam MC, Akerjordet K, Lyberg A, et al. A qualitative review of migrant women's  
4  
5 469 perceptions of their needs and experiences related to pregnancy and childbirth. *J Adv*  
6  
7 470 *Nur* 2013;69:1919-30. doi: 10.1111/jan.12139  
8  
9  
10 471 27. Gibson-Helm ME, Teede HJ, Cheng IH, et al. Maternal health and pregnancy  
11  
12 472 outcomes comparing migrant women born in humanitarian and non humanitarian  
13  
14 473 source countries: a retrospective, observational study. *Birth* 2015;42:116-24. doi:  
15  
16 474 10.1111/birt.12159  
17  
18 475 28. The World Bank. 2011. The World Bank. <http://data.worldbank.org/>. Accessed July  
19  
20 476 22, 2014.  
21  
22 477 29. Bianco A, Larosa E, Pileggi C, Nobile CG, Pavia M. Utilization of health-care  
23  
24 478 services among immigrants recruited through non-profit organizations in southern  
25  
26 479 Italy. *Int J Public Health* 2016;61:673-82. doi: 10.1007/s00038-016-0820-1  
27  
28 480 30. StataCorp. Stata: Release 11. Statistical Software. 2009, College Station, TX:  
29  
30 481 StataCorp LP.  
31  
32 482 31. Ricardo-Rodrigues I, Jiménez-García R, Hernández-Barrera V, Carrasco-Garrido P,  
33  
34 483 Jiménez-Trujillo I, López de Andrés A. Social disparities in access to breast and  
35  
36 484 cervical cancer screening by women living in Spain. *Public Health* 2015;129:881-8.  
37  
38 485 doi: 10.1016/j.puhe.2015.02.021  
39  
40 486 32. Rondet C, Lapostolle A, Soler M, Grillo F, Parizot I, Chauvin P. Are immigrants and  
41  
42 487 nationals born to immigrants at higher risk for delayed or no lifetime breast and  
43  
44 488 cervical cancer screening? The results from a population-based survey in Paris  
45  
46 489 metropolitan area in 2010. *PLoS One* 2014;9:e87046; doi:  
47  
48 490 10.1371/journal.pone.0087046. eCollection 2014.  
49  
50 491 33. Almeida LM, Caldas J, Ayres-de-Campos D, Salcedo-Barrientos D, Dias S. Maternal  
51  
52 492 healthcare in migrants: a systematic review. *Matern Child Health J* 2013;17:1346-54.  
53  
54 493 doi: 10.1007/s10995-012-1149-x  
55  
56  
57  
58  
59  
60



- 1  
2  
3 494 34. Grandahl M, Tydén T, Gottvall M, Westerling R, Oscarsson M. Immigrant women's  
4 experiences and views on the prevention of cervical cancer: a qualitative study. *Health*  
5 495 *Expect* 2015;18:344-54. doi: 10.1111/hex.12034  
6  
7 496  
8  
9 497 35. Hasnain M, Menon U, Ferrans CE, Szalacha L. Breast cancer screening practices  
10 among first-generation immigrant muslim women. *J Womens Health (Larchmt)*  
11 498 2014;23:602-12. doi: 10.1089/jwh.2013.4569  
12  
13 499  
14  
15 500 36. Campostrini S, Carrozzi G, Salmaso S, Severoni S. (Ed.) *Malattie croniche e migranti*  
16 in Italia. Rapporto sui comportamenti a rischio, prevenzione e diseguaglianze di  
17 501 salute, Organizzazione Mondiale della Sanità - Istituto Superiore della Sanità -  
18 502 Università Ca' Foscari, Venezia, 2015.  
19  
20  
21 503  
22  
23 504 37. The National Centre for Screening Monitoring Tenth Report. *Epidemiol Prev*  
24 505 2012;36:1-96.  
25  
26 506 <http://www.osservatorionazionale screening.it/sites/default/files/allegati/EPv36i6s1.pdf>  
27 . Accessed December 2, 2016.  
28  
29 507  
30  
31 508 38. La sorveglianza PASSI. Screening mammografico 2012-2015.  
32 <http://www.epicentro.iss.it/passi/dati/ScreeningCervicale.asp>. Accessed April 10,  
33 509 2017.  
34  
35 510  
36  
37 511 39. La sorveglianza PASSI. Screening cervicale 2012-2015.  
38 <http://www.epicentro.iss.it/passi/dati/ScreeningMammografico.asp>. Accessed April  
39 512 10, 2017.  
40  
41 513  
42  
43 514 40. Vahabi M, Lofters A, Kumar M, Glazier RH. Breast cancer screening disparities  
44 515 among urban immigrants: a population-based study in Ontario, Canada. *BMC Public*  
45 516 *Health* 2015;15:679. doi: 10.1186/s12889-015-2050-5  
46  
47  
48 517 41. Blomberg K, Tishelman C, Ternstedt BM, Tornberg S, Leval A, Widmark C. How  
49 518 can young women be encouraged to attend cervical cancer screening? Suggestions  
50 519 from face-to-face and internet focus group discussions with 30-year-old women in

