

# Screening for Cervical Cancer - Uptake and Associated Factors in a Representative Sample in the City of Patras, West-Greece

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**Abstract** The aim of this study is to provide a profile of cervical cancer screening practices among the women in Patras and to assess factors associated with cervical cancer screening uptake. Data from a representative sample of 873 women were analyzed. 67.2% had at least one Pap test in their life, with 54.4% having been tested in the previous three years. Women aged 35-44 and 45-54 years were more likely to have had a recent Pap test (OR>3) as well as married/partnered women (OR=2.4). Unemployed women and women with the lowest educational level were less likely to have had a recent Pap test. Compared to women with a monthly household income of <500€, those with higher income were more likely to have had a Pap test.

The prevalence of Pap testing in Patras is very low. Our findings support the necessity of implementation of national screening programs or targeted screening interventions mainly in the identified under-screened population subgroups, i.e. women with socioeconomic disadvantages.

**Keywords** Cervical cancer, Greece, Pap-test, screening

## 1. Introduction

The Health profile of the city of Patras was conducted in 2006 with the aim of collecting information about the current socioeconomic and demographical situation of its citizens, their living conditions and health status as well as health related behaviors including cervical cancer screening. Cervical cancer is the third most common cancer in women worldwide. It accounts for almost 9% of the total number of new cancer cases diagnosed and 8% of the total number of cancer deaths among females [1]. More than 85% of deaths due to cervical cancer occur in developing countries. This disproportionately high burden of cervical cancer cases in developing countries and elsewhere among medically underserved populations is largely due to insufficient

screening that allows the detection of precancerous lesions or early stage cervical cancer [2].

In 2008, 31,038 cervical cancer cases were diagnosed in the EU-27 member states (MS) and 13,430 died from the disease in the same year [1]. Although the burden of cervical cancer varies among these countries the most profound difference is observed between the old and the new MS which to a large extent have yet to implement population based organized screening programs for cervical cancer [3,4].

Organized population based cervical cancer screening every 3-5 years that applies quality assurance measures can reduce the incidence of cervical cancer up to 80%. In countries that have established such programs – which tend to be part of the developed world - cervical cancer incidence has showed a marked decrease [5,6].

The EU Council recommends that population-based cervical cancer screening programs that apply quality assurance at all levels as outlined in the European guidelines are implemented in all MS [7].

Based on these recommendations most MS have implemented population based organized cervical cancer screening programs either nationally or regionally. Greece is among the few European countries that have yet to establish national organized screening for cervical cancer [3]. Screening in Greece is opportunistic and conducted primarily through public and university hospitals, some primary health care centers, and social insurance health services. A number of large metropolitan gynecological hospitals – for example in Athens – have very well organized programs but reliable data on the percentage of women covered are not available. National Health Service (NHS) screening services generally have long waiting lists something that discourages women from having frequent tests [8-10]. Private gynecologists also perform Pap tests in their private practices although these are not free of cost. There are no reliable data on the percentage of women who perform Pap tests privately.

Two regional organized cancer screening programs exist in Greece in Ormylia, Halkidiki in Northern Greece and in the prefectures of Messinia and Ilia in Southern Greece. Although successful since their implementation in 1991 these programs cover a small percentage of the overall population [8-10].

There are plans to establish a national organized population based screening program for cervical cancer as mentioned in the National Action Plan for Cancer which has been in effect since 2008. Given the current financial crisis there is no timeline for the implementation of these plans [11].

Available data indicate a general downward trend in cervical cancer mortality rates in Greece as in all old EU member states compared to the new MS [3,12].

According to the WHO/ICO Information Centre on HPV and Cervical Cancer [13], in Greece in 2008 the crude mortality rate for cervical cancer was 2.8 per 100.00 women while the age-standardized mortality rate was 1.5 per 100 000 women.

The aim of this paper is to provide a profile of cervical cancer screening practices among the women in Patras and discuss the implications for the establishment of an organized population based screening program.

## 2. Materials and Methods

### 2.1. Study Design, Data Collection and Study Population

The data were collected between June and July 2006 through a structured survey questionnaire. Detailed questionnaires were distributed to a representative sample of 873 women aged 18 to 74 years old and residents of Patras, selected by stratified sampling based on the census data of Patras.

