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**The prevalence and factors associated with cervical cancer screening  
among women in the general population:  
evidence from National Health Survey**

Учесталост и фактори повезани са скринингом рака грлића материце код жена у општој популацији: докази из Националног истраживања здравља

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## The prevalence and factors associated with cervical cancer screening among women in the general population: evidence from National Health Survey

Учесталост и фактори повезани са скринингом рака грлића материце код жена у општој популацији: докази из Националног истраживања здравља

### SUMMARY

**Introduction/Objective** Serbia has been burdened with one of the highest cervical cancer incidence and mortality rates in Europe.

The aim of the study was to estimate the prevalence and factors associated with compliance to cervical cancer screening among women in the general population.

**Method** The study used the data from 2013 National Health Survey of the population of Serbia. Logistic regression analysis was further used to examine demographic and socio-economic factors which affect the disparities in cervical cancer screening practices among the female population.

**Results** Every third woman (35.4%) has never done a Pap test in her lifetime. The highest percentage of respondents did their Pap tests after they were recommended by doctors (52.3%); 45% of women did it on their own initiative and only 2.7% did it after they had been summoned to participate in an organized screening by their doctor. The multivariate logistic regression analysis revealed that the most important factors in women who had never undergone Pap tests were: being within the youngest or the oldest age group, having a rural residence and low education level, belonging to poor socio-economic class, and never being married.

**Conclusion** Further strategies and interventions for improving cervical cancer incidence and mortality rates should be focused on socially and economically endangered population groups in order to reduce disparities in cervical cancer screening more effectively.

**Keywords:** cervical cancer screening; Pap test; socioeconomic inequalities

### САЖЕТАК

**Увод/Циљ** Србија доживљава високу оптерећеност карциномом грлића материце и има једну од највећих стопа инциденције и смртности у Европи. Циљ студије је процена преваленције и фактора повезаних са коришћењем скрининга на карцином грлића материце у општој популацији жена.

**Метод** Коришћени су подаци из националног Истраживања здравља становништва Србије 2013. Логистичка регресиона анализа је примењена за испитивање повезаности демографских и социоекономских фактора са неједнакостима приликом коришћења скрининга на рак грлића материце.

**Резултати** Свака трећа жена (35,4%) никада није урадила Папаниколау тест током живота. Највећи проценат испитаница, Папа тест је урадила по савету лекара (52,3%), а затим самоиницијативно 45% жена, док позив лекара у оквиру организованог скрининга наводи свега 2,7 % жена. Мултиваријантна логистичка регресија као најзначајније факторе за жене које никада нису урадиле Папа тест, издвојила је најмлађу и најстарију добну групу, ванградска насеља, низак ниво образовања, сиромашну класу и жене које никада нису биле у браку/ванбрачној заједници.

**Закључак** Ефективне стратегије и интервенције треба да буду усмерене на социјално и економски угрожене групе како би се ефикасно смањили диспаритети у скринингу карцинома грлића материце.

**Кључне речи:** скрининг на карцином грлића материце; Папа тест; социоекономске неједнакости

## INTRODUCTION

Cervical cancer is one of the most common causes of cancer death in women worldwide [1, 2]. Incidence and mortality rates have decreased in high-resource countries. Nowadays, approximately 87% of cervical cancer deaths occur in developing and low-resource countries due to the lack of awareness within their female populations and certain difficulties in running cervical cancer screening programs (Pap test) [3, 4].

Serbia has been burdened with one of the highest cervical cancer incidence and mortality rates in Europe. According to the Cancer Registry of the Republic of Serbia for 2015, the age-adjusted incidence rate was 18.1 and the mortality rate 6.1 per 100.000 women

[5]. Regular screenings are the most effective way to reduce the cervical cancer incidence and mortality rates [6, 7]. Following the recommendations of the European Union Council, almost all European governments have made political decisions to introduce cervical cancer screenings in their health systems. However, the levels of implementation are uneven. The majority of developed countries use organized screening models recommended by the relevant international professional organization while the others organize periodic screenings. There are considerable variations in screening strategies (i.e. age limit, screening intervals, etc.) and the extents to which they cover the target population [8].

