

## Research Article

# Cervical Cancer Screening in the Municipality of Nicosia, Cyprus - Coverage and Association with Socioeconomic Determinants

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## Abstract

The aim of the present study is to determine the prevalence of Pap smear use among the women in Nicosia and to identify the factors associated with Pap test's performance. A cross-sectional study was carried out on a representative sample of 525 women living in the municipality of Nicosia in 2014. Prevalence Ratios (PR) of Pap smear use were calculated. Information about demographic, socioeconomic and lifestyle factors was collected. About 81% had at least one Pap test in their life, with 70% having been tested in the previous three years. Women aged 25-64 were more likely to have had a recent Pap test than women aged 20-24. Furthermore, married/partnered women, employed women, women with higher education were more likely to have had a recent Pap test. Compared to women with a monthly household income of >1000€, those with lower income were less likely to have had a recent Pap test. Finally non-Cypriot women are less likely to have had a recent Pap test than Cypriot females. The prevalence of Pap testing in Nicosia is high. However, efforts to establish a cervical cancer screening in Cyprus should be planned and implemented in the framework of a comprehensive cancer control program taking into account overall health care needs and priorities emphasizing mainly in women with socioeconomic disadvantages.

**Keywords:** Cervical cancer screening; Prevalence of pap test

## Introduction

The Health Profile of the city of Nicosia, Cyprus, was conducted in 2013-2014, within the Healthy Cities Programme, with the aim to collect and analyse information about the current socioeconomic and demographic situation of its citizens, their living conditions and health status as well as health related behaviors and to evaluate and implement preventive programmes, including cervical cancer screening. The ultimate purpose was to conduct a Health Action Programme of the City of Nicosia.

Cervical cancer is one of the world's most common cancer among women, but at the same time one of the most preventable and treatable forms if detected early and managed effectively [1].

It is estimated that over one million women worldwide currently have cervical cancer. Most of these women have not been diagnosed, nor do they have access to treatment that could cure them or prolong their lives [1]. There is an unequal burden of cervical cancer [2]. In 2012, 528,000 new cases of cervical cancer were diagnosed worldwide and 266,000 women died of the disease, nearly 90% of them in low-to middle-income countries. Without urgent attention, deaths due to cervical cancer are projected to rise by almost 25% over the next 10 years [1].

Although significant advances are being made in the fight against cervical cancer, the disease remains a key public health concern and a tremendous burden on European societies. In the European Union (EU) 34,000 new cases and more than 16,000 deaths due to

cervical cancer are reported annually [3,4]. The highest annual world-standardized mortality rates are currently reported in Romania and Lithuania (13.7 and 10/100,000, respectively) and the lowest in Finland (1.1/100,000) [5].

Among all malignant tumours, cervical cancer is the one that can be most effectively controlled by screening [6]. It has been predicted that by implementing 100% population coverage of cervical cancer screening every 3-5 years, an estimated reduction of over 94% of life years lost could be attained, and for every 152 Pap smear tests performed, one life year could be gained [7]. In countries that have established such programs – mainly countries of developed world - cervical cancer incidence has shown a marked decrease. In times of financial instability, it is all the more important to maintain investments in health, in particular through preventive actions [8].

The EU Council recommends implementation of population-based cervical cancer screening programs with identification and personal invitation of each woman in the eligible target population to the EU member states, with quality assurance at all levels [5]. Based on these recommendations most Member States (MS) have implemented population based organized cervical cancer screening programs either nationally or regionally. The highest screening rates are achieved in the United Kingdom, Norway and Sweden (80%) while the lowest ones are observed in Hungary (36%), the Slovak Republic (23%) and Romania (14%) [9].