The outcome variable of interest for this analysis was the proportion of women who have ever had a Pap-test and the proportion of women who had had a Pap-test within the last 3 years before the study. Independent variables included demographic and socioeconomic characteristics, such as age in years, marital status, educational level, household income, house ownership, health care coverage and occupational status. Secondary characteristics included body mass index (BMI categorized as underweight [18.5-19.9 kg/m<sup>2</sup>], within acceptable limits [20-24.9 kg/m<sup>2</sup>], overweight [25-29.9 kg/m<sup>2</sup>], obese [ $\geq$ 30kg/m<sup>2</sup>]), tobacco exposure (expressed in pack-years and defined as 1 pack-year corresponding to twenty cigarettes smoked every day for one year) and alcohol consumption.

### 2.2. Statistical Analysis

The statistical analysis was conducted by using SPSS software program version 17.0. The age-weighted prevalence estimates of "Ever having had a Pap test" and "Having had Pap test in the past 3 years" were calculated.

The relationship between cervical cancer screening behavior and demographic, clinical, and lifestyle factors was assessed by using Pearson's chi square ( $\chi$ ) in SPSS cross tabulation. Chi square ( $\chi$ ) results were considered statistically significant at  $p \leq 0.05$ . To further assess these relationships multiple (multivariate) logistic regression models were applied. The prevalence odds ratios and their 95% confidence intervals (CI) were estimated to determine the magnitude of the association between the specific factors and cervical cancer screening behavior. The variables significantly associated with cervical cancer screening ( $p < 0.05$ ), odds ratios (OR) and 95% CI were calculated using logistic regression analysis. All data were weighted by respondent's age.

## 3. Results

The main demographic and socioeconomic characteristics of the study population are presented in table 1. From the 873 women, 67.2% had ever had a Pap test and 54.4% had been tested in the previous three years (Table 1).

**Table 1.** Basic demographic and socioeconomic characteristics of the study population (n=873)

Characteristics	Number (n)	Percentage (%)
Ever had Pap-test		
Yes	587	67.2
No	286	32.8
Time since last Pap-test		
< 3 years ago	475	54.4
> 3 years ago	99	11.3
Don't remember	13	1.5
Never	286	32.8
Respondent's age		
18-24	126	14.4
25-34	180	20.6
35-44	168	19.2
45-54	167	19.1
55-64	133	15.2
65-74	99	11.3
Marital status		
Single	216	24.7
Married/Partnered	547	62.7
Formerly married	110	12.6
BMI		
Underweight	40	4.7
Normal	460	53.7
Overweight	239	27.9
Obese	118	13.7
Educational status		
Primary (<6 years)	41	4.7
Lower secondary (6-9 years)	319	36.8
Higher secondary (9-12 years)	348	40.2
Tertiary (> 12 years)	159	18.3

Occupational status		
Employed	263	30.2
Unemployed	609	69.8
Home ownership		
Yes	672	77.0
No	201	23.0
Household income (€)		
< 500	58	6.6
500≤1000	220	25.2
1000≤1500	199	22.8
1500≤2000	151	17.3
2000≤2500	98	11.2
2500≤3000	51	5.8
> 3000	38	4.5
No response	58	6.6
Insured		
Yes	829	95.0
No	44	5.0
Nationality		
Greek	838	96.0
Other	35	4.0
Presence of health problems		
Yes	471	54.0
No	402	46.0
Alcohol consumption		
Yes	542	62.1
No	331	37.9
Alcohol frequency		
Never/Rare	264	48.7
> 1 time/week	278	51.3
Heavy alcohol consumption ("more than 4 glasses")		
Never/rare	361	66.6
> 1 time/week	181	33.4
Smoking habits		
Non Smoker	442	50.6
Former Smoker	61	6.7
< 1 pack-years	112	12.8
1 to 5 pack-years	206	13.6
>5 pack-years	46	5.3

Women were more likely to have had a recent Pap test if they were aged 35-44 (OR=5.0 vs. age 18-24, 95% CI 2.2-11.5) or 45-54 (OR=3.0 vs. age 18-24, 95% CI 1.4-6.7) and if they were married/partnered (OR=2.4 vs. single, 95% CI 1.4-4.1) (Table 2, Table 3). Women with no education or belonging to the lowest educational level were less likely to have had a recent Pap test (OR=0.2 vs. >12 years education, 95% CI 0.1-0.5) as well as unemployed women (OR=0.5 vs. employed, 95% CI 0.3-0.7). Compared to women with a monthly household income of less than <500€, those with higher incomes were more likely to have had a Pap test. There was no statistically significant difference between screening behavior and BMI, health care coverage and house ownership.

