



Association of Missed Cervical Cancer Screening with Sociodemographic Characteristics and Depression in Women Age 25-64 Years

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SUMMARY

Introduction: There is evidence that cancer screening and similar health interventions in patients with mental illnesses in some countries remain suboptimal. Considering the high prevalence of depression among women in Vojvodina, this study aimed to estimate the association of reduced utilization of cervical screening tests with sociodemographic variables and with depression.

Aim: Considering the high prevalence of depression among women in Vojvodina, this study aimed to estimate the association of reduced utilization of cervical screening tests with sociodemographic variables and with depression.

Material and Methods: The study was conducted as a cross-sectional study on 1,226 women age 25-64 years from the Province of Vojvodina, as a part of the National Health Survey. To determine the impact of the time when the last smearing test was done (as a dependent variable) on sociodemographic characteristics and depression binary logistic regression model (Enter) was implemented. Models were adjusted for age, type of settlement, education, material status (wealth index), employment status, having a gynecologist in state-owned and private practice, and depression.

Results: Out of the total, 555 women (59.7%) missed the cervical smear test in the last 12 months. Women with a secondary school were more likely to miss the cervical smear test in the last 12 months (OR=1.62; 95% CI=1.13-2.33) as well as women age 50-64 years (OR=1.45; 95% CI=0.99-2.13). Women without gynecologist in either a state-owned or private health practice had 4.13 and 2.20 higher odds of not done cervical smear tests during the last 12 months.

Conclusion: The results show that special attention should be paid by physicians to identifying disorders in women, which can lead to neglect of their health, and reduced health control.

Keywords: Cervical Smears, Depression, Mental Health, Female

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INTRODUCTION

Cancer is the second leading cause of death globally, accounting for an estimated 9.6 million deaths, or one in six deaths. In 2018 breast, colorectal, lung, cervical and thyroid cancer were the most common among women [1]. Although all these diseases belong to the group of preventable, the morbidity and mortality rates from these diseases are still high as a result of insufficient and low coverage of women with preventive examinations [2]. Pap smear screening of cervical cancer has been one of the most successful public health measures over the last decade [3]. It has a high potential of detection in early-stage cervical cancer and it can reduce the incidence rate and the mortality rate of cervical cancer by 79% and 70%, respectively [4]. Thus, the Pap smear screening exam is considered an effective and cheap tool for early detection and primary prevention of cervical malignancies [5,6]. A population-based study in Switzerland documented inequalities in cervical cancer screening. In particular, older, single women, those with low socioeconomic status (SES) or living in the rural area are less often screened for cervical cancer [7]. Unfortunately, screening participation is variable, even in health systems with adequate resources [8]. When cancer screening is considered, people with mental illnesses occasionally are overlooked. Major mental illnesses include medical conditions such as major depression, schizophrenia, bipolar disorder, obsessive-compulsive disorder, panic disorder, and post-traumatic stress disorder. There is evidence that women who suffer from depression are at risk, not only of poor mental health outcomes but physical health outcomes as well [9]. Previous literature has demonstrated the association between mental illnesses such as schizophrenia and bipolar disorder and cancer screening. There was a limited number of studies examining the association between anxiety and depression and cancer screening behavior [10]. Because of increasing evidence of disparities in disease-specific morbidity and mortality in mentally ill patients, there is a growing need to understand the impact of mental illness as a barrier to cancer screening [11-14].

AIM

This study aimed to estimate the association

of reduced utilization of cervical screening test with sociodemographic indicators and with depression in women in the Province of Vojvodina.

MATERIAL AND METHODS

This study is a secondary data analysis of a survey conducted 2013 as a cross-sectional study on a representative sample of the adult population of the Republic of Serbia. The Ethics Review Board of the Institute of Public Health of Serbia (Decision number 5996/1, of October 1, 2013) and the Ministry of Health of the Republic of Serbia issued the necessary approval for undertaking this study. A random sample of households and respondents was obtained by stratification and multi-sampling. Population data from the population census of the Republic of Serbia for 2011 with two variables (region and type of settlement) used for the initial strata. Same variables were used for stratification of the sample, so the samples were stratified in two dimensions. Vojvodina and 3 other statistical regions (Belgrade, Sumadija and Western Serbia, Southern and Eastern Serbia) were separated as the main stratum in the sample. Further, subdivisions were obtained by further division of the strata into the city and other areas. Subsequently, two-stage sampling was performed. In the first sample selection stage, the census circles were selected based on Probability Proportional Sampling (PPS) probability, and a total of 670 enumeration cycles were selected at this stage. In the second stage, 10 households and 3 spare households were selected from each list of households. Households were selected with the same probability of choice and without repetition, using the linear random sampling method and the simple Random Sample without Replacement (SRSWoR). The protocol of the survey, for Serbia, envisages the coverage of 10,089 households which were randomly selected, and 6,500 of them agreed to participate in the survey. The following categories of the population did not enter the survey: persons living in collective households and institutions (foster homes, social institutions, prisons, psychiatric institutions). All respondents were informed about the purpose of the study and agreed to participate. Three types of questionnaires were used: self-administered question-