Certain socio-demographic and cultural characteristics have been recognized as barriers to cervical cancer screening, including low income, low education level, marital status, rural residence, lack of knowledge and awareness about the importance of Pap tests, cultural beliefs, traditions and fear of cancer [9, 10, 11]. The health care providers fail to inform and encourage women to get tested, which is also a common obstacle to the provision of adequate services. The main systemic barriers are the inaccessibility to healthcare services and thus the inaccessibility to Pap test execution facilities [12].

The aim of the study was to estimate the prevalence and factors associated with compliance to cervical cancer screening among women in the general population.

## **METHODS**

This study used the data from the 2013 National Health Survey for the population of Serbia (without data on Kosovo and Metohia). This was a third population-based cross-sectional survey conducted by the Ministry of Health of the Republic of Serbia. In this survey, the research tools (methodology, questionnaires, instructions) were harmonized with the instruments of the European Health Survey second wave (EHIS wave 2) [13] taking into account the defined, internationally accepted indicators. The aim was to obtain the results that would be comparable with the results obtained in the EU member countries. The study used a national representative probability sample; two-stage stratified sample with known probability of sample unit selection at every sampling stage. Three types of questionnaires were used in the survey.

Ethical Standards in Health Research were harmonized with the international World Medical Association Declaration of Helsinki. The study was approved by the Ethics Committee, which covers four major regions in Serbia and is based in the Batut Republic Institute of Public Health in Belgrade, Institute of Public Health in Novi Sad, Institute of Public Health in Kragujevac and Institute of Public Health in Niš. All necessary steps were taken, in accordance with the Law on Personal Data Protection (Off. Gazette of RS No 97/08, 104/09) [14], to ensure the protection of privacy and confidentiality of collected information.

The study used only the data on the respondents aged 15 and above and their respective households. The final sample for analysis included 7864 women. Demographic characteristics (i.e. age, marital status, settlement type, region) and socioeconomic status (i.e. education, employment, and well-being index) are used as independent variables. The cervical cancer screening practices were taken as dependent variables.

The data of interest were analyzed with the mathematical-statistical methods suitable for the data type.  $\chi^2$  test was applied to examine the differences in the frequencies of categorical variables. Logistic regression analysis was used to examine demographic and socio-economic factors associated with the disparities in cervical cancer screening habits. All results with the probability equal to or less than 5% ( $p \leq 0.05$ ) were considered as statistically significant. Statistical analysis was performed in a commercial, standard software package SPSS, version 19.0. (The Statistical Package for Social Sciences software (SPSS Inc., version 19.0, Chicago, IL).

## RESULTS

The 62.1% of respondents had done a Pap test prior to the study. 42.6% of them had undergone cervical cancer screening in the previous three years (22.7% during 12 months and 13.7% one or two years prior the survey). Every third subject (35.4%) had never had a Pap test.

During the three years prior the survey, a Pap test had been executed most frequently on women aged 25–34 (68.4%), the married (52.7%), the Belgrade residents (57.1%) and other urban dwellers (47.8%), the highly educated (66.6%), the employed (69.5%) and those belonging to the richest population group (62.8%) (Table 1).

The highest percentage of respondents did the Pap test after it had been recommended by a doctor (52.3%); 45% of subjects did it on their own initiative and only 2.7% did it after being summoned by medical professionals to attend organized screenings.

The analysis shows that there is a statistically significant correlation between all the observed demographic and socio-economic features and the screening initiatives. The highly educated subjects were most likely to take screening examinations voluntarily (60.6%); the same ratio for the women with the lowest education level equaled 29.1%. Those respondents (with elementary or lower education) were significantly more likely to undergo Pap testing after being recommended to do so by a doctor (66.8% to 37.2%). The same pattern is revealed for financial statuses. The rich did their Pap tests more frequently on their own initiative (57.1%) than the poorest (30.9%). The opposite correlation was determined for screenings performed at doctors' recommendations. The poorest respondents were most likely to get tested in suchlike manner (64.3%). In terms of employment, the analysis reveals that employed women were most likely to get tested on their own demand (50.7%). 43.9% of the unemployed and 38.7% of the inactive respondents reported the same practice. The respondents from Belgrade (50.3%) and other urban areas (50.1%) and in Belgrade (50.3%) were more likely to take a Pap test on their own initiative while women from urban areas away from cities (60.3%) and other regions were more likely to get tested after doctors had recommended them to do so (Table 2).