In cross tabulation analysis “ever having had a Pap test” was significantly associated (p<0.05) with age, marital status, educational status, household income, occupational status, nationality, presence of health problems, alcohol frequency, heavy alcohol consumption, house ownership and smoking. Lower rates of Pap screening were observed in younger, single women, women with lower household income, unemployed and other nationalities except Greek. Moreover women, who had more than five smoking pack-year history, had higher rates of Pap test screening. In addition, higher rates of screening in the last 3 years were found in women who had university education and with a household income of more than 2,000€ per month. Pap screening test was not associated with BMI, and health care coverage.

In the multivariate logistic regression models, the response variables were “Ever having had a Pap test” and “Having had Pap test in the past 3 years”. Our estimates show that older age groups had higher screening rates than younger women by 2 to 5 times (Table 2, Table 3). Furthermore married or partnered women were screened 2 times more than single women. Occupational status and presence of health problems were negatively associated with having had a Pap test while household income was positively associated (Table 3).

**Table 2.** Screening history (ever cervical smear, up to 3 years cervical smear) by age group of respondent (n=873)

Age group (years)	Total number in sample	Ever Pap test		Up to 3 years Pap test	
		% (95% CI)	N	% (95% CI)	N
18-24	126	29.4 (21.4 - 34.3)	37	28.6 (20.7 - 36.5 )	36
25-34	180	66.1 (59.2 - 73.0)	119	58.3 (51.1 - 65.5 )	105
35-44	168	85.1 (79.7 - 90.5)	143	73.2 (66.5 - 79.9)	123
45-54	167	81.4 (75.5 - 87.3)	136	69.5 (62.5 - 76.5)	116
55-64	133	76.7 (69.5 - 83.9)	102	54.9 (46.4 - 63.4)	73
65-74	99	50.5 (40.6 - 60.4)	50	22.2 (14.0 - 30.4)	22
Total	873	67.2 (64.1 - 70.4)	587	54.4 (51.1 - 57.7)	475

**Table 3.** Odds ratios of screening history (ever Pap test, up to 3 years Pap test) by sociodemographic characteristics (n=873)