In Cyprus in 2012 the incidence rate for cervical cancer was 5.2 per 100,000 women and the crude mortality rate was 2.5 per 100,000

**Table 1:** Basic demographic and socioeconomic characteristics of the study population (n=525).

Characteristics	Number (n)	Percentage (%)
<b>Ever had Pap-test</b>		
Yes	421	80,8%
No	100	19,2%
<b>Time since last Pap-test</b>		
< 3 years ago	365	70,3%
> 3 years ago	154	29,7%
<b>Respondent's age</b>		
20-24	45	8,6%
25-34	123	23,4%
35-44	111	21,1%
45-54	84	16,0%
55-64	66	12,6%
65-74	51	9,7%
75+	45	8,6%
<b>Marital status</b>		
Single	131	25,0%
Married/Partnered	291	55,4%
Formerly married	103	19,6%
<b>BMI</b>		
Underweight	24	4,6%
Normal	298	56,8%
Overweight	158	30,1%
Obese	45	8,6%
<b>Educational status</b>		
Primary (<6 years)	72	13,7%
Lower secondary (6-9 years)	23	4,4%
Higher secondary (9-12 years)	153	29,1%
Undergraduate (12-16 years)	224	42,7%
Postgraduate (>16 years)	53	10,1%
<b>Occupational status</b>		
Unemployed	63	12,5%
Employed	310	61,6%
Retired	102	19,4%
Household Worker	28	5,3%
Don't Know/No answer	22	4,2%
<b>Home ownership</b>		
Yes	380	72,4%
No	145	27,6%
<b>Household income (€)</b>		
< 500	37	7,0%
500≤1000	95	18,1%
1000≤1500	103	19,6%
1500≤2000	99	18,9%
2000≤2500	84	16,0%
2500≤3000	54	10,3%
> 3000	52	9,9%
No response	1	0,2%
<b>Nationality</b>		
Greek	437	83,2%
Other	88	16,8%
<b>Presence of health problems</b>		
Yes	196	37,3%
No	328	62,5%
Don't Know/No answer	1	0,2%
<b>Alcohol consumption</b>		
Yes	231	44,0%
No	294	56,0%
<b>Alcohol frequency</b>		
Never/Rare	264	50,3%
1-3 times/month	85	16,2%
1-2 times/week	141	26,9%
3-4 times/week	22	4,2%
Almost every day	13	2,5%
<b>Smoking habits</b>		
Non Smoker	344	65,5%
Former Smoker	39	7,4%
1-5 cigarettes/day	34	6,5%
Half package per day	53	10,1%
One package or more per day	55	10,5%

women, while the age-standardized mortality rate was 7.2 per 100,000 women [10].

**Table 2:** Screening history (ever cervical smear, up to 3 years cervical smear) by age group of respondent (n=525).

Age group (years)	Total	Ever Pap test			Up to 3 years Pap test				
		N	%	95% CI	N	%	95% CI		
20-24	45	43	39,5	24,3	54,8	45	37,8	23,0	52,5
25-34	123	122	83,6	76,9	90,3	122	82,0	75,0	88,9
35-44	111	111	91,9	86,7	97,0	111	89,2	83,3	95,1
45-54	84	84	89,3	82,5	96,0	84	85,7	78,1	93,4
55-64	66	66	92,4	85,9	99,0	66	84,8	76,0	93,7
65-74	51	50	72,0	59,1	84,9	50	36,0	22,2	49,8
75+	45	45	62,2	47,5	77,0	41	7,3	-1,0	15,6
Total	525	521	80,8	77,4	84,2	519	70,3	66,4	74,3

Cyprus is among the few European countries that have not yet establish both a national screening program for cervical cancer and a vaccination program against Human Papilloma Virus (HPV) that is causally linked with cervical cancer. However, from 2012, a regional pilot screening program was implemented in some communities in Nicosia district area, that includes women aged 25-65 under the care of the Ministry of Health. A private organisation of women in cooperation with the governmental health services organised this screening programme in which the Ministry of Health offers all the supplies and the health centers and the women organisation the doctors, the information and invitation of the eligible target population to performance of the screening test.

Cyprus has not established yet a National Health System (NHS), thus cervical screening in Cyprus is opportunistic and can be conducted in public or private hospitals or clinics. Several private clinics, mainly in Nicosia and Limasol, have very well organized programs but no reliable data on the percentage of women covered are available. The majority of private gynaecologists also perform Pap tests in their private practices, not free of cost. There are no reliable data on the percentage of women who perform Pap tests privately. 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.

## Materials and Methods

### Study design, data collection and study population

The data were collected between May 2013 and April 2014 through a research-administered survey. An interviewer addressed the questions to a representative sample of 525 women aged 20 to 74 years old, residents of Nicosia, who were selected by stratified sampling based on the census data of Cyprus.

