



## Do women in rural areas of Serbia rarely apply preventive measures against cervical cancer?

Da li žene iz seoskog područja Srbije ređe sprovode preventivne mere protiv karcinoma grlića materice?

Ljiljana Antić\*, Bosiljka Djikanović†, Dejana Vuković†, Vladimir Kaludjerović‡

\*High Medical School of Professional Studies in Čuprija, Čuprija, Serbia;

†Institute for Social Medicine, Faculty of Medicine, University of Belgrade, Serbia;

‡General Hospital in Čuprija, Čuprija, Serbia

### Abstract

**Background/Aim.** The incidence of cervical cancer in Central Serbia has the higher rate as compared with that in other European countries. Considering mortality rate for cervical cancer, the standardized rate in Serbia is 10.1 per 10,000 females, which is the second highest one after that in Romania with 13.0. The aim of this study was to examine application of preventive measures for cervical cancer in women both from rural and urban areas in Serbia and if they are associated with sociodemographic characteristics and sexual behaviour. **Methods.** We analyzed secondary data of the 2006 National Health Survey of the population of Serbia focused on characteristics of adult females aged 25 to 65 years (5,314 in total) taking into consideration that programme of the organized screening will include female population aged over 25 years. **Results.** Respondents from rural areas have gynecological examination less than once a year in comparison with those from urban areas (OR = 0.60, 95% CI 0.54–0.68). Less women from rural areas did Pap test during the last 12 months in comparison with respondents from urban areas (OR = 0.55, 95% CI 0.48–0.64). Respondents from urban areas less often do the Pap test on doctor's advice in comparison with those from rural one (OR = 0.55, 95% CI 0.42–0.62). **Conclusion.** This study shows that women in rural areas rarely implement preventive gynecological measures against cervical cancer in comparison with those in urban areas. Implementation of preventive measures among rural women is conditioned by lower levels of education and lower socioeconomic status.

### Key words:

uterine cervical neoplasms; rural health; urban health; vaginal smears; socioeconomic factors; women; serbia.

### Apstrakt

**Uvod/Cilj.** U poređenju sa drugim evropskim zemljama, učestalost raka grlića materice u centralnoj Srbiji je najviša. Sa standardizovanom stopom mortaliteta od 10,1 na 1000 000 žena, Srbija je na drugom mestu u Evropi. Cilj istraživanja bio je da se ispituju razlike u primeni mera prevencije raka grlića materice kod žena seoskih i gradskih područja u Srbiji i ustanovi da li su one povezane sa sociodemografskim karakteristikama ispitanica i njihovim seksualnim ponašanjem. **Metode.** Izvršili smo sekundarnu analizu Nacionalnog istraživanja zdravlja stanovništva Srbije iz 2006. godine sprovedeno na reprezentativnom uzorku populacije, po metodi slučajnog uzorka. U ovom radu analizirane su karakteristike ukupno 5 314 žena starosti od 25 do 64 godine. **Rezultati.** Ispitanice iz seoske sredine idu ređe nego jednom godišnje na kontrolne ginekološke preglede (OR = 0,60 95% CI 0,54–0,68). Manje je ispitanica iz seoskih sredina koje su u poslednjih 12 meseci uradile PAPA test, nego ispitanica iz gradskih sredina (OR = 0,55; 95% CI 0,48–0,64). Ispitanice iz grada ređe idu na PAPA test po savetu lekara, u odnosu na ispitanice sa sela (OR = 0,51 95% CI 0,42–0,62). **Zaključak.** Žene iz seoskih područja Srbije u povećanom su riziku od raka grlića materice nego žene iz gradskih područja. Nesprovođenje preventivnih mera kod seoskih žena nije posledica njihovog mesta boravka, već nižeg obrazovnog i socioekonomskog statusa.

### Ključne reči:

grlić materice, neoplazme; zdravlje, ruralna populacija; zdravlje, urbana populacija; vaginalni brisevi; socioekonomski faktori; žene; srbija.