The multivariable logistic regression analysis shows that the most important factors in women who have never done a Pap test are: being within the youngest or the oldest age group, having a rural residence and low education level, belonging to poor socio-economic class, and never being married.

The respondents with the lowest education level were 4 times less likely to take a Pap test than those with the highest education level (OR = 4.203). Those who belong to the poor group, based on the index of well being, did their Pap smear tests 2.8 times less frequently than those who were classified as rich (OR = 2.856). Women who had never been married were significantly less likely to get tested than those who were married (OR = 2.761). The same applied to economically inactive women (OR = 1.632). The youngest subjects, i.e. those who were less than 24 years old, did Pap tests least frequently (OR = 1.816).

## DISCUSSION

Every third women had never had a Pap test in life. The most important factors in women who had never undergone Pap tests were: being within the youngest or the oldest age group, having a rural residence and low education level, belonging to poor socio-economic class, and never being married.

The results of our study show that 62.1% of the subjects had done a Pap smear point at some time prior the survey. Only 42.6% of our respondents had done it during the three years prior to the study. Compared to our results, the higher rates of screening were recorded in the national research in Brazil in 2013 on a sample of 31,845 respondents (78.8%) [15]. Similar rates were also recorded by the Cancer Barometer surveys in France; however, they also noted a declining trend from 75.3% in 2006 (n = 3820) to 71.9% in 2010 (n = 3727) [16]. Quite contrary, the data obtained in a population-based cross-sectional surveys within Lithuanian Health Behaviour Monitoring that included 4248 female subjects aged 25 – 60 revealed a constant increasing trend; from 60.0% in 2006 to 74.2% in 2014. The likelihood of not being screened for cervical cancer was lower among older than among younger women (OR = 0.70; 95% CI = 0.61–0.82) [20].

Developed countries reported even higher screening rates. For example, 83% of women reported having a Pap smear test performed during the previous three years in the United States [19]. The analysis of the cross-sectional survey from Great Britain indicate that 91% of women aged 40 – 74 had had a cervical smear test; 3% of women aged 53 – 74 years had never undergone cervical screening [21].

Several Latin American countries reported the screening rates that are lower than ours. In all countries in question, the ratio of a recent Pap smear test was below 55%; for example, 49% (95% CI, 49–50%) in the Dominican Republic, 42% (95% CI, 41–43%) in Bolivia and 52% (95% CI, 51–53%) in Peru. There were indications that the proportions of women with Pap test awareness were growing in both Bolivia and Peru with the level consistently higher in the latter country [17].

The results obtained for the countries in the region vary significantly. In Greece, women aged 40 to 69 were recruited for the pap smear screening program. About 7% of them reported that they had never done a Pap test before they entered the program and 28.8% had not done it during the previous three years [22]. Reportedly, cervical cancer screening rates in

Hungary amount to 74%. On the other hand, the careening coverage among women in their reproductive age in Albania is extremely low. It is the lowest detected rate in the region with only 3.2% of females aged 15 to 44 ever being tested. The organized cervical cancer screening program in Bosnia and Herzegovina has not been improved significantly and the country still lacks national cervical cancer registries and Pap test databases. In Bulgaria, there is not a national program for cancer prevention. Currently, The Former Yugoslav Republic of Macedonia also lacks a national cancer registry. However, several countries in the region have managed to establish organized cervical cancer screenings that are relatively well-functioning. The others are still in the early or preparatory stages of suchlike screening practices. In the countries where cervical screening is performed, plans and strategies have been established for switching to organized screenings in the near future [18].

The results of our analysis show that only 2.7% of women responded to a doctor's call to attend organized screening. The Ministry of Health of the Republic of Serbia appointed a special working group for the prevention of cervical cancer in June 2006 as an official response to high incidence of cervical cancer. The group's task was to establish a national program for the prevention. The program was adopted in 2008 but the results still have not been satisfactory, primarily because of the low response from the female population whose health culture is low. In addition, the implementation of health promotion programs has been insufficient, probably due to disregarding the recommendations from the appointed group, as well as the incompetence in managing suchlike programs.