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 [≥ 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.

### Statistical analysis

The statistical analysis was conducted by using IBM SPSS Statistics

**Table 3:** Odds ratios of screening history (ever Pap test, up to 3 years Pap test) by socio demographic characteristics (n=525).

	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>								
20-24	39,5	1,00			37,8	1,00		
25-34	83,6	8,59	(2,54 - 29,02)	,001	82,0	5,36	(1,83 - 15,74)	,002
35-44	91,9	18,40	(4,58 - 73,94)	,000	89,2	9,04	(2,71 - 30,2)	,000
45-54	89,3	7,52	(1,67 - 33,96)	,009	85,7	4,35	(1,18 - 16,08)	,028
55-64	92,4	14,18	(2,80 - 71,84)	,001	84,8	6,54	(1,64 - 26,11)	,008
65-74	72,0	1,72	(0,15 - 19,31)	,661	36,0	0,35	(0,04 - 3,3)	,361
75+	62,2	1,44	(0,12 - 17,04)	,772	7,3	0,08	(0,01 - 0,95)	,046
<b>Marital status</b>								
Single	59,4	1,00			55,4	1,00		
Married/partnered	92,4	10,59	(4,65 - 24,1)	,000	82,1	7,53	(3,5 - 16,2)	,000
Divorced/widowed	74,8	3,53	(1,37 - 9,07)	,009	55,6	2,82	(1,11 - 7,17)	,029
<b>Educational status</b>								
Primary (<6 years)	70,4	1,00			29,4	1,00		
Lower secondary (6-9 years)	78,3	1,18	(0,29 - 4,75)	,819	36,4	1,43	(0,37 - 5,5)	,602
Higher secondary (9-12 years)	82,1	0,86	(0,30 - 2,50)	,781	73,9	2,74	(1,01 - 7,41)	,047
Undergraduate (12-16 years)	83,0	1,02	(0,34 - 3,13)	,967	81,3	4,30	(1,52 - 12,16)	,006
Postgraduate (>16 years)	82,7	0,70	(0,16 - 3,08)	,638	80,8	3,20	(0,8 - 12,78)	,100
<b>Occupational status</b>								
Unemployed	71,0	1,00			66,7	1,00		
Employed	89,0	1,71	(0,68 - 4,31)	,253	85,8	1,65	(0,72 - 3,75)	,236
Retired	70,3	2,95	(0,33 - 26,62)	,336	29,9	3,77	(0,48 - 29,7)	,208
Household Worker	82,1	0,83	(0,17 - 4,08)	,817	75,0	1,60	(0,37 - 6,86)	,525
<b>Household income</b>								
<500€	69,4	1,00			55,6	1,00		
500≤1000	69,5	1,16	(0,41 - 3,3)	,774	51,6	1,52	(0,51 - 4,58)	,455
1000≤1500	85,3	3,12	(0,96 - 10,11)	,058	66,3	1,37	(0,45 - 4,19)	,586
1500≤2000	81,4	1,15	(0,35 - 3,83)	,820	76,5	1,17	(0,36 - 3,83)	,796
2000≤2500	84,5	1,98	(0,5 - 7,91)	,331	78,6	1,29	(0,36 - 4,68)	,694
2500≤3000	90,7	2,80	(0,55 - 14,37)	,216	87,0	2,61	(0,59 - 11,61)	,208
>3000€	82,7	1,86	(0,42 - 8,18)	,412	78,8	1,78	(0,43 - 7,28)	,423
<b>Presence of health problems</b>								
Yes	75,9	1,00			55,5	1,00		
No	83,7	1,61	(0,76 - 3,42)	,217	78,9	1,16	(0,59 - 2,31)	,663
<b>Nationality</b>								
Cypriot	81,1	1,00			68,9	1,00		
Other	79,5	0,28	(0,11 - 0,70)	,007	77,3	0,43	(0,19 - 0,96)	,039
<b>Alcohol frequency</b>								
Never/rare	77,2	1,00				1,00		
1-3 times/month	82,4	1,61	(0,66 - 3,97)	,298	81,2	2,63	(1,12 - 6,18)	,027
1-2 times/week	85,0	2,07	(0,89 - 4,82)	,092	79,4	1,84	(0,88 - 3,85)	,108
3-4 times/week	90,5	14,30	(1,52 - 134,39)	,020	77,3	2,79	(0,63 - 12,3)	,176
Almost every day	83,3	1,65	(0,29 - 9,51)	,577	69,2	1,81	(0,34 - 9,71)	,489
<b>Smoking habits</b>								
Non Smoker	78,3	1,00			64,6	1,00		
Former Smoker	87,2	2,13	(0,60 - 7,54)	,241	79,5	2,02	(0,63 - 6,5)	,239
1-5 cigarettes/day	85,3	1,01	(0,30 - 3,45)	,982	85,3	1,76	(0,52 - 5,94)	,364
Half package per day	90,6	4,02	(1,17 - 13,82)	,027	86,5	2,80	(0,96 - 8,12)	,059
One package or more per day	79,6	1,24	(0,48 - 3,23)	,658	74,5	1,03	(0,44 - 2,44)	,939
<b>Home ownership</b>								
No	77,1	1,00			72,0	1,00		
Yes	82,2	0,89	(0,45 - 1,75)	,731	69,7	0,70	(0,35 - 1,39)	,312