- 1  
2  
3 520 Stockholm. Sweden Acta Oncologica 2011;50:112-20. doi:  
4  
5 521 10.3109/0284186X.2010.528790  
6  
7 522 42. Everett T, Bryant A, Griffin MF, Martin-Hirsch PP, Forbes CA, Jepson RG.  
8  
9 523 Interventions targeted at women to encourage the uptake of cervical screening.  
10  
11 524 Cochrane Database of Systematic Reviews 2011;5:CD002834. doi:  
12  
13 525 10.1002/14651858.CD002834.pub2  
14  
15 526 43. Abdullahi A. Cervical screening: perceptions and barriers to uptake among Somali  
16  
17 527 women in Camden. Public Health 2009;123:680-5. doi: 10.1016/j.puhe.2009.09.011  
18  
19 528

peer review only

529 **Table 1. Distribution of characteristics among the total study population and eligible women having undergone cervical and breast cancer screening**  
 530 **(CS)**

Characteristic	Total (464)		Cervical CS				Breast CS (125)			
	No.	(%)	Eligible women (419)		Adherence to recommendations (164)		Eligible women (125)		Adherence to recommendations (57)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
<i>Age, years</i>										
18-30	92	(19.8)	84	(20)	28	(33.3)	-	-	-	-
31-40	141	(30.4)	127	(30.3)	42	(33.1)	-	-	-	-
41-50	117	(25.2)	113	(27)	53	(46.9)	12	(9.6)	7	(58.3)
≥51	114	(24.6)	95	(22.7)	41	(43.2)	113	(90.4)	50	(44.2)
					Trend $\chi^2=6.64$ , 3 df, $p=0.084$			Trend $\chi^2=0.86$ , 1 df, $p=0.353$		

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

*Education level, years*

≤7	121	(26.1)	112	(26.8)	48	(42.9)	27	(21.6)	13	(48.2)
8-13	275	(59.3)	247	(58.9)	86	(34.8)	70	(56)	29	(41.4)
>13, with university degree	68	(14.6)	60	(14.3)	30	(50)	28	(22.4)	15	(53.6)

$\chi^2=5.56, 2 \text{ df}, p=0.062$

$\chi^2=1.28, 2 \text{ df}, p=0.528$

*Marital status\**

			418				124			
Married	260	(56.3)	243	(58.1)	99	(40.7)	54	(43.5)	25	(46.3)
Other	202	(43.7)	175	(41.9)	64	(36.6)	70	(56.5)	31	(44.3)

$\chi^2=0.74, 1 \text{ df}, p=0.389$

$\chi^2=0.05, 1 \text{ df}, p=0.823$

*Children*

No	115	(24.8)	98	(23.4)	30	(30.6)	17	(13.6)	7	(41.2)
----	-----	--------	----	--------	----	--------	----	--------	---	--------