## Introduction

Incidence of cervical cancer in central Serbia has the highest rate among the other European countries. Significant regional differences range from the lowest rate (16.6 per 100,000 females) registered in the Machvan region to the highest one in eastern Serbia and the Belgrade region (32.5–38.1 per 100.00 females)<sup>1</sup>. Considering mortality rate for cervical cancer, the standardized rate in Serbia is 10.1 per 100.00 females, which is the second highest one after that in Romania with 13.0<sup>2</sup>. According to the current knowledge, human papillomavirus (HPV) infection has an important role in the development of the cervical cancer<sup>3,4</sup>. Other important risks are poor socioeconomic conditions,<sup>5</sup> chemical agents (smoking),<sup>6</sup> sexual habits (early sexual activities), promiscuity<sup>7, 8</sup> factors associated with male partners<sup>9</sup>, abortions and deliveries in adolescent as<sup>8</sup>. There is an increased risk for women taking oral contraceptives<sup>3</sup>. Women from rural areas are at higher risk of cervical cancer associated with factors such as: lower educational level,<sup>10</sup> poorer socioeconomic conditions<sup>11</sup> and insufficient awareness of necessary regular preventive control examinations<sup>12</sup>. Women at high risk of cervical cancer are those unreliable for follow-up, those who have no regular Pap test, those with high parity<sup>13</sup>.

Cervical cancer is preventable and can be effectively treated if early diagnosed. The problem of both high incidence and mortality rate in Serbia can be partly attributed to the lack of awareness about health, but also to the problem in the system of health care approach and lack of the prevention programme. A key reason for higher incidence of cervical cancer in developing countries is the lack of effective screening programs<sup>14</sup>.

So far, in Serbia except for pilot projects in some regions, there was no organized screening for cervical cancer, but only the oportune one<sup>15</sup>. Alarming is the fact that 7.9% of women from rural areas in Serbia have never visited the gynecologist and that only 25.6% of them did the Pap test within a 3-year period<sup>16</sup>. Sociodemographic factors (educational level, occupation, socioeconomic status) are the dominant factors influencing upon application of preventive gynecologic examinations of women<sup>17</sup>. The study by Matejić et al.<sup>18</sup> have shown that the lack of women's knowledge on reproductive health in Serbia, inappropriate gynecologists' attitude and personal problems are associated with negative experience in the primary health care and influence upon low priority of preventive measures both for women and gynecologists<sup>18</sup>. All these factors result each year in about 500 fatal outcomes in Serbia due to cervical cancer.

According to the available literature no study has so far systematically examined differences in behaviour related to reproductive health in our country referring to either regular visits to gynecologist, colposcopic examinations and Pap test, or differences in usage of preventive health services among women living both in rural and urban environment of Serbia and being relevant for the cervical cancer prevention. This study has been designed to complement previous studies and point out women from rural areas as a target group

with less probability to respond to organized screening programme for cervical cancer.

The aim of this study was to examine application of preventive measures against cervical cancer in women both from rural and urban areas in Serbia and to determine their association with sociodemographic characteristics and sexual behaviour.

## Methods

This study was a secondary data analysis of the 2006 National Health Survey of the population of Serbia (without data concerning Kosovo and Metohia), carried out by the Ministry of Health of the Republic of Serbia with financial and professional support from the World Bank, the WHO regional Office for Europe (Country Office of Serbia) and the Institute of Public Health of Serbia "Dr Milan Jovanovich Batut". This was a cross-sectional study on a randomly selected representative population sample including 14,522 subjects aged 20 years and more<sup>16</sup>. In order to provide statistically reliable estimates of the health indicators on the national level, firstly was formed a stratified two-stage randomized sample of all registered households in the 2002 Serbia population census. Out of 7,673 randomly selected households, 6,156 were interviewed within the period September to October 2006. The household response rate was 80.2%. In these households there were 7,664 women aged 20 years and older. Individual response rate was 93.2%. We focused on characteristics of adult females aged 25 to 65 years (5,314 in total) taking into consideration that the programme of organized screening will include female population aged over 25 years<sup>19</sup>. Information about sociodemographic and socioeconomic characteristics as well as about preventive measures were obtained through interviews (face-to-face questionnaire and self-administered questionnaire) administered by the trained interviewers.

The three groups of data relevant to cervical cancer were analyzed: sociodemographic characteristics, sexual behaviour and application of preventive gynecological measures.

Of the analyzed sociodemographic variables there were: age of responders (shown in the ten-year intervals from 25 to 65 years); education (primary, high school and university); socioeconomic status measured by the household wealth index; region (Vojvodina, Central Serbia, Belgrade) and the number of children (0, 1, 2, 3 or more). According to the calculated wealth index values respondents were classified into five socioeconomic categories or quintiles: poorest, poor, medium, rich and wealthy<sup>16</sup>.

Of the variables related to sexual behaviour we analyzed: early sexual activity (< 16 years, 17–19, 20–22, 23–25 and > 26 years), the number of sexual partners in the last 12 months but not regular partners (1–3, or more) and the number of abortions (0–3, or more).