The current literature on the topic reports that recent medical visits are a significant indicator of recent cervical cancer tests [17]. The results of this study show that the highest ratio of respondents did their Pap test after they had been advised by a doctor to do so (52.3%). The women from Latin America who had had a recent visit to a doctor's office were 1.47 and 3.44 times more likely to have a recent Pap smear test than those who had not visited a doctor recently. The probability of having a Pap test in this manner was 48% higher in Bolivia (95% CI, 39–59%), 241% higher in Brazil (95% CI, 182–312%), 98% higher in the Dominican Republic (95% CI, 85–113%), 77% higher in Guatemala (95% CI, 36–125%) and 94% higher in Nicaragua (95% CI, 67–129%). In summary, women were between 47% and 244% more likely to receive a recent Pap smear screening after they had recently visited a doctor than those who had not. These data were adjusted to other socioeconomic covariates. Even the poorest women with the recent medical visit were more likely to get tested than the

richest women who had not recently visited a doctor. The relations between a recent doctor's visit and cervical cancer screening may operate through different pathways. Screening may coincide with prenatal or postnatal care or the treatment of any illness as opposed to seeking preventive care directly [23, 24].

The cervical cancer screening habits in Serbia exhibit significant disparities within the female population based on socioeconomic and demographic characteristics. The multivariable logistic regression analysis shows that the most important factors in women who have never done a Pap test are: being within the youngest or the oldest age group, having a rural residence and low education level, belonging to poor socio-economic class, and never being married.

Some studies suggest that the participation in the cervical screening is significantly higher in younger women who belong to higher social classes, are better educated and financially better off, who live in urban areas and visit their gynecologist on regular basis. On the other hand, the women of lower socioeconomic status and education, the unemployed and the disabled, and the women who do not have a habit of visiting a gynecologist regularly are less likely to enter a screening program [25].

The previous studies in the field have shown that household income is a significant predictor of cervical cancer screening practices and habits [26]. The current findings from Latin America show that the knowledge about the Pap smears and their importance in cancer prevention increases with age (reaching a plateau in the age group 31–35) and with education levels. In Bolivia, women with no formal education were 19% (95% CI, 16–22%) less likely to be familiar with Pap smear tests than those with primary education. The subjects with secondary and higher education were more likely to be informed by 11% (95% CI, 10%–13%) and 15% (95% CI, 14%–17%), respectively. The results from Ecuador, Nicaragua, Peru, and Trinidad and Tobago show that the probability of cervical cancer screening was significantly higher in the residents of urban areas than in those who inhabited rural settlements. The opposite pattern has been recorded in Bolivia [17]. In Brazil, the screening prominence was higher in the subjects with households in urban regions, with partner cohabitation, with better education and with private health insurance. Also, those who underwent screenings on regular basis and with established protocols had healthier lifestyles including healthier behavior patterns in terms of cervical cancer prevention [27].

Our results are in accordance with other findings reported for the countries of the European continent. For example, in Lithuania, the non-attendance to cervical screenings was associated with lower education, being single and having rare contacts with doctors [20]. The survey conducted in Italy revealed that the age group 55 – 64 (OR = 2.11, 95% CI: 1.76-2.53) and divorce (OR = 1.32, 95% CI 1.02–1.71) were important factors [28].

The current literature suggests that the participation in cervical screenings of those individuals with lower incomes can be enhanced with adequate interventions at the primary levels of health care where an additional focus should be placed on members of vulnerable groups. Therefore, it is important to keep monitoring how the current public health policies, like expanding the scope of free cervical cancer examination of women whose households are in the lower 50% of the income bracket, impact the participation rates over time [26].