	Ever vs Never Pap test			Up to 3 years vs Never Pap test		
	%	OR (95% CI)	p-value	%	OR (95% CI)	p-value
<b>Age</b>						
18-24	29.4	1.0		28.6	1.0	
25-34	66.1	2.13 (1.14 -4)	.018	58.3	1.99(1.04 -3.79)	.036
35-44	85.1	6.85 (3.15 -14.92)	.000	73.2	5.59(2.50 -12.50)	.000
45-54	81.4	5.29 (2.52 -11.11)	.000	69.5	4.57(2.10 -9.90)	.000
55-64	76.7	3.21 (1.52 -6.60)	.002	54.9	2.40(1.08 -5.32)	.032
65-74	50.5	1.63 (.76 -3.52)	.212	22.2	.62(.27 -1.44)	.264
<b>Marital status</b>						
Single	44.7	1.0		38.8	1.0	
Married/partnered	77.2	2 (1.25 -3.19)	.004	59.9	2.02(1.21 -3.38)	.007
Formerly married	63.1	1.29 (.74 -2.23)	.369	42.6	1.43(.78 -2.62)	.254
<b>Educational status</b>						
Primary (<6 years)	41.1	1.0		16.9	1.0	
Lower secondary (6-9 years)	70.1	2.79 (1.74 -4.64)	.000	49.5	3.42(1.86 -8.33)	.000
Higher secondary (9-12 years)	73.7	3.98 (2.78 -6.99)	.000	58.9	4.54(2.31 -9.10)	.000
Tertiary (> 12 years)	80.3	3.50 (1.89 -6.45)	.000	75.2	4.98(2.42 -10.31)	.000
<b>Occupational status</b>						
Employed	81.5	1.0		72.0	1.0	
Unemployed	66.7	.43 (.30 -.62)	.000	47.7	.41(.28 -.58)	.000
<b>Household income</b>						
<500€	46.8	1.0		25.9	1.0	
500≤1000	59.8	3.39 (2.07 -5.52)	.000	39.8	1.92(1.11 -3.44)	.020
1000≤1500	76.6	3.54 (2.11 -5.95)	.000	58.2	2.29(1.29 -4.10)	.005
1500≤2000	76.5	2.95 (1.69 -5.13)	.000	65.0	2.21(1.20 -4.08)	.011
2000≤2500	82.6	4.13 (2.20 -7.81)	.000	67.2	2.99(1.53 -5.88)	.001
2500≤3000	84.0	4.20 (2.06 -8.62)	.000	75.0	3.30(1.53 -7.09)	.002
>3000€	80.4	4.03 (1.75 -9.35)	.001	78.6	4.07(1.68 -6.22)	.002
<b>Presence of health problems</b>						
Yes	71.1	1.0		53.0	1.0	
No	69.5	.66 (.48 -.90)	.009	56.0	.68(.50 -.93)	.015
<b>Nationality</b>						
Greek	71.1	1.0		54.2	1.0	
Other	58.1	.11 (.06 -.22)	.000	47.3	.11(.05 -.22)	.000
<b>Alcohol frequency</b>						
Never/rare	72.3	1.0		53.6	1.0	
> 1 times/week	68.1	.79 (.61 -1.02)	.072	55.9	.81(.61 -1.04)	.136
<b>Smoking habits</b>						
Non Smoker	65.3	1.0		49.2	1.0	
Former Smoker	79.4	1.39 (.85 -2.89)	.189	62.4	1.43(.84 -2.45)	.190
< 1 pack-year	59.6	.58 (.37 -.90)	.015	48.0	.52(.32 -.82)	.005
1-5 pack-years	81.8	1.19 (.84 -1.70)	.321	65.1	1.02(.71 -1.46)	.437
> 5 pack-years	78.9	2.99 (1.55 -5.78)	.001	53.4		.080
<b>Home ownership</b>						
Yes	71.9	1.0		55.3	1.0	
No	64.0	1.31 (.92 -1.87)	.132	48.1	1.12(.28 -.58)	.575

## 4. Discussion

The estimated prevalence rates of screening for cervical cancer are relatively low among women living in Patras as one in two women had not been tested in the previous three years. Screening rates in the EU differ between Member States (MS) with the highest screening achieved in the United Kingdom, Norway and Sweden where rates reach as high as 80% while the lowest ones are observed in Hungary and the Slovak Republic.

There are no reliable data concerning screening rates in Greece due to the large number of opportunistic testing and the lack of an organized population based approach. The systematic examination of factors associated with cervical cancer screening among women in the city of Patras has led to a deeper understanding of the characteristics of under screened women in Patras. Consequently health promotion actions can be targeted to increase the number of women from specific socioeconomic categories who screen.

The present study shows that younger (18-24) and older (65-74) Greek women reported lower rates of cervical cancer screening than women aged 35-54. Of interest is the low prevalence of screening among women aged 18-24 years in Greece (29.4%), possibly related to the fact that screening in Greece is recommended for women between 25 to 65 years [14,15]. In addition, women with household income of at least 2,000€, were 3 to 4 times more likely to have been screened compared to those with lower household income. Household income has been found in multiple studies to be positively correlated with screening uptake, possibly due to greater financial freedom as a result of higher income [16-24]. Although the Greek NHS offers free cervical cancer screening, long waiting lists can discourage women - especially women of lower socioeconomic status - to access them. Another reason for this is that women of higher income have a better understanding of the benefits of screening in detecting precancerous lesions [25].