Of the variables related to the use of preventive measures we analyzed: frequency of regular gynecological examinations (once a year once every two years less than once in two years never) and time when the last Pap test was done

(during the last year 1–3 years ago more than 3 years ago more than 5 years ago I do not remember never). Pap testing reasons (own decision on doctor's advice in the screening) were also analyzed.

All the above mentioned data are presented and compared with each other in relation to place of residence (urban/rural, urban = 0, rural = 1).

To find out whether the place of respondents' residence was a key factor influencing upon women's decision to practice prevention for cervical cancer, the variables (regular gynaecological examination, during the last Pap test and reasons for it) were analyzed as dependent ones and place of the residence as an independent one. Dependent variables were regular gynecological examinations (once a year, less than once a year), time of the last Pap test (in the last year, infrequently) and the reason for the Pap test (on their own initiative, on doctor's advice).

cal examinations (once a year, less than once a year), time of the last Pap test (in the last year, infrequently), and reasons for the Pap test (on their own initiative, on doctor's advice)] and sociodemographic factors (independent variables) was tested by both univariate and multivariate logistic regression analysis. Multivariate logistic regression model was created by adding place of living. Associations were expressed by the odds ratio (OR) and 95% of the confidence interval (95% CI).

Analyses were performed by using the SPSS software (version 19).

## Results

The study included women aged 25 to 65 years (mean age  $44.9 \pm 11.3$  years). Table 1 shows the frequency and the results of the univariate logistic regression for sociodemographic characteristics of respondents by the place of living.

**Table 1**  
**The frequency of demographic and socioeconomic characteristics of the studied women population**

Variables	Place of living			<i>p</i>
	Total, n (%)	Urban, n (%)	Rural, n (%)	
Age (years) mean $\pm$ SD	44.9 $\pm$ 11.3	4.47 $\pm$ 11.0	45.0 $\pm$ 10.8	
Age (years)	5314 (100.0)	2951 (55.5)	2363 (44.5)	0.593
25–34	1216 (22.9)	673 (22.8)	543 (23.0)	
35–44	1293 (24.3)	731 (24.8)	562 (23.8)	
45–54	1482 (27.2)	803 (27.2)	679 (28.7)	
55–64	1323 (24.9)	744 (25.2)	579 (24.5)	
Education	5058(100.0)	2809 (55.5)	2249 (44.5)	< 0.000
elementary	1768 (35.0)	640 (22.8)	1128 (50.2)	
secondary	2526 (49.9)	1556 (55.4)	970 (43.1)	
university	764 (15.1)	613 (21.8)	151(6.7)	
Wealth Index	5314 (100.0)	2951 (55.5)	2363 (44.5)	< 0.000
the poorest	904 (17.0)	200 (6.8)	704 (29.8)	
poor	1107 (20.8)	395 (13.4)	712 (30.1)	
average	1137(21.4)	557 (18.9)	580 (24.5)	
moderately	1105 (20.8)	823 (27.9)	282 (11.9)	
the wealthiest	1061(20.0)	976 (33.1)	85 (3.6)	
Region	531 (100.0)	2951 (55.5)	2363 (44.5)	< 0.000
Vojvodina	1345 (25.3)	805 (27.3)	540 (22.9)	
Belgrade	968 (18.2)	729 (24.7)	239 (10.1)	
Central Serbia	3001 (56.5)	1417 (48.0)	1584 (67.0)	
Children	5058 (100.0)	2809 (55.5)	2249 (44.5)	< 0.000
0	542 (10.7)	360 (12.8)	182 (8.1)	
1	958 (18.9)	595 (21.2)	363 (16.1)	
2	2837(56.1)	1498 (53.3)	1339 (59.5)	
> = 3	611 (12.1)	285 (10.1)	326 (14.5)	

All the data were analyzed in accordance with the methods of descriptive and inferential statistics. The difference in distribution of the mentioned variables among women living in rural and urban areas was tested by the  $\chi^2$  test. For the minimum level of statistical significance  $p < 0.05$  was used, where  $p < 0.01$  was taken as highly statistically significant. Variables shown as highly significant after univariate analysis, were further tested by using multivariate analysis.

The association between gynecological measures preventive application [dependent variables: regular gynecologi-

There were no differences in the age of women living either in urban or in rural areas of Serbia ( $p = 0.593$ ). The number of examinees of all the age groups was equal both for those living in urban and rural regions (22–28%). With regard to the number of children, the difference is significant: in rural areas there are more women with two, three or more children. As for education, women with secondary or high educational level considerably more often live in urban areas. According to the socioeconomic status more women belonging to the category of the wealthiest live in urban areas in comparison with those living in rural ones.