1											
2											
3											
4											
5											
6	Yes	349	(75.2)	321	(76.6)	134	(41.7)	108	(86.4)	50	(46.3)
7											
8											
9						$\chi^2=3.91, 1 \text{ df}, p=0.048$				$\chi^2=0.16, 1 \text{ df}, p=0.694$	
10											
11	<i>Employment status</i>										
12											
13											
14	Unemployed	147	(31.7)	129	(30.8)	55	(42.6)	30	(24)	14	(46.7)
15											
16											
17	Housekeeper,	273	(58.8)	255	(60.9)	90	(35.3)	85	(68)	40	(47.1)
18											
19	caregiver										
20											
21											
22	Manual worker	24	(5.2)	16	(3.8)	8	(50)	7	(5.6)	1	(14.3)
23											
24											
25	Sedentary worker	20	(4.3)	19	(4.5)	11	(57.9)	3	(2.4)	2	(66.7)
26											
27											
28						$\chi^2=5.84, 3 \text{ df}, p=0.120$				Fisher's exact=3.36, p=0.339	
29											
30											
31	<i>Nationality</i>										
32											
33											
34	European	215	(46.3)	197	(47)	76	(38.6)	81	(64.8)	35	(43.2)
35											
36											
37	African	138	(29.8)	123	(29.4)	55	(44.7)	19	(15.2)	9	(47.4)
38											
39											
40											
41										26	
42											
43											
44											
45											
46											
47											
48											
49											

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

Asian	98	(21.1)	86	(20.5)	23	(26.7)	24	(19.2)	12	(50)
American	13	(2.8)	13	(3.1)	10	(76.9)	1	(0.8)	1	(100)

$\chi^2=14.97, 3 \text{ df}, p=0.002$

Fisher's exact=1.59, p=0.661

*Self-reported legal status*

Regular	418	(90.1)	375	(89.5)	154	(41.1)	108	(86.4)	54	(50)
Irregular	46	(9.9)	44	(10.5)	10	(22.7)	17	(13.6)	3	(17.7)

$\chi^2=5.56, 1 \text{ df}, p=0.018$

Fisher's exact=6.20, p=0.013

*Length of stay in Italy, years*

1-2	83	(17.9)	74	(17.7)	16	(21.6)	19	(15.2)	3	(15.8)
3-5	124	(26.7)	108	(25.7)	24	(22.2)	20	(16)	6	(30)

6-8	97	(20.9)	95	(22.7)	45	(47.4)	21	(16.8)	10	(47.6)
≥9	160	(34.5)	142	(33.9)	79	(55.6)	65	(28)	38	(58.5)
					Trend $\chi^2=41.33$ , 3 df, $p<0.001$			Trend $\chi^2=13.03$ , 3 df, $p=0.005$		
<i>Physical activity*</i>			406							
No	157	(34.9)	139	(34.2)	57	(41)	44	(35.2)	18	(40.9)
Yes	293	(65.1)	267	(65.8)	102	(38.2)	81	(64.8)	39	(48.2)
					$\chi^2=0.30$ , 1 df, $p=0.583$			$\chi^2=0.60$ , 1 df, $p=0.438$		
<i>Alcohol consumption in the previous 30 days*</i>			406							
No	321	(71.3)	288	(70.9)	113	(39.2)	81	(64.8)	38	(46.9)
Yes	129	(28.7)	118	(29.1)	46	(39)	44	(35.2)	19	(43.2)
					$\chi^2=0.00$ , 1 df, $p=0.962$			$\chi^2=0.16$ , 1 df, $p=0.689$		

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

*Current smoker\**

406

No

363 (80.7)

324 (79.8)

127 (39.2)

95 (76)

45 (47.4)

Yes

87 (19.3)

82 (20.2)

32 (39)

30 (24)

12 (40)

$\chi^2=0.00$ , 1 df, p=0.977

$\chi^2=0.50$ , 1 df, p=0.480

*Chronic diseases\**

403

No

227 (50.8)

201 (49.9)

64 (31.8)

29 (23.2)

12 (41.4)

Yes

220 (49.2)

202 (50.1)

94 (46.5)

96 (76.8)

45 (46.9)