naire, face-to-face questionnaire, and household questionnaire. For this study, we analyzed data on 1,226 women from the Autonomic Province of Vojvodina age 25-64 years.

Data on cervical smear over time were obtained by answering the question When was the last time when you have done cytological smear of the cervix (during the last 12 months, 1–3 years ago, more than 3 years ago, more than 5 years ago, never). Then to examine how many women have done a cervical smear test in the last 12 months, a new variable was formed which included responses of women who did cervical smear test over time, and women were divided into 2 categories, those who did not and who did a cervical smear test in the last 12 months (Yes/No). Variables included sociodemographic characteristics: age, type of settlement, marital status, education, material status (Wealth Index), and employment status. Two more variables were included: the presence of chosen gynecologist in a state-owned practice and the presence of chosen gynecologist in private practice. These variables were dichotomized (yes or no). According to the Wealth Index (Demographic and Health Survey Wealth Index) respondents were classified into three socioeconomic groups or tercili: rich (richer and the richest class), middle and poor (poorest and poorer) [14]. Employment status was divided into three categories: employed, unemployed and inactive (retired, students, housewives, unable to work, and other inactive). To assess the presence of depressive disorders in the last 2 weeks the eight-item The Patient Health Questionnaire depression scale (PHQ-8) was used. A total score of 0 to 4 represents no significant symptoms of depressive; a score of 5 to 9 represents mild symptoms of depressive, and score ≥ 10 represents depression [15].

Statistical analysis

The data were analyzed by the method of descriptive and inferential statistics, where numerical features were presented by the arithmetic mean and standard deviation, while attributive features were expressed by frequencies and percentages. Numerical data were tested for normal distribution. Normal distribution was evaluated using graphical methods (Q-Q plot, histogram, boxplot), descriptive statistics (mean, standard deviation and median) and tests for normality (Kolmogorov-

Smirnov). Sociodemographic characteristics, depression, and its association with missed cervical smear tests in the last 12 months were first examined using the chi-square test. Then, to determine the impact of last cervical smear test > 12 months, as a dependent variable, on sociodemographic characteristics and depression binary logistic regression model (Enter) were implemented. The variables, which were shown to be highly significant after univariate analysis (age, type of settlement, education, wealth index, employment status, depression, having a gynecologist in state-owned or private practice), were further tested using binary logistic regression analysis. The evaluation of the validity of the logistic regression model implied an assessment of its goodness-of-fit measure and its accuracy. The Hosmer and Lemeshow as well as Nagelkerke R Square goodness-of-fit test was performed to determine how well the model fits the data. Multicollinearity among independent variables was tested by the test of Tolerance and Variance Inflation Factor (VIF) values. In the interpretation of the results, the Odds ratio was used together with the 95% Confidence Interval (CI). The probability, $p < 0.05$ was considered as a minimum level of significance. The analyses were done by using the statistical software package SPSS 21, including the weight factor („weight on”), which was used for correction of disproportionate size of the sample and adjustment of the data collected. A weighting factor was excluded when the study population was described.

RESULTS

Out of the total number of women, 555 (59.7%) missed the cervical smear test in the last 12 months. However, 17 (1.4%) women did not answer the questions about cervical smear in the last 12 months, and the response rate was 98.6%. The sociodemographic characteristics of women age 25-64 years are shown in Table 1. The sample structure consisted of 1,226 women age 24-65 from the Autonomic Province of Vojvodina. The average age of the respondents was 46.8 and most of them belonging to the age category 50-64 years (47.1%). More than half of women (55.5%) had received a secondary education and 28.3% primary school or less. About three-fourth of women were married or live with a partner (72.3%) which is in line with the age structure. Less than half of