Our study has several limitations. The main limitation is its cross-sectional design which does not permit inferences about potential causal relations between the explanatory variables and disorders of interest. In addition, the self-reporting is always prone to recall biases in describing past screening experiences or socioeconomic variables. Several factors that may influence the rate of participation in cervical cancer screenings, such as accessibility and availability of screening facilities, were not included in this study. These factors should be examined in the future. The further research in the field is also needed in order to explore longitudinal trends and identify other potential factors of inequalities in cervical cancer screening. For better understanding and more efficient implementation of public health strategies, focusing on female population with low socio-economic status, we need comprehensible studies to be conducted constantly in the future.

## CONCLUSION

Cervical cancer is a preventable disease. When regular screening is properly implemented, early detection and appropriate treatment are possible. In developing countries like Serbia, a lot more has to be done to improve the screening rates. The measures should focus on increasing the accessibility and availability of cervical cancer screening facilities and services and on decreasing health expenditure. Also, the infrastructure has to be improved. Health care providers must be better educated and equipped.

Educational programs and strategies for raising awareness about cervical cancer, cervical cancer screening and prevention, are crucial steps in deepening and expanding the knowledge of the female population about the issue. As we have shown in this paper, health care service providers have a major impact on the decisions their patients make about their health care and prevention. Their role is crucial in addressing the lack of knowledge, cultural barriers, shame and fear of pain. Thus, they may have a huge impact on the success of all preventive measures and interventions. Finally, health care system and its health care centers should incorporate cervical cancer screening into their health services at the primary health care level.

The results of this study may be helpful to decision makers, health care providers and the whole community in designing proper strategies to handle Serbian unfavourable cervical cancer statistics. The findings of this study emphasize the need to explore continuously the reasons why women do not attend regular cervical cancer screenings and to constantly examine the potential ways of supporting and encouraging vulnerable groups to take part in regular screenings. All the strategies and interventions should place an additional emphasis on those population groups that are socially and economically vulnerable and thus most endangered. Only by doing so, we can effectively reduce the current disparities in cervical cancer screenings and diminish the inequalities in the diagnosis stage and treatment, and eventually in survival rates.

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**Table 1.** The frequency distributions of the last Pap test based on the demographic and socio-economic characteristics of respondents

Variables	In the last 12 months	1–2 years ago	2–3 years ago	≥ 3 years ago	Never	No answer	P*
<b>Age</b>							
< 24	15.5	6.1	1.4	1.1	75.0	0.9	< 0.001
25–34	39.1	21.7	7.6	5.8	25.2	0.6	
35–44	37.7	19.7	8.7	13.1	20.0	0.8	
45–54	29.3	20.5	9.8	19.7	19.2	1.5	
55–64	21.6	13.5	6.1	29.8	26.7	2.3	
≥ 65	5.7	5.4	3.7	30.5	48.7	6.0	
<b>Marital status</b>							
single	18.9	9.5	2.7	3.4	64.2	1.3	< 0.001
married	27.4	17.3	8.0	20.4	25.1	1.8	
widow	9.9	5.6	3.1	29.0	46.5	5.9	
divorced	27.8	15.8	6.9	25.9	21.8	1.8	
<b>Tip of settlement</b>							
city	26.7	14.6	6.5	21.9	28.4	1.9	< 0.001
other	17.2	12.4	5.7	16.6	44.8	3.3	
<b>Reggion</b>							
Vojvodina	22.9	12.9	5.6	21.5	35.4	1.9	< 0.001
Belgrade	33.2	16.9	7.0	23.8	16.8	2.3	
Šumadia and W. Serbia	18.6	12.8	5.5	16.9	43.6	2.6	
S. and E. Serbia	17.8	12.6	6.6	17.2	42.2	3.6	
<b>Education</b>							
primary school	9.4	6.8	4.0	20.2	54.5	5.1	< 0.001
high school	27.4	17.4	7.7	20.0	26.5	1.0	
faculty	40.8	19.2	6.6	17.1	15.4	1.0	
<b>Working status</b>							
employed	40.5	20.9	8.1	13.0	16.8	0.7	< 0.001
unemployed	25.5	18.1	6.6	15.3	32.8	1.7	
inactive	13.1	8.4	5.0	24.6	45.2	3.7	
<b>Financial status</b>							
I (the purest)	10.7	7.4	4.8	18.7	53.6	4.8	< 0.001
II	17.3	13.6	6.3	20.9	40.3	1.6	
III	22.4	14.0	7.4	20.5	33.0	2.7	
IV	28.0	17.3	5.7	20.1	26.9	2.0	
V (the richest)	38.7	17.4	6.7	17.6	18.4	1.2	

