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Original Article

Association between Sociodemographic Factors and Depressive Symptoms among Adult Population in Serbia

Vera Simic [1], Ivana Simic Vukomanovic [2], Svetlana Radevic [2], Vladimir Vukomanovic [3], Svetlana Djukic [4], Albert Darijan [5], Jovana Radovanovic [6], Viktor Selakovic [6], Milos Stepovic [7], Ermin Fetahovic [8], Snezana Radovanovic [2]

1. *Department of Nursing, Secondary Medical School, Belgrade, Belgrade, Serbia*
2. *Department of Social medicine, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia*
3. *Department of Nuclear Medicine, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia*
4. *Department of Internal Medicine, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia*
5. *College of Health Sciences, Academy of Applied Stidies Belgrade, Belgrade, Serbia*
6. *Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia*
7. *Department of Anatomy, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia*
8. *Department of Communication Skills, Ethics, and Psychology, Faculty of Medical Sciences, University Kragujevac, Kragujevac, Serbia*

***Corresponding Author:** Email: drivanasimic@gmail.com

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Abstract

Background: Lower socioeconomic groups were more affected by depressive symptoms among adults of Serbia. In this study, we tested a model that examines association between sociodemographic factors and depressive symptoms among adult population in Serbia.

Methods: The study was conducted within the National Health Survey of the Serbian population in 2019. The questionnaires used as instruments in this study were created in accordance with the questionnaires of the European Health Interview Survey –Third Wave. The Patient Health Questionnaire - 8 was used to evaluate the presence of depressive symptoms to the adult population aged 20 years and over. The relations between depression symptoms and a set of independent variables were examined with univariate and multivariate logistic regression analyses.

Results: The prevalence of mild depressive symptoms was 6.6%, %, the prevalence of depressive episodes was 2.2%, while 91.2% of respondents had no depressive symptoms. In the univariate regression model, depressive episodes is 1.9 times more frequent in women (OR=1.909), 6.6 times more frequent in persons over 80 years of age (OR=6.610), 3.1 times more frequent in divorced or without a partner (OR=3.143), 6.6 times more frequent in persons with low education (OR=6.609), 3.3 times more frequent in persons with a poor well-being index (OR=3.373), 3.6 times more frequent in persons inactive (OR=3.649) and 1.9 times more frequent in persons from Vojvodina (OR=1.902).

Conclusion: Sociodemographic factors should be considered for policymaking and for the development of new interventions to lower prevalence of depressive symptoms in adults.

Keywords: Depressive symptoms; Adults; National health survey; Serbia

Introduction

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community (1).

It can affect all aspects of life, including relationships with family, friends and community. An estimated 3.8% of the population experiences depression, including 5% of adults (4% among men and 6% among women) and 5.7% of adults over age 60. Approximately 280 million people worldwide suffer from depression (2).

Depression is about 50% more common among women than among men. Although there are known, effective treatments for mental disorders, more than 75% of people in low and middle-income countries do not receive any treatment. Barriers to effective care include a lack of investment in mental health care, a shortage of skilled health professionals, and the social stigma associated with mental disorders (3).

The prevalence of depression varies significantly both within and between countries around the world, reflecting the role of different factors. Socioeconomic status (SES) and the inequalities associated with it have been recorded as a key determinant of depression. The role of sociodemographic factors in depression are important topics, and there is a large literature illustrating a negative association between sociodemographic and depression where individuals with low SES are more likely to be depressed (4).

Social determinants of health have been a focus in disparities research because these factors can be changed through prevention, intervention, and policy. Recently, there have been concerted efforts around the world to examine how social and environmental factors affect an individual's health status (5).

In this study, we tested a model that examines association between sociodemographic factors and depressive symptoms among adult population in Serbia.

Methods

Study type

This cross sectional study is a part of the fourth national health survey in Serbia, conducted by the Institute of Statistics of the Republic of Serbia in cooperation with the Institute of Public Health of Serbia "Dr. Milan JovanovićBatut" and the Ministry of Health of the Republic of Serbian accordance with the recommendations for conducting the European health Interview Survey. The survey was conducted during 2019 (Oct-Dec).

Target population

The primary target population consisted of all persons aged 15 and over living in private (non-institutional) households in the Republic of Serbia, who represent the usual population. Stratification was performed according to the type of area (urban and other) and the four regions: Belgrade region, Vojvodina region, Sumadija and Western Serbia region, Southern and Eastern Serbia region.

A total of 5,114 households and 15,621 respondents were included in the survey. Out of 6,335 contacted households, 5,114 of them agreed to participate in the research. The response rate of the households was 80.7%. Out of a total of 13,589 registered members of households aged 15 and over, 13,178 of them agreed or was able to be surveyed, which gives a response rate of 97.0%. For the purposes of this study, data on the adult population aged 20 years and older (N=12,439) were used.