Low income impacts health seeking behaviors such as cervical screening in many ways other than difficulties in health services utilization. Women from low income backgrounds often are not able to utilize public services due to long working hours or inability to access public services due to long distances [26]. Strong cervical cancer screening adherence predictors for women of all income are having a regular source of care and a physician recommending screening [27, 28, 29]. These services may be difficult to obtain for women from lower socioeconomic backgrounds. In addition women from lower socioeconomic backgrounds have low levels of health literacy and in general low educational levels which may explain low adherence levels [30, 31] even though free health insurance is available.

This was evident in the Patras study, since women with high school or university level education were 3 to 4 times more likely to have had a Pap test compared to women with some or no school education, a finding confirmed by other studies [16,22,23,26]. Furthermore, women of low

education were less likely to repeat screening after 3 years compared to women of higher education. Finally, employed women were 2 times more likely to have had a Pap test compared to women who did not work, another finding confirmed by the literature [32].

Screening behavior was not influenced by health care coverage, BMI, house ownership or alcohol consumption in the present study. The lack of a significantly positive association between screening behavior and health care coverage may be due to the high prevalence of women who had health care coverage (95.1%).

The study also shows a positive correlation between number of smoking pack-years and Pap testing. Women who had over 5 pack-years were about 3 times more likely to receive a Pap test than those who didn't. This may be explained as a consequence of an increased level of awareness of heavy smokers due to their hazardous habit. On the other hand, less heavy smokers (< 1 pack-year) seem to have less regular Pap tests compared to non-smokers, a finding also observed in several other studies.[16, 33-35]. However, the number of heavy smokers in the sample was low (5.3%) therefore more research needs to be conducted in order to establish an association with smoking.

Although studies have consistently shown an inverse relationship between obesity and screening behavior (decreased cervical cancer screening with increasing BMI) [36-38], this study did not detect a statistically significant relationship between Pap test screening and BMI.

Most EU countries have had population based Pap screening test programs since the early 60s. Finland, Luxemburg and Sweden were the first to establish these programs followed by other MS [14]. Most programs were financially supported by government resources. Unfortunately no such programs exist in Greece up until now.

The National Action Plan for Cancer which has been in effect since 2008 includes a number of measures for the prevention of cancer including cervical cancer. There are plans to implement organized population based cervical cancer screening on a national basis and according to the European Guidelines for Quality Assurance for Cervical Cancer screening. Due to the existing financial crisis there is no further information on when these plans will be put into effect.

Since 2006 when the study was conducted HPV vaccination was introduced to the Greek National Immunization schedule in 2007. The age of the target population is 12 to 15 years old and the recommended catch-up age is 16 to 26 years. Vaccination is offered free of charge for females aged 12-26 according to specific criteria and it is not compulsory, but given on demand. The costs of the vaccine are fully reimbursed by the social insurance funds.

Latest developments show that a program that combines cervical cancer screening using the Pap test, HPV vaccination and molecular testing for HPV type will drastically improve cervical cancer detection and treatment

[39].

The main limitation of the present study is that the data were collected 7 years ago and prior to the financial crisis. However, the 2006 data for screening among women in Patras are valuable for future comparisons especially in terms of measuring the impact of the financial crisis on health seeking behaviors such as screening for cervical cancer or HPV vaccination.

Follow up study should investigate the uptake of HPV vaccinations among the population in Patras as this will provide new insights to the cervical cancer screening profile of the city as well as to help create or improve policy recommendations.

## 5. Conclusions

It is important that findings from this study are widely disseminated in particular among local stakeholders. Given the financial crisis that has affected Greece since 2009 it is expected that problems for people belonging to low socioeconomic groups will intensify and that health seeking behaviors such as screening for cervical cancer among this group would have worsened. Local authorities should utilize existing and low cost mechanisms to implement awareness raising activities for the local community. Such mechanisms include local TV and radio stations as well as local health care services. Nevertheless, the best method to reduce cervical cancer is the implementation of a population based organized screening program according to the EU guidelines which would also facilitate the collection of consistent data for statistical monitoring. This would enable optimal examination, application and comparison of new test methodologies such as HPV-testing and would also facilitate evaluation of the program. In the long term this is the best way to reduce health costs related to the treatment of cervical cancer and the best argument for policy makers in the context of the current financial crisis.

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