Table 2 shows the number of variables related to women's sexual behaviour in relation to the place of residence. Concerning the number of partners (not regular), there is no difference between respondents from rural and urban areas ( $p = 0.931$ ). Also, there is no difference in the number of abortions ( $p = 0.452$ ) among women living either in rural or urban areas. In our sample, respondents from rural areas are more often younger when start with sexual relationships than those from urban environment ( $p < 0.000$ ).

Table 3 shows the variables related to applications of preventive measures against cervical cancer in Serbia by the

women's place of residence. Respondents from urban areas apply them considerably more often (gynecological examination and Pap test), in comparison with those from the rural areas ( $p < 0.000$ ). Respondents from urban areas considerably more often do Pap test on their own, unlike those from the villages who more often do it owing to the doctor's advice.

Table 4 shows the results of the univariate regression analysis. Whether the respondents' place of residence is the key factor influencing upon women's decision to apply preventive measures for cervical cancer, then variables (regular gynecological examination during the last Pap test and the reasons for

Table 2

The frequency of sexual and other behavior in the studied women by the place of living

Variables	Place of living			<i>p</i>
	Total, n (%)	Urban, n (%)	Rural, n (%)	
Age of first sexual intercourse (years)	4642 (100.0)	2610 (56.2)	2032 (43.8)	< 0.000
>16	843 (18.2)	401 (15.4)	442 (21.8)	
17–19	1992 (42.9)	1116 (42.8)	876 (43.1)	
20–22	1331 (28.7)	794 (30.4)	537 (26.4)	
23–25	367 (7.9)	225 (8.6)	142 (7.0)	
>= 26	109 (2.3)	74 (2.8)	35 (1.7)	
Partner in the last 12 months	128 (100.0)	90 (70.3)	38 (29.7)	0.931
1	90 (70.3)	64 (71.1)	26 (68.4)	
2	20 (15.6)	14 (15.6)	6 (15.8)	
>= 3	18 (14.1)	12 (13.3)	6 (15.8)	
Abortus	2129 (100.0)	1175 (55.4)	984 (44.6)	0.452
0	988 (45.8)	531 (45.2)	457 (46.4)	
1	328 (15.2)	175 (14.9)	153 (15.5)	
2	375 (17.4)	199 (16.9)	176 (17.9)	
>=3	468 (21.7)	270 (23.0)	198 (20.1)	

Table 3

The frequency of preventive practice relevant to women for cervical cancer by the place of living

Variables	Place of living			<i>p</i>
	Total, n (%)	Urban, n (%)	Rural, n (%)	
Regular check-ups	4927 (100.0)	2755 (55.9)	2172 (44.1)	< 0.000
once a year	1642 (33.3)	1051 (38.1)	591 (27.2)	
once a two year	501 (10.2)	296 (10.7)	205 (9.4)	
rarely	1543 (31.3)	814 (29.5)	729 (33.6)	
not at all	1208 (24.5)	576 (20.9)	632 (29.1)	
PAP test in the last 12 months	5058 (100.0)	2809 (55.5)	2249 (44.5)	< 0.000
within the last 12 months	1006 (19.9)	672 (23.9)	334 (14.9)	
1–3 years ago	821 (16.2)	535 (19.0)	286 (12.7)	
more than 3 years ago	292 (5.8)	192 (6.8)	100 (4.4)	
more than 5 years ago	491 (9.7)	316 (11.2)	175 (7.8)	
rarely	254 (5.0)	131 (4.7)	123 (5.5)	
never	1862 (36.8)	838 (29.8)	1024 (45.5)	
I do not know what that is	310 (6.1)	109 (3.9)	210 (8.9)	
Reason for PAP test	2632 (100.0)	1731(65.8)	901(34.2)	< 0.000
self initiated	769 (29.2)	583 (33.7)	186 (20.6)	
following doctor's advice	1695 (64.4)	1035 (59.8)	660 (73.3)	
following call for screening	130 (4.9)	88 (5.1)	42 (4.7)	

Table 4

Use of preventive practices: univariate logistic regression analysis

Place of living	Regular check-ups Yes / No		Last Pap smear Yes / No		Reasons for Pap smear self-initiated / screening	
	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Urban	1.00	<0.001	1.00	<0.001	1.00	<0.001
Rural	0.60 (0.54–0.68)		0.55 (0.48–0.64)		0.51 (0.42–0.62)	

it), were all analyzed as dependent, but the place of residence as an independent one. Respondents from the rural areas had gynecological examination less than once a year in comparison with those from the urban areas (OR = 0.60, 95% CI 0.54–0.68). Less women from rural areas did Pap test during the last 12 months in comparison with respondents from urban areas (OR = 0.55, 95% CI 0.48–0.64). Respondents from the urban areas less often did the Pap test on doctor's advice in comparison with those from the rural one (OR = 0.55, 95% CI 0.42–0.62).