\* $\chi^2$  test

**Table 2.** Frequency distributions for Pap test initiatives based on the demographic and socio-economic characteristics of respondents

Variables	personal initiative	doctor's recommendation	summoned to screening (by a doctor)	p*
<b>Age</b>				
< 24	41.1	57.9	1.0	< 0.001
25–34	46.6	52.0	1.4	
35–44	52.7	45.1	2.2	
45–54	43.5	53.1	3.4	
55–64	41.7	54.2	4.1	
≥ 65	39.1	56.4	4.5	
<b>Marital status</b>				
single	57.7	41.0	1.3	< 0.001
married	42.1	54.9	3.0	
widow	41.9	56.0	2.1	
divorced	58.2	39.5	2.3	
<b>Tip of settlement</b>				
city	50.1	47.9	2.0	< 0.001
other	35.7	60.3	4.0	
<b>Reggion</b>				
Vojvodina	46.7	51.9	1.4	< 0.001
Belgrade	50.3	48.9	0.8	
Šumadia and W. Serbia	42.0	53.8	4.2	
S. and E. Serbia	39.0	55.9	5.1	
<b>Education</b>				
primary school	29.1	66.8	4.1	< 0.001
high school	43.5	53.9	2.6	
faculty	60.6	37.2	2.2	
<b>Working status</b>				
employed	50.7	46.7	2.6	< 0.001
unemployed	43.9	54.0	2.1	
inactive	38.7	58.0	3.3	
<b>Financial status</b>				
I (the purest)	30.9	64.3	4.8	< 0.001
II	35.1	62.1	2.8	
III	43.0	53.9	3.1	
IV	48.2	49.9	1.9	
V (the richest)	57.1	40.7	2.2	

\* $\chi^2$  test

**Table 3.** The cross ratios (OR) and 95% confidence intervals (CI) for women who have never done the screening based on the demographic and socio-economic characteristics

Variables	Univariate model		Multivariate model	
	OR (95%CI)	p	OR (95%CI)	p
<b>Age</b>				
< 24	2.899 (2.424-3.468)	< 0.0005	1.816 (1.397-2.362)	< 0.0005
25–34	0.317 (0.268-0.375)	< 0.0005	0.505 (0.406-0.628)	< 0.0005
35–44	0.236 (0.199-0.280)	< 0.0005	0.472 (0.383-0.582)	< 0.0005
45–54	0.226 (0.192-0.267)	< 0.0005	0.401 (0.330-0.488)	< 0.0005
55–64	0.350 (0.303-0.404)	< 0.0005	0.491 (0.417-0.579)	< 0.0005
≥ 65	1		1	
<b>Marital status</b>				
single	1		1	
married	3.603 (3.094-4.196)	< 0.0005	2.761 (2.231-3.416)	< 0.0005
widow	1.183 (0.888-1.576)	0.25	1.347 (0.994-1.826)	0.055
<b>Tip of settlement</b>				
city	1		1	
other	1.524 (1.334-1.741)	< 0.0005	1.006 (0.849-1.192)	0.945
<b>Education</b>				
primary school	1		1	
high school	2.113 (1.760-2.548)	< 0.0005	1.656 (1.339-2.049)	< 0.0005
faculty	8.334 (6.575-10.563)	< 0.0005	4.203 (3.164-5.583)	< 0.0005
<b>Working status</b>				
employed	1		1	
unemployed	5.202 (4.342-6.233)	< 0.0005	1.632 (1.302-2.045)	< 0.0005
inactive	1.989 (1.702-2.324)	< 0.0005	1.249 (1.049-1.487)	0.012
<b>Well-being index</b>				
rich class	1		1	
middle class	1.838 (1.557-2.171)	< 0.0005	1.639 (1.339-2.005)	< 0.0005
poor class	4.117 (3.272-5.181)	< 0.0005	2.856 (2.121-3.846)	< 0.0005