$\chi^2=9.13$ , 1 df, p=0.003

$\chi^2=0.27$ , 1 df, p=0.603

---

531 \*Total may not be equal to No. because of missing values



532 **Table 2. Cervical and breast cancers screening practice**

<b>Cancer screening services</b>	<b>No.</b>	<b>Percent</b>
<b>Cervix<sup>†</sup></b>		
<b>Having received cervical cancer screening through Pap smear (419)</b>		
No	247	59
Yes, for control	164	39.1
Yes, I had problems	8	1.9
<b>Time since last pap test, years (419)</b>		
≤ 3	135	32.8
> 3 or never	283	67.5
<b>Breast<sup>#</sup></b>		
<b>Having received breast cancer screening through mammography (125)</b>		
No	61	48.8
Yes, for control	57	45.6
Yes, I had problems	7	5.6
<b>Time since last mammogram, years (125)</b>		
≤ 2	26	20.8
> 2 or never	99	79.2

533 <sup>†</sup> All sexually active women aged 25-64 years and having an intact uterus were eligible534 <sup>#</sup> Women aged 50-69 years without previous diagnosis of invasive or in situ breast cancer were

535 eligible

536 **Table 3. Multiple logistic regression analysis between variables potentially associated with**  
 537 **having received a Pap smear in the previous three years**

Variable	OR	SE	95% CI	P value
<i>Model Outcome: Pap smear for screening purposes in the previous three years</i>				
<i>Log-likelihood = -227.53, <math>\chi^2 = 50.97</math>, P value &lt; 0.0001, No. of obs. = 402<sup>s</sup></i>				
Length of stay in Italy, ordinal	1.64	0.21	1.28-2.1	<0.001
Nationality				
European*	1.00	-	-	-
South American	7.87	6.14	1.7-36.32	0.008
Asian	0.35	0.13	0.17-0.72	0.004
African	0.74	0.27	0.36-1.51	0.411
Employment status				
Unemployed*	1.00	-	-	-
Housekeeper, caregiver	0.7	0.19	0.4-1.2	0.198
Manual workers	0.58	0.36	0.17-1.95	0.374
Sedentary workers	0.85	0.53	0.25-2.87	0.798
Chronic diseases				
No*	1.00	-	-	-
Yes	1.37	0.34	0.84-2.21	0.204
Marital status				
Married*	1.00	-	-	-
Not married	0.73	0.19	0.44-1.22	0.228
Alcohol consumption in the previous 30 days				
No*	1.00	-	-	-

Yes	0.75	0.22	0.42-1.32	0.312
Physical activity				
No*	1.00	-	-	-
Yes	0.83	0.21	0.5-1.36	0.457
Age, continuous				
	1.07	0.14	0.83-1.39	0.601
Self-reported legal status				
Regular*	1.00	-	-	-
Irregular	1.18	0.52	0.5-2.79	0.704
Education level, years				
≤ 7	1.03	0.42	0.46-2.31	0.944
8-13	0.65	0.22	0.33-1.25	0.195
>13, with university degree*	1.00	-	-	-

538 \* reference category

539 § the observations do not sum to No. (419) due to missing values

540 **Table 4. Pregnancy, antenatal and post-partum care characteristics of the eligible women and**  
 541 **comparison with Italian population**

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
<b>Age, years</b>		34.9±8.9	32
<b>Pregnancies in Italy (123)</b>			
1	90 (73.2)		(53.9)
≥2	33 (26.8)		(46.1)
<b>Smoking status (123)</b>			
Nonsmoker	98 (79.7)		(68.1)
Smoker before pregnancy	14 (11.4)		(24.4)
Smoker	11 (8.9)		(7.5)
<b>Prepartum course participation (122)</b>			
No	89 (73)		(60.5)
Yes	33 (27)		(39.5)
<b>Visit after delivery (within 12 months) (119)</b>			
Yes	95 (79.8)		/
No	24 (20.2)		/
<b>Counseling on postpartum contraceptive methods (122)</b>			
No	66 (54.1)		(40.9)
Yes	56 (45.9)		(59.1)
<b>Infant feeding (122)</b>			
Breastfeeding only	85 (69.6)		(88.5)
Breastfeeding and bottle-feeding	24 (19.7)		
Bottle-feeding only	13 (10.7)		(11.5)
<b>Utilization of family planning clinic (121)</b>			
Yes	66 (54.5)		(27.9)

Characteristic	N (%)	Mean±SD	Italian population (%) <sup>41</sup>
No	55 (45.5)		(72.1)