Table 5 shows results of multivariate regression analysis for cervical cancer preventive measures (regular gynecological examinations and during the last Pap test). Multivariate logis-

Table 6 shows the results of the multivariate regression analysis of the reasons to go to the Pap test. This analysis shows that the difference existing between the respondents from urban and rural areas is not only caused by the place of respondents' living, but also by their educational and financial status being lower in women from rural areas. Urban areas respondents did the Pap test less often on doctor's advice than on their own initiative (OR = 0.79, 95% CI 0.63–1.00). Age was not a factor influencing upon reason for the Pap test. Only those aged 35–44 years did the Pap test less often on the doctor's advice in comparison with younger than 35 years (OR = 0.75, 95% CI 0.58–1.00).

**Table 5**  
Regular check-ups and last Pap smear: controlled (multivariate) logistic regression analysis

Variables	Regular check-ups		Last Pap smear	
	yes / no		yes / no	
	AOR* (95% CI)	<i>p</i>	AOR* (95% CI)	<i>p</i>
Place of living				
urban	1.00		1.00	
rural	0.93 (0.80–1.08)	0.334	0.95 (0.80–1.13)	0.590
Education				
elementary	1.00		1.00	
secondary	2.24 (1.79–2.80)	< 0.000	1.91 (1.48–2.45)	< 0.000
university	1.32 (1.10–1.58)	0.003	1.42 (1.17–1.72)	< 0.000
Wealth index				
the poorest	1.00		1.00	
poor	2.51 (1.73–2.88)	< 0.000	3.53 (2.57–4.85)	< 0.000
average	1.94 (1.45–2.23)	< 0.000	3.11 (2.38–4.05)	< 0.000
moderately wealthy	1.74 (1.40–2.08)	< 0.000	1.63 (1.30–2.04)	< 0.000
the wealthiest	1.29 (1.05–1.52)	0.008	1.27 (1.04–1.56)	0.018
Age (years)				
25–34	1.00		1.00	
35–44	0.21 (0.17–0.26)	< 0.000	0.39 (0.31–0.50)	< 0.000
45–54	0.36 (0.30–0.49)	< 0.000	0.43 (0.37–0.54)	< 0.000
55–64	0.41 (0.34–0.50)	< 0.000	0.44 (0.35–0.55)	< 0.000

\*adjusted for education, wealth index and age; \*\**p* < 0.01.

tic regression showed that the difference in implementation of cervical cancer preventive measures present between respondents from urban and rural areas were not caused by the place of living, but by their educational level and financial status being lower in women from the rural areas. The middle aged and older respondents went to preventive examination for cervical cancer less often than the younger ones (aged 25–34 years). College-educated women often go to preventive gynecological examinations in comparison with those with only primary school education (OR = 1.32, 95% CI 1.10–1.58). The richest women in comparison with the poorest ones went often to control gynecological examinations (OR = 1.29, 95% CI 1.05–1.52). In the last 12 months the Pap test was more often performed in college-educated women in comparison with those with primary education (OR = 1.42, 95% CI 1.17–1.72). When compared with the poorest women, the richest ones went to the Pap tests more frequently in the last 12 months (OR = 1.27, 95% CI 1.04–1.56). Age was also a factor influencing upon women's decision to do preventive controls. The oldest category subjects rarely went to preventive gynecologic examinations in comparison with the youngest ones (25–34 years), (OR = 0.41, 95% CI 0.4–0.50) and to the Pap test (OR = 0.44, 95% CI 0.35–0.55).

**Table 6**  
The reasons for PAP smear: controlled (multivariate) logistic regression analysis

Variables	Reasons for Pap smear self-initiated / screening	
	AOR* (95% CI)	<i>p</i>
Place of living		
rural	1.00	
urban	0.79 (0.63–1.00)	0.041
Education		
elementary	1.00	
secondary	2.35 (1.69–3.26)	< 0.000
university	1.26 (1.02–1.55)	0.034
Wealth index		
the poorest	1.00	
poor	2.43 (1.55–3.81)	< 0.000
average	1.91 (1.40–2.61)	< 0.000
moderately wealthy	2.00 (1.52–2.62)	< 0.000
the wealthiest	1.42 (1.14–1.78)	0.002
Age (years)		
25–34	1.00	
35–44	0.75 (0.58–1.00)	0.042
45–54	0.88 (0.68–1.15)	0.359
55–64	1.01 (0.78–1.30)	0.934

\* adjusted for education, wealth index and age; \*\**p* < 0.01.