	Women	
	n	%
	1,226	100.0
Age ($\bar{x}\pm SD$)	46.83 \pm 11.705	
Age (median(IQR)); Mean \pm SD	73.0	73.0
Age category		
25-34	243	19.8
35-49	405	33.0
50-64	578	47.1
Marital status		
married/living with a partner	886	72.3
never married/never lived with a partner	126	10.3
widowed	118	9.6
divorced/separated	96	7.8
Type of settlement		
urban	736	60.0
rural	490	40.0
Education		
primary school	347	28.3
secondary school	680	55.5
university degree	199	16.2
Wealth index		
poor	547	44.6
middle	270	22.0
rich	409	33.4
Employment status		
employed	430	35.1
unemployed	350	28.5
inactive	446	36.4
Depressive disorder		
no depressive symptoms	1,026	84.0
mild depressive symptoms	128	10.5
depression	68	5.6
Time when the last Pap smear test was done		
during the last 12 months	375	31.0
1-3 years ago	208	17.2
more than 3 years ago	99	8.2
more than 5 years ago	248	20.5
never	279	23.1
Chosen gynecologist in a state-owned practice		
yes	732	59.9
no	491	40.1
Chosen gynecologist in a private practice		
yes	187	15.3
no	1,036	84.7

Table 1. Sociodemographic characteristics, depression, presence of gynecologist in state-owned and private practice and cervical smear test of women age 25-64

Table 2. Cervical cancer screening participation according to sociodemographic characteristics, presence of gynecologist and depression disorders in women

Variable	Cervical smear tests in the last 12 months						P
	yes		no		total		
	n	%	n	%	n	%	
Women	375	40.3	555	59.7	930	100.0	
Age category							
25-34	121	28.9	120	20.3	241	23.9	
35-49	171	40.9	197	33.3	368	36.4	<0.001
50-64	126	30.1	275	46.5	401	39.7	
total					1,010	100.0	
Marital status							
married/living with a partner	308	73.7	444	75.0	752	74.5	
never married/never lived with a partner	45	10.8	54	9.1	99	9.8	0.854
widowed	30	7.2	42	7.1	72	7.1	
divorced/separated	35	8.4	52	8.8	87	8.6	
total					1,010	100.0	
Type of settlement							
urban	295	70.7	360	60.8	655	64.9	0.001
rural	122	29.3	232	39.2	354	35.1	
total					1,009	100.0	
Education							
primary school	65	15.6	142	24.0	207	20.5	
secondary school	245	58.6	363	61.3	608	60.2	<0.001
university degree	108	25.8	87	14.7	195	19.3	
total					1,010	100.0	
Wealth index							
poor	124	29.7	263	44.4	387	38.3	
middle	105	25.1	119	20.1	224	22.2	<0.001
rich	189	45.2	210	35.5	399	39.5	
total					1,010	100.0	
Employment status							
employed	208	49.8	210	35.5	418	41.4	
unemployed	111	26.6	179	30.2	290	28.7	<0.001
inactive	99	23.7	203	34.3	302	29.9	
total					1,010	100.0	
Depressive disorder							
no depressive symptoms	373	89.4	486	82.4	859	85.3	
mild depressive symptoms	27	6.5	68	11.5	95	9.4	0.007
depression	17	4.1	36	6.1	53	5.3	
total					1,007	100.0	
Chosen gynecologist in a state-owned practice							
yes	340	81.3	344	58.1	684	67.7	<0.001
no	78	18.7	248	41.9	326	32.3	
total					1,010	100.0	

Chosen gynecologist in private practice							
yes	104	24.9	96	16.2	200	19.8	0.001
no	314	75.1	496	83.8	810	80.2	
total					1,010	100.0	

women were poor (44.6%), 35.1% of women were employed and 60.0% lived in a city. Most women have chosen gynecologist in a state-owned practice (59.9%), while 15.3% of women have chosen gynecologist in private practice. More than one-fifth of women never done a cervical smear test (23.1%) (Table 1).

The results of the chi-square test indicate that about half of the woman (46.5%) who have not done cervical smear tests in the last 12 months were among women age 50-64 years ($p < 0.001$) and 39.2% of them were from a rural settlement ($p = 0.001$). In the last 12 months, 11.5% of women who have not done the cervical smear test in the last 12 months had mild depressive symptoms and 6.1% had depression ($p = 0.007$). About 61% of the woman who have not done cervical smear test in a last 12 months was with secondary education ($p < 0.001$), 35.5% were employed ($p < 0.001$) and 44.4% ac-

ording to the Wealth index belong to the poor category ($p < 0.001$) which is significantly more in comparison with women who did Pap test in a last 12 months. Significantly more women who do not have a chosen gynecologist in a state-owned (41.9%; $p < 0.001$) and private practice (83.8%; $p = 0.001$) didn't have a cervical smear test in the last 12 months (Table 2).