542 The number of participants responding to the questions is indicated in brackets

For peer review only



**UNIVERSITY OF CATANZARO "MAGNA GRÆCIA"**  
**DEPARTMENT OF HEALTH SCIENCES**  
**MEDICAL SCHOOL**  
**CHAIR OF HYGIENE**

**CERVICAL AND BREAST CANCER SCREENING PARTICIPATION AND UTILIZATION OF  
 MATERNAL HEALTH SERVICES AMONG IMMIGRANT WOMEN IN SOUTHERN ITALY**

*Questionnaire used in the survey*

Date of interview \_\_\_/\_\_\_/\_\_\_

No. \_\_\_\_\_

**A) Demographic characteristics**

**A.1. How old were you on your last birthday?** (years) \_\_\_\_\_

**A.2. What is your marital status?**  Single  Married with husband in Italy  Married without husband in Italy  
 Divorced  Widowed  Other (please, specify \_\_\_\_\_)

**A.3.1. Do you have any children?**  No (→A.4.)  Yes (n° \_\_\_\_\_) **A.3.2. Are they living in Italy?**  No  Yes (n° \_\_\_\_\_)

**A.3.3. How old were they on their last birthday? What is their sex?**

I. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VI. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
II. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
III. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	VIII. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
IV. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	IX. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F
V. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F	X. _____ years	<input type="checkbox"/> M	<input type="checkbox"/> F

**A.4. What is the highest level of education that you have completed?** (years)

< 5  5 – 7  8 – 12  ≥13, without university degree  
 ≥13, with university degree (please, specify \_\_\_\_\_)

**A.5. What is your occupation?**  None  Student  Housewife  
 Housekeeper, caregiver  Peddler  Farmer  Manual worker  
 Professional employed  Other (spec. \_\_\_\_\_)

**A.6. What is your religion?**  None  Catholic Christian  Orthodox Christian  
 Jewish  Islamic  Buddhist  Hindu  Other (spec. \_\_\_\_\_)

**A.7. What is your country of origin?** \_\_\_\_\_

**A.8. From what country did you arrive in**  Country of origin  Other country (please, specify \_\_\_\_\_)  
 Italy?

**A.9. How long have you lived in Italy?** (years) \_\_\_\_\_ (if less than 1 year, end interview.)

**A.10. What is your legal immigration status?**  Regular  Irregular  Asylum seeker

**B) General health conditions**

**B.1. Do you suffer from any of the following chronic diseases?** (please, if yes, specify one or more of the following diseases)

No/I don't know

Cardiovascular diseases (eg. hypertension, hypercholesterolemia, etc.) \_\_\_\_\_

Respiratory diseases (eg. asthma, chronic obstructive pulmonary disease, etc.) \_\_\_\_\_

Gastrointestinal diseases (eg. gastroenteritis, esophagitis, celiac disease, etc.) \_\_\_\_\_

Musculoskeletal diseases (eg. osteoarthritis, osteoporosis, carpal tunnel syndrome, etc.) \_\_\_\_\_

Oral diseases (dental caries, gingivitis, stomatitis, malocclusion, etc.) \_\_\_\_\_

Genitourinary diseases (calculi, erectile dysfunction, prostatitis, etc.) \_\_\_\_\_

Psychiatric disorders (depression, schizophrenia, eating disorders) \_\_\_\_\_

Metabolic diseases (eg. chronic renal failure, liver cirrhosis, diabetes, thyroid disease, etc.) \_\_\_\_\_

Autoimmune disorders (eg. SLE, psoriasis, inflammatory bowel diseases, ecc.) \_\_\_\_\_

Other (please, specify \_\_\_\_\_)

**B.2. Are you affected by any of the following infectious diseases?**  No/I don't know  HIV  Hepatitis B

Hepatitis C     Tuberculosis     Parasitosis (es. malaria, toxoplasmosis, giardia, schistosomiasis, taenia, ecc.)  
 STD (eg. syphilis, gonorrhoea, HSV, etc.)     Other (please, specify \_\_\_\_\_)