## Discussion

The aim of this study was to examine applications of preventive measures among women in rural and urban areas of Serbia and to identify whether they have any association with women's sociodemographic characteristics and sexual behaviour.

It was found out that women in rural areas rarely apply preventive measures against cervical cancer (gynecological controls and Pap tests) in comparison with those living in urban areas. However, after considering effects of educational level, socioeconomic status and age, this difference was no longer significant. Women from rural areas, less educated, and with lower socioeconomic status, middle-aged and elderly, rarely apply preventive measures against cervical cancer.

Numerous studies have identified demographic and behavioural factors associated with cervical cancer prevention<sup>12, 20</sup>. Higher socioeconomic status is associated with more frequent application of preventive measures against cervical cancer in female population on the Belgrade territory<sup>21</sup>.

Our study confirms that girls from the rural areas often have sexual activities before the age of 16 years in comparison with those from urban areas. The majority of our respondents had the first sex at the age of 19. Early sexual activity is a risk factor for reproductive organs health and for sexually transmitted diseases (STDs) including HPV infections<sup>3</sup>. In the study performed by Stanković et al.<sup>22</sup>, most of girls have sexual activities at the age of 17.9. Asked about the number of not regular partners within the last 12 months, only 2.4% of respondents answered. According to the obtained answers there was no difference between respondents' place of residence. Having more sexual partners is a risk factor for reproductive organs health and numerous studies emphasize the importance of reducing irregular partners number for cervical cancer prevention<sup>7</sup>. As for the number of abortions, 40.3% of respondents gave this information with no significant differences with regard to the place of respondents' residence. These data are inconsistent with the study written by Rasevich and Sedlecki<sup>23</sup> in which the projected number of abortions in Serbia was over 200,000 a year. However, registered data on induced abortions since 1999 are not reliable (the number of registered abortions in 2000 was 42,322 and in 2007 was 24,273).

According to our results, women from urban areas considerably more often go to gynecological examinations in comparison with those from rural areas. Also, the Pap test once a year did significantly more respondents from urban than from rural areas. The fact that every other woman from rural area as well as one-third of those from urban environment have never done a Pap test. Since the same number of women (4,894) in our study gave information about gynecological examination and the Pap test, but because their medical reports were not used for verification of their statements, we could not confirm that any of them did both gynecological examination and the Pap test. The fact that 8.9% of women from rural areas do not know what kind of a test it is, our results may appear to be doubtful. In a study on Serbian

population health in 2006, in a sample of women older than 20 years, 6.3% of respondents had never visited a gynecologist. Organized prevention activities and screening cover only a small part of female population and there are also considerable geographic differences and variations by the type of a settlement (5.2%) in Eastern Serbia where the incidence of cervical cancer is highest). Many women do not go to gynecological examination because they are symptomless and have finished the reproductive function, postmenopausal and elderly women from rural areas<sup>16</sup>.

In our study as a part of the organized screening, the Pap test was done only by 4.7% of women in rural areas and by 5.1% of them in urban ones. Women from rural areas were screened more frequently upon gynecologist's advice, as a type of opportune screening. Women from urban areas did more frequent Pap screening independently. The study by Spaczynski et al.<sup>20</sup> as well as our study confirm that women from villages less often than those from urban areas comply to the Pap screening. Some studies indicate that Pap screening is associated with the socioeconomic women's status<sup>11, 24</sup>. This study as well as those by Franceschi et al.<sup>5</sup>, Sabates and Feinstein<sup>11</sup>, and Spaczynsky et al.<sup>20</sup> confirm that higher level of education is an important factor for women's decision to initiate the Pap screening test.

Screening was conducted in some other countries such as Hungary until 2003, but it did not offer satisfying results aiming to reduce morbidity and mortality rate from cervical cancer<sup>25</sup>. Efforts to prevent cervical cancer in women are worldwide focused on organized screening and treatment of precancerous lesions. When screening of high quality and coverage were realized, the incidence of invasive forms of cervical cancer in Serbia was reduced even by 90%<sup>26</sup>. Since 2012 in Serbia a classical cytodiagnosics has been applied as a part of the programme of organized cervical cancer screening<sup>19</sup>. American Association of Obstetrics and Gynecology and the European Association for Infectious Diseases in Gynecology and Obstetrics have given different recommendations for screening such as: to initiate screening at the age of 21 with a 2-year intervals up to 30 years of age and afterwards, combination of ligniol based cytology (LBC) and HPV testing at a 3-year intervals. This instruction was aimed to prevent many unnecessary tests for women who are not at risk of cervical cancer<sup>27, 28</sup>. Only 16 European Union countries have organized the National Screening Programme for cervical cancer and they applied it for women aged 20–30 and 60–65 years after 3- or 5-year intervals<sup>29</sup>.