The binary logistic regression analysis showed the consistency of the association of age, lower education, chosen gynecologist in a state owned or private practice among women who had no cervical smear test done in the last 12 months (Table 3). Women with a secondary school were more likely to miss the cervical smear test in the last 12 months (OR=1.62; 95% CI=1.13-2.33) compared to women with a high education level. Women age 50-64 years were more likely to miss cervical smear tests in the last 12 months com-

Parameters for last cervical smear tests > 12 months predictors*	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)	
							Lower	Upper
Age ^b	.372	.162	5.287	1	.021	1.451	1.056	1.992
Education ^c (secondary)	.483	.185	6.830	1	.009	1.621	1.128	2.329
Choesen gynecologist in a state-owned practice ^d	1.417	.178	63.546	1	.000	4.126	2.912	5.846
Chosen gynecologist in private practice ^e	.790	.198	15.870	1	.000	2.203	1.493	3.248

Table 3. Association of cervical cancer screening test in the last 12 months with sociodemographic characteristics, presence of gynecologist and depression disorders

* Adjusted for type of settlement, employment status, wealth index, depression
 S.E. - standard error
 C.I. - confidence interval
 B - regression coefficient
^b Reference value for youngest
^c Reference value for highest level of education
^d Reference value for having choesen gynecologist in a state-owned practice
^e Reference value for having chosen gynecologist in private practice

pared to those age 25-49 years (OR=1.45; 95% CI=1.06-1.99). Women without gynecologist in a state-owned or private health practice had higher odds to miss cervical smear tests in the last 12 months compared to women who have gynecologist (OR=4.13; 95% CI=2.91-5.85 and OR=2.20; 95% CI=1.49-3.25) (Table 3).

DISCUSSION

Our study showed that 59.7% of women age 25-64 did not have a cervical smear test in the last 12 months. Results of the 2006 National Health Survey in Serbia showed that the percentage of women who did not have the cervical smear test in the last three years was 65.1%, which is higher than results from the 2013 National Health Survey when 42.9% of women

did not have a cervical smear test in the last three year [16, 17].

According to the data of the International Fund for Cancer Research (American Institute for Cancer Research), in 2018, half a million newly diagnosed women with cervical cancer were registered in the world, and the countries with the highest percentage of new cases are Swaziland, Malawi, and Zambia [18]. In Europe, Latvia (52.5%), Bosnia and Herzegovina (46.4%), Estonia (42.4%), as well as Serbia, with the highest age-standardized incidence rate of cervical cancer in the category of women age 25-64. The Republic of Serbia is on the high sixth position with an age-standardized incidence rate of 38.8 per 100,000 women [19]. Such high incidence rates are unacceptable, given that cervical cancer can be prevent-

ed by applying preventive measures. If a woman gets sick, she can be successfully treated if the disease is detected in time [20]. Therefore, there is no justification for the fact that over seven hundred women die from this disease in the world every day. Numerous studies in this area have shown the same results, that women of higher socioeconomic status measured by education, financial status, and economic status have achieved greater coverage with this preventive examination [21-24].

This analysis showed that with the decline in material status, the number of women who did not have the cervical smear test in the last 12 months increased, and 44.4% of poor women missed this test. Numerous studies have confirmed an association between low-income and cervical cancer screening [9, 11] and especially important is finding that even in countries that have good health care coverage, the cervical screening rate is suboptimal among low-income women at greatest risk. In addition, follow up among women with inadequate or abnormal test results is also often poor [25].

Our results show that women with a secondary education, were more likely to miss a cervical smear test in the last 12 months compared to women with a high level of education. Study conducted on women from Latin America also confirmed the influence of education on cervical cancer screening [26]. Olsen et al. also reported that non participation in cervical screening is associated with lower level of education [27]. Both studies also confirmed the association between depressive disorders and cervical cancer screening participation [26, 27]. The mental health of women is of special importance, not only because of the vulnerability of women but also because of the fact that women take care of the health of their children, parents, and other family members [2]. Depression is the most common mental health disorder, and according to the WHO, about 300 million people on the planet suffer from this disorder, most of whom are women [28]. There is evidence that women who suffer from depression are at risk, for poor physical health outcomes, lower rate of cervical screening, as well as, reduced health control generally. Drus and Fang in their studies have found lower rates of screening among women with severe mental illness, particularly among older women, those with a history of substance use, and those living with schizophrenia or other