**C) Health risk habits**

**C.1. Tobacco use**  
 C.1.1. Have you smoked at least 100 cigarettes in your entire life?     No (→C.2.1.)     Yes  
 C.1.2. Do you now smoke cigarettes:     Some days (specify n° \_\_\_\_\_)     Every day (specify n° \_\_\_\_\_)     Never (→C.2.1.)  
 C.1.3. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?     No     Yes  
**C.2. Alcohol consumption**  
 C.2.1. During the past 30 days, did you have at least one drink of any alcoholic beverage such as beer, wine or liquor?     No (→D.1.)     Yes  
 C.2.2. During the past 30 days, how many days per month did you have at least one drink of any alcoholic beverage? \_\_\_\_\_  
 C.2.3. During the past 30 days, on the days when you drank, approximately how many drinks did you drink on average?  
 Wine \_\_\_\_\_    Beer \_\_\_\_\_    Liquor \_\_\_\_\_

**D) Prevention and screening**

**D.1. Immunization**  
**D.1.1. Which of the following vaccinations have you had? (more than one option allowed)**  
 Diphtheria     Tetanus     Pertussis     Polio  
 Hepatitis B     Mumps     Rubella     Measles  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)  
 (If participant answered Yes to the question A.3.2. skip to question D.1.2.. If participant answered No to the question A.3.2. skip to question D.2.1.)  
**D.1.2. Have your children received vaccinations included in the national programs?**     No     I don't remember     Yes (→D.1.4.)  
**D.1.3. Why have they not received children's vaccinations? (more than one option allowed)**  
 I was not aware of their availability     Vaccinations are not useful     Vaccinations are dangerous  
 Religious reasons     Lack of time     Other (please, specify \_\_\_\_\_)  
**D.1.4. Do you remember which of the following vaccinations your children have had?**  
 Mandatory vaccinations (diphtheria, tetanus, polio, hepatitis B)     Pertussis     Measles, mumps and rubella  
 Chicken pox     Haemophilus B     Pneumococcal     Meningococcal  
 Influenza     None/I don't know     Other (please, specify \_\_\_\_\_)  
**D.2. Screening**  
**D.2.1. Have you ever had Pap test?**  
 No     Yes, for control     Yes, for problems  
**D.2.2. When was the last time you had a Pap test? (years)**  
 <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago  
**D.2.3. Have you had a hysterectomy?**     No     Yes  
**D.2.4. Have you ever had a mammography?**  
 No     Yes, for control     Yes, for problems  
**D.2.5. When was the last time you had a mammography? (years)**  
 <1 yr ago     1-2 yrs ago     2-3 yrs ago     3-5 yrs ago     ≥5 yrs ago

**E) Utilization of maternal health services**

(If participant answered Yes to question A.3.1. skip to question E.1. If participant answered No to question A.4.1. end interview.)  
**E.1. How many times have you given birth since you've been in Italy?**     None     (spec. n°) \_\_\_\_\_  
**E.2. How many times have you had a miscarriage?**     None     I don't remember     (spec. n°) \_\_\_\_\_  
**E.3. How many times have you had an abortion?**     None     I don't remember     (spec. n°) \_\_\_\_\_  
 (If participant answered None to question E.1. end interview. Otherwise, complete interview with all following questions referred to last pregnancy.)  
**E.4. Who was mainly monitoring your pregnancy/ies?**     None     General practitioner  
 Gynecologist     Midwife     Other (please, specify \_\_\_\_\_)  
**E.5. How many prenatal visits did you attend during each pregnancy?**