In Poland, highly educated women from urban areas more frequently do screening in private health institutions<sup>20</sup>. Numerous studies both from developed countries, Greece, Sweden as well as from China and South Africa confirmed the association between the place of residence and preventive measures against cervical cancer, with more frequent application of preventive measures in urban female population<sup>30–32, 14</sup>.

## Conclusion

Our study shows that women in rural areas rarely implement preventive gynecological measures against cervical

cancer in comparison with those in urban areas. Women from rural areas have more risk factors (early sexual relationships, higher parity, lower educational and socioeconomic status). Implementation of preventive measures among rural women is conditioned by lower levels of education and lower socioeconomic status. A particular attention should be paid to reducing identified differences. Education and preventive gynecological practices should be provided and available to rural women.

### Acknowledgments

The 2006 National Health Survey for the population of Serbia (without data on Kosovo and Metohia) was conducted

by the Ministry of Health, of the Republic of Serbia, with financial and professional support by the World Bank – the “Serbia Health Project”, the World Health Organization Regional Office for Europe – Country Office Serbia and the Institute of Public Health of Serbia “Dr Milan Jovanovic Batut”.

This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Project No 175025).

### Competing interests

None declared.

## R E F E R E N C E S

1. *Kesić V, Jovičić-Bekić A, Vujanović M.* Cervical cancer screening in Serbia. *Coll Antropol* 2007; 31(Suppl 2): 31–6.
2. *Arbyn M, Primic-Zakelj M, Raiju AO, Grve M, Paraskevaidis E, Diakomanolis E,* et al. The burden of cervical cancer in South-East Europe at the beginning of the 21st century. *Coll Antropol* 2007; 31(Suppl 2): 7–10.
3. *Smith JS, Green J, Berrington GA, Appleby P, Peto J, Plummer M,* et al. Cervical cancer and use of hormonal contraceptives: a systematic review. *Lancet* 2003; 361(9364): 1159–67.
4. *Mitrović-Jovanović A, Stanimirović B, Nikolić B, Zamurović M, Perišić Ž, Pantić-Aksentijević S.* Intraepithelial neoplasms of the cervix, vagina and vulva. *Vojnosanit Pregl* 2011; 68(12): 1051–6. (Serbian)
5. *Franceschi S, Plummer M, Clifford G, Sanjose S, Bosch X, Herrero R,* et al. Differences in the risk of cervical cancer and human papillomavirus infection by education level. *Br J Cancer* 2009;101(5): 865–70.
6. *McIntyre-Seltman K, Castle PE, Guido R, Schiffman M, Wheeler CM.* Smoking is a risk factor for cervical intraepithelial neoplasia grade 3 among oncogenic human papillomavirus DNA-positive women with equivocal or mildly abnormal cytology. *Cancer Epidemiol Biomarkers Prev* 2005;14(5):1165–70.
7. *Cotbram MM, White JP.* Adolescent behavior and sexually transmitted diseases: the dilemma of human papillomavirus. *Health Care Women Int* 2002; 23(3): 306–19.
8. *Louie KS, de Sanjose S, Diaz M, Castellsague X, Herrero R, Meijer CJ,* et al. Early age at first sexual intercourse and early pregnancy are risk factors for cervical cancer in developing countries. *Br J Cancer* 2009; 100(7): 1191–7.
9. *Jensen KE, Hannibal CG, Nielsen A, Jensen A, Nøhr B, Munk C,* et al. . Social inequality and incidence of and survival from cancer of the female genital organs in a population-based study in Denmark. *Eur J Cancer* 2008; 44(14): 2003–17.
10. *Massad LS, Evans CT, Weber KM, Goderre JL, Hessel NA, Henry D,* et al. . Changes in knowledge of cervical cancer prevention and human papillomavirus among women with human immunodeficiency virus. *Obstet Gynecol* 2010; 116(4): 941–7.
11. *Sabates R, Feinstein L.* The role of education in the uptake of preventative health care: the case of cervical screening in Britain. *Soc Sci Med* 2006; 62(12): 2998–3010.