for Windows, Version 22.0. (IBM SPSS Statistics for Windows, Released 2013. Armonk, NY: IBM Corp.). The relationship between cervical cancer screening behaviour and demographic, clinical, and lifestyle factors was assessed by using Pearson’s chi square tests. In addition, binary logistic regression models, using the forced entry method, were used to further assess these relationships, where 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 behaviour. The accepted levels of significance were 0.05 or less.

## Result

The main demographic and socioeconomic characteristics of the study population are presented in (Table 1).

The estimated prevalence rates of screening for cervical cancer

are relatively high among women living in Nicosia as 80.8% out of the 525 interviewed women had a smear test at least one time in their life, whereas 19.2% have never been screened (Table 1). The overall screening coverage meaning the percentage of women screened less than three years ago was 70.3% (Table 1).

In the multivariate analysis the parameter “Having been screened in the last 3 years (Up to 3 years Pap test)” was significantly associated with age, marital status, internet access at home, alcohol consumption, smoking habits, occupational status, educational status, health problems, household income and nationality (Table 2 and 3). Women aged 25-64 were more likely to have had a recent Pap test than younger or older, as well as married/partnered women compared to single and divorced or widowed. Further, women that were able to have access to internet from their home, were more likely to have had a recent Pap test. Women that indicated none or rare

consumption of alcohol, no smokers, pensioner and unemployed women, women with lower education and with health problems were less likely to have had a recent Pap test. Compared to women with a monthly household income of <1000€, those with higher income were more likely to have had a recent Pap test.

The outcome “Having been screened at least one time in their life (Ever Pap test)” was significantly associated with age, marital status, occupational status and household income and health problems (Table 3). Women aged 25-64 were more likely to have had a Pap test than younger and older, as well as married/partnered women compared to single and divorced or widowed. Unemployed and retired as well as women with health problems were less likely to have had a Pap test. Compared to women with a monthly household income of <1000€, those with higher income were more likely to have had a Pap test.

## Discussion

The estimated prevalence rates of screening for cervical cancer are relatively high among women living in Nicosia, as 70.3% of women had been tested in the previous three years. Population-based cervical cancer screening programs have been promoted by the Council of the European Union and the European Commission [11,12] but the periodicity and target groups vary among member states. Screening rates for cervical cancer in the United Kingdom, Sweden and Norway achieved high coverage, with close to 80% of the target population, whereas in the Slovak Republic and Hungary the screening rates are the lowest.

This study shows that women aged 25-64 are more likely to have had a recent Pap test, than younger or older age groups and this is possibly related to the fact that screening in Cyprus is recommended for women between 25 to 65 years [10,13]. The age limits and the frequency of the checks vary by country and health system. In Greece the program is aimed at women over 18 which calls for Pap test every 2, 3 or 5 years [13]. In Australia the program invites women 18-69 years for Pap test every 2 years, in Lithuania women aged 30-60 years are invited to check every 3 years and Sweden provides Pap test every 3 years for women aged 23-50 years and every 5 years for women aged 51-70 years old. The majority of the cervical cancer screening programs focuses at women aged 25-65 years (England, Wales, B. Ireland, Italy, France, Belgium, Hungary, Slovenia) [14,15].