- None  1  >1 (*spec. n°*)
- 1 E.6. When did you receive your first pregnancy appointment?  I don't remember  (*please, specify weeks of pregnancy*)
- 2 E.7.1. How many prenatal ultrasound checks did you have during your pregnancy? (*spec. n°*)
- 3 E.7.2. Do you remember in which weeks of pregnancy you had these prenatal ultrasound checks? (*more than one option*)  None
- 4 allowed)
- 5  <8  8-12  13-16  17-20  21-24  25-28  29-32  ≥33
- 6 E.8. Did you know that prenatal visits and ultrasound checks are free?  No  Yes
- 7 E.9. Did you have any prenatal diagnostic testing? (*max. 4 options*)  No  Yes, maternal serum markers
- 8  Yes, chorionic villus sampling  Yes, amniocentesis  Yes, nuchal translucency  Other (*please, specify* \_\_\_\_\_)
- 9 E.10. Have you ever participated in a prepartum course/prenatal class?  No  Yes
- 10 E.11. Overall, do you believe you have had difficulties of access to and use of prenatal services during your  No
- 11 pregnancy? (*max. 3 options*)
- 12  Yes, I don't know system's organization  Yes, for language barriers  Yes, for long waiting times for access to health-care services
- 13  Yes, lack of time  Yes, for my poor socioeconomic situation  Other (*please, specify* \_\_\_\_\_)
- 14 E.12. Did you ever smoke during pregnancy?  No, I don't smoke  No, I stopped
- 15  Yes, I continued to smoke the same number of cigarettes  Yes, but I decreased the number of cigarettes
- 16 E.13. Did you have a postnatal visit within 12 months after delivery?  No  Yes
- 17 E.14. What was your chosen infant feeding method?  Breastfeeding only (→E.17.)  Bottle-feeding only
- 18  Breastfeeding and other (water, tisane, or other infusion)  Breastfeeding and bottle-feeding
- 19 E.15. Who advised you regarding the formula milk?  Nobody, I decided  Pediatrician
- 20  Family/Friends  Physician of hospital ward  Other (*please, specify* \_\_\_\_\_)
- 21 E.16. What is the reason for the formula milk? (*max. 3 options*)  I don't have enough milk  I stopped breastfeeding
- 22  The baby was not gains weight  The baby couldn't latch on well
- 23  I had painful nipples, and/or mastitis  I had acute health problems  My child had acute health problems
- 24  I had to resume work shortly  I had to moved my child abroad  I was tired
- 25  I took some drugs (*please, specify* \_\_\_\_\_)  Other (*please, specify* \_\_\_\_\_)
- 26 E.17. Who gave you information about infant feeding?  None  I know
- 27  Midwife of hospital ward  Midwife of family planning center  Pediatrician  Family/Friends
- 28  Other (*please, specify* \_\_\_\_\_)
- 29 E.18. Do you believe it is possible to get pregnant during the period of breastfeeding?
- 30  No, it's not possible  I don't know  Yes, it's possible
- 31 E.19. Who counseled you on postpartum contraceptive methods?
- 32  None (→E.21.)  Family/Friends  General practitioner
- 33  Specialist  Midwife of family planning center  Other (*please, specify* \_\_\_\_\_)
- 34 E.20. Do you believe this counseling has been sufficient?
- 35  Yes, I believe it has  No, I would like to know more
- 36 E.21. At the resumption of sexual relations, are you thinking of using contraception?
- 37  No  I don't know yet  Yes (*please, specify* \_\_\_\_\_)
- 38 E.22. Do you know a family planning center?
- 39  No (→E.24.)  Yes, but I never used it  Yes, I have used it (→ E.24.)
- 40 E.23. Why have you never used a family planning center? (*please, specify one or more reason*) \_\_\_\_\_
- 41
- 42 E.24. Are you accessing any healthcare services since discharge?  No (→E.26.)  Yes
- 43 E.25. Please, specify one or more of following healthcare services:
- 44  Pediatric planning center  Family planning center  Advice center  Specialist clinic
- 45  Emergency Department  Hospital  Other (*please, specify* \_\_\_\_\_)
- 46 E.26. Whom have you selected as the child's physician?  None  Specialist
- 47  Physician of family planning center  Physician of hospital ward  Pediatrician  Other (*please, specify* \_\_\_\_\_)



STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item N <sup>o</sup>	Recommendation	Page
<b>Title and abstract</b>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5
Objectives	3	State specific objectives, including any prespecified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6,7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7,8
Bias	9	Describe any efforts to address potential sources of bias	13
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9,10
		(b) Indicate number of participants with missing data for each variable of interest	21,23

Outcome data	15*	Report numbers of outcome events or summary measures	9,10; 21-23
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9,10; 21-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	10-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-14
Generalisability	21	Discuss the generalisability (external validity) of the study results	10-14
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).