12. *Uysal A, Birsal A.* Knowledge about cervical cancer risk factors and pap testing behaviour among Turkish women. *Asian Pac J Cancer Prev* 2009; 10(3): 345–50.
13. *Hoque M, Hoque E, Kader SB.* Evaluation of cervical cancer screening program at a rural community of South Africa. *East Afr J Public Health* 2008; 5(2): 111–6.
14. *Sheris J, Herdman C, Elias C.* Cervical cancer in the developing world. *West J Med* 2001; 175(4): 231–3.
15. *Marković M, Kesić V, Topić L, Matejić B.* Barriers to cervical cancer screening: A qualitative study with women in Serbia. *Soc Sci Med* 2005; 61(12): 2528–35.
16. *Ministry of Health Republic of Serbia.* National Health Survey for the population of Republic of Serbia, (without data on Kosovo and Metohia). Basic results. Belgrade: Ministry of Health Republic of Serbia; 2006. (Serbian)
17. *Antić LJ, Djikanović B, Vuković D, Matejić B.* Factors associated with preventive practices for cervical cancer in women in Serbia: Data from the National Population Health Survey in Serbia 2006. *Health Med* 2012; 6(4): 1265–78.
18. *Matejić B, Kesić V, Marković M, Topić L.* Communications about cervical cancer between women and gynecologists in Serbia. *Int J Public Health* 2008; 53(5): 245–51.
19. *Ministry of Health Serbia.* Project "Support to the implementation of the National Program", "Serbia against cancer" 2010. Available from: <http://www.screeningserbia.rs/sites/default/files/.2011.pdf>
20. *Spaczyński M, Nowak-Markwitz E, Januszek-Michalecka L, Karonić-Bilińska A.* Women's social conditions and their participation in Cervical Cancer Population Screening Program in Poland. *Ginekol Pol* 2009; 80(11): 833–8. (Polish)
21. *Matejić B, Vuković D, Pekmezović T, Kesić V, Marković M.* Determinants of preventive health behavior in relation to cervical cancer screening among the female population of Belgrade. *Health Educ Res* 2010; 26(2): 201–11.
22. *Stanković M, Miljković S, Grbeša G, Višnjić A.* General characteristics of adolescent sexual behavior: National survey. *Srp Arh Celok Lek* 2009; 137(7–8): 409–15.
23. *Rasević M, Sedlecki K.* The abortion issue in Serbia. *Eur J Contracept Reprod Helth Care* 2009; 14(6): 385–90.
24. *Abdullah AS, Leung TY.* Factors associated with the use of breast and cervical cancer screening services among Chinese women in Hong Kong. *Public Health* 2001; 115(3): 212–7.
25. *Kovács A, Dobrossy L, Budai A, Boncz I, Cornides A.* The state of organized cervical screening program in Hungary in 2006. *Orv Hetil* 2007; 148(12): 535–7.
26. *Gustafsson L, Pontén J, Zack M, Adami HO.* International incidence rates of invasive cervical cancer after introduction of cytological screening. *Cancer Causes Control* 1997; 8(5): 755–63.
27. *American Cancer Society.* Detailed Guide: Cervical Cancer. Can Cervical Cancer Be Prevented. 2010. Available from: [www.cancer.org](http://www.cancer.org) [cited 2012 March 14].

28. *Anttila A, Ronco G.* Description of the national situation of cervical cancer screening in the member states of the European Union. *Eur J Cancer* 2009; 45(15): 2685–708.
29. *Anttila A, Karsa L, Aasmaa A, Fender M, Patnick J, Rebolj M, et al.* Cervical cancer screening policies and coverage in Europe. *Eur J Cancer* 2009; 45(15): 2649–59.
30. *Vivilaki V, Romanidou A, Theodorakis P, Lionis C.* Are health education meetings effective in recruiting women in cervical screening programmes? An innovative and inexpensive intervention from the island of Crete. *Rural Remote Health* 2005; 5(2): 376.
31. *Eaker S, Adami HO, Sparen P.* Reasons women do not attend screening for cervical cancer: A population-based study in Sweden. *Prev Med* 2001; 32(6): 482-91.
32. *Li J, Li L, Ma J, Wei L, Njyazi M, Li C, et al.* Knowledge and attitudes about human papillomavirus (HPV) and HPV vaccines among women living in metropolitan and rural regions of China. *Vaccine* 2009; 27(8): 1210–5.

Received on September 6, 2012.

Revised on November 26, 2012.

Accepted on November 27, 2012.

OnLine-First Avgust, 2013.