Compared to women with a monthly household income of <500€, those with higher income were more likely to have had a Pap test. 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 [16-18]. In the city of Patras 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 [18].

In Cyprus, the public hospitals offer free Pap test for women in their gynecological departments, but long waiting lists most likely discourage them, especially women of lower socioeconomic status to access them [10], evidence also observed in Greece where the Greek NHS offers free cervical cancer screening [18]. In EU countries most programs are financially supported by government resources. Cervical screening is a free service of the National Health System in

the United Kingdom, Wales and Northern Ireland [19].

Another relevant parameter seems to be the marital status. In this study married or partnered women were twice as likely to have been screened compared to single and divorced women. Married women may be more likely to visit a doctor for reproductive health; another explanation is the belief that only sexually active women need a smear test. Furthermore, the stigma associated with extramarital sexual activity in Cypriot culture may deter unmarried women from getting Pap smears. Married women have been found in many studies to be positively correlated with screening uptake [18-24]. Jelastopulu et al., reported that married women in the city of Patras were also twice as likely to have been screened compared to single and divorced women [18]. Also Nguyen et al., reported that Vietnamese-American married women aged  $\geq 18$  years living in Santa Clara County, California, and Harris County, Texas, were twice as likely to have been screened compared to single women [20] and Taylor et al., reported that Vietnamese-American married women aged  $\geq 18$  years living in Seattle community in Washington also screened twice for Pap test compared to single women [24].

Many previous studies have shown that women with lower education were less likely to have had a recent Pap test [18,25-30]. This relationship was evident in the present study too, since women with academic education were 3 to 4 times more likely to have had a Pap test compared to women with lower education. Olesen et al., reported that women with higher education were two times more likely to have had a Pap test compared to women with lower education, mainly due to higher education and consequently higher awareness [31].

Regarding the occupational status, the present study reveals that employed women were five times more likely to have had a Pap test compared to unemployed women, a finding that is seen in several other studies, albeit not in these magnitude [18,29-31]. In the cross-sectional study of Olesen et al., with 1685 women from the Australian Capital Territory and Queanbeyan Australia, unemployed women were two times less likely to have had a smear test compared to employed [31] and similar results were seen in the cross-sectional survey on a total of 8570 randomly selected women aged 25 to 64 years in Abruzzo (Italy), conducted by De Vito et al., [29].

Furthermore, screening behavior seems to be influenced by nationality, since Greek Cypriot women were 3 to 4 times more likely to have had a Pap test compared to immigrant women from other countries. An analogue result was also found in the study of Fernandez et al., where foreign-born Hispanic women residing in the Washington DC metropolitan area obtain to lesser extent screening tests due to many barriers, such as language, competing priorities, and lack of knowledge about preventive screening methods [32].

In opposite to the results of Olesen, in the present study we did not see any association between home ownership and higher rates of screening [31].

An interesting issue was that not heavy female smokers were more likely to have had a Pap test compared to non-smokers. However, this finding was also observed in several other studies [18,33-36]. Possibly smokers tend to be more aware about the consequences due to their hazardous habits and provide for the risk of cancer in better time.

Many studies indicate that the implementation of a population



based organized screening program according to the EU guidelines lead to the decrease of the incidence of cervical cancer [37-39]. The Council of the EU has recommended implementation of population-based cervical cancer screening programs to the EU member states, with quality assurance at all levels and in accordance with European guidelines [11]. Unfortunately no such programs exist in Cyprus up until now but 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.

## Conclusion

There are inequalities in cervical cancer screening in the city of Nicosia despite the subsidized costs of cervical cancer screening. Utilizing these findings local leaders have the ability to implement efforts to increase awareness in female risk groups in the community, i.e. older women, unmarried or single, with low education and low income. Community mobilization and health education are essential tools for overcoming common challenges that impede access to and utilization of preventive care. These common barriers include social taboos, lack of information and lack of transportation to service sites. Health education messages about cervical cancer should reflect the national policy and should be culturally appropriate and consistent at all levels of the health system.

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