psychotic disorders [29, 30]. Fear of an event, such as invasive cancer, that would not be possible to cope with either financially or emotionally and fear of death, those barriers were found in studies in Mexico, Ecuador, Peru [26]. The results which describe that depressive symptoms were significantly associated with lower odds of being screened for cervical cancer are also supported by findings of Zhang et al. [10]. Our results show that women age 50-64 years have higher odds of missed cervical smear tests than women age 25-49 years, but there was no significant association with depressive disorders. In line with our results are the results of Vigods study where middle-age and older women missed Pap test [9]. The same results are shown in the study of Kaida et al. where middle-age women (age 40-49 and 50-59 years) were significantly less likely to report a recent Pap test compared with their counterparts [31]. This may be of particular importance because the development of cervical cancer is slow and majority of cases present in women over the age of 35, indicating the need for increased vigilance in that age group [9]. Many authors believe that women over the age of 50 missed cervical screening because other cancer screening measures (including mammography and colonoscopy), menopausal counseling, and other chronic disease prevention may take priority [26]. Other factors that have consistently been associated with poor coverage with screening include lack of a regular source of healthcare or a regular physician [30]. Having a primary care provider generally is associated with better screening in all populations [30]. Our results showed that women who didn't have a chosen gynecologist in state-owned as well as in private practice had greater odds of missed cervical smear test in the last 12 months compared to those who had a selected health providers. The barriers to screening identified by consumers and health care providers showed similarities with those identified in other disadvantaged groups, including difficulties with transport and access, embarrassment, adverse experiences, lack of reminders, and primary health care providers [32]. Having a regular primary care provider and their engagement in patient care may play crucial role in cancer screening for this population [11].

CONCLUSION

This study showed the association of missed cervical smear tests in the last 12 months with sociodemographic determinants, depression and healthcare utilization. In most countries, health policies have not put cervical cancer as a priority and there is insufficient coverage of the target age group. The results show that special attention should be paid by physicians to identifying mental health disorders in women which can lead to neglect of their health and reduced health control. Cooperation between the public and private sectors as well as their cooperation with volunteer groups and NGOs should be strengthened, and synergies of material and human resources should be increased to improve coverage and monitoring.

LIMITATIONS OF THE STUDY

Our study was carried out as a cross-sectional study which limits us for examining behaviors over time as well as the ability to determine the cause-effect relations. Second, our data on health care utilization and screening are self-reported and could be a potential source of bias. Despite this limitation, using data from the National Health Survey is a special advantage because the results are based on data from a nationally representative population sample, which provides reliable statistical analysis. The internal and external validity of the study was ensured by random sampling and the use of a standardized PHQ-8 questionnaire, which also enabled the generalization of results.

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CONFLICTS OF INTEREST

All authors declare no conflict of interest.

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Povezanost propuštanja skrininga na karcinom grlića materice sa sociodemografskim karakteristikama i depresijom kod žena starosti 25-64 godina

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KRATAK SADRŽAJ

Uvod: Postoje dokazi da skrining nakarcinome, kao i drugi zdravstveni postupci kod pacijenata sa mentalnim bolestima u nekim zemljama ostaju neoptimalni.

Cilj: Uzimajući u obzir visoku raširenost depresije među ženama u Vojvodini, ova studija je imala za cilj da proceni povezanost smanjene upotrebe skrininga karcinom grlića materice sa sociodemografskim pokazateljima i sa depresijom.

Materijal i metode: Studija je sprovedena kao studija preseka na 1.226 žena starosti 25-64 godine iz Autonomne Pokrajine Vojvodine, kao deo Nacionalne studije. Da bi se utvrdilo uticaj vremena kada je urađen poslednji cervikalni test kao zavisne varijable na sociodemografske karakteristike i depresiju, primenjen je model binarne logističke regresije po metodi Enter. Modeli su prilagođeni starosti, vrsti naselja, obrazovanju, materijalnom statusu (indeksu blagostanja), radnom statusu, posedovanju ginekologa u državnoj i privatnoj praksi i depresiji.

Rezultati: Od ukupnog broja, 555 žena (59,7%) je propustilo bris grlića materice u poslednjih 12 meseci. Žene srednjeg nivoa obrazovanja su češće propustile bris grlića materice u poslednjih 12 meseci (OR=1,62; 95% CI=1,13-2,33), kao i žene starosti 50-64 godina (OR=1,45; 95% CI=1,06-1,99). Žene bez ginekologa u državnoj i privatnoj zdravstvenoj praksi imale su 4,13 i 2,20 veću šansu da ne urade bris grlića materice u poslednjih 12 meseci.

Zaključak: Rezultati ukazuju da lekari treba da posvete posebnu pažnju identifikovanju problema kod žena koji mogu dovesti do zanemarivanja njihovog zdravlja i smanjene zdravstvene kontrole.

Ključne reči: cervikalni bris, depresija, mentalno zdravlje, žene

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