Ethical and legal aspects

Ethical procedures in the Health Research of the Serbian population are in line with the international Declaration of Helsinki, as well as with the legislation of the Republic of Serbia. In order to maintain the privacy of research participants, all

necessary steps were taken in accordance with the General Data Protection Regulation (GDPR), a new European legal framework that prescribes the handling of citizens' personal data, as well as the National Personal Data Protection Act. An informed notice was acquired via written signature from every participant that accepted to take part in the study.

Research instruments

Standardized questionnaires created according to the European Health Interview Survey (EHIS – European Health Interview Survey, wave 3), (6) and adjusted to the specific regional characteristics served as the research instrument. Types of questionnaires used:

1) A household info panel, which was used to collect information about all members of the household, i.e. socio-economic characteristics of the household itself;

2) A self-completion questionnaire, which was filled in independently by each member of the household aged 15 and over.

Depressive symptoms were evaluated with the Patient Health Questionnaire-8 (PHQ-8) that was incorporated in a "face-to-face" questionnaire (7).

Variables measured in the study

For the purposes of this research were used both the independent and dependent variables. The independent variables encompass demographic attributes such as gender, age, marital status, and region, as well as socioeconomic factors like education, employment status, and welfare index. On the other hand, the dependent variable of interest is the depressive symptoms.

Statistical methods

All data of interest are presented and analyzed by adequate mathematical-statistical methods appropriate for the data type. $\chi 2$ test was applied to test the difference in the frequency of categorical variables. The relations between depression symptoms (a dependent variable) and a set of independent variables were examined with univariate and multivariate logistic regression analyses. All results with the probability that is equal to or less than 5% ($p \leq 0.05$) were considered statistically significant. Statistical analysis was performed using a commercial, standard software package SPSS, version 19.0 (IBM Corp., Armonk, NY, USA).

Results

The average age of the respondents is 51.7±17.5 years. The largest number of male respondents (19.9%) and female respondents (21.1%) belong to the 60-69 age group. The sociodemographic characteristics of respondents by gender and overall are shown in Table 1.

The prevalence of mild depressive symptoms was 6.6%, the prevalence of depressive episodes was 2.2%, while 91.2% of respondents had no depressive symptoms. The average values of PHQ-8 in the whole group were 1, 20±2,72.

Depressive episodes were more common among women (1.6% vs. 2.9%), among the oldest population group 80+ (6.9%), among widowers (5.7%), in the region of Vojvodina (3.0%), among persons with lower education (4.8%), among persons who are inactive (10.5%), and among persons from the poorest strata (3.5%), Table 2.

Table 1: Sociodemographic characteristics of the adult population of Serbia

Variables	***Total***		***Male***		***Female***	
	N	%	N	%	N	%
Total	12439	100	6032	48.5	6407	51.5
		Age(yr)				
20-29	155	12.4	807	13.4	738	11.5
30-39	1762	14.2	901	14.9	861	13.4
40-49	1981	15.9	1019	16.9	962	15.0
50-59	2215	17.8	1058	17.5	1157	18.1
60-69	2551	20.5	1201	19.9	1350	21.1
70-79	1604	12.9	726	12.0	878	13.7
80+	781	6.3	320	5.3	461	7.2
Average age ± SD	52.8±17.7		51.7±17.5		53.8±17.8	
Marital status						
Unmarried/unmarried	2239	18.0	1409	23.4	380	13.0
Married	7844	63.1	3941	65.3	3903	60.9
Widower	1672	13.4	378	6.3	1294	20.2
Divorced	658	5.3	293	4.9	365	5.7
Region						
Vojvodina	2912	23.4	1363	22.6	1549	24.2
Šumadija and Central Serbia	2793	22.5	1343	22.3	1450	22.6
Southern and Eastern Serbia	3977	32.0	1977	32.8	2000	31.2
Belgrade	2757	22.2	1349	22.4	1708	22.0
Level of Education						
Primary and lower school	3070	24.7	1174	19.0	1896	29.6
High School	7009	56.4	3739	62	3270	51.0
College and university	2352	18.9	1112	18.4	1240	19.4
Employment Status						
Employed	4648	37.4	2586	42.9	2062	32.2
Unemployed	2271	18.3	1168	19.4	1103	17.2
Retired	4183	33.6	1895	31.4	2288	35.7
Unable to work	95	0.8	44	0.7	51	0.8
Students	440	3.5	192	3.2	248	3.9
Household chores	645	5.2	40	0.7	605	9.4
Well-being index						
Bad	5022	40.4	2414	40	2608	40.7
Middle	2525	20.3	1206	20	1319	20.6
Good	4892	39.3	2412	40	2480	38.7

Table 2: Frequency of depressive symptoms in relation to sociodemographic characteristics of respondents

Variables		*No symptoms of depression*		*Mild depressive symptoms*		*Depressive episode*		*P**
		N	%	N	%	N	%	
Total		11346	91.2	815	6.6	278	2.2	< 0.001
Average PHQ-8 score				1,20±2,72				
Gender								
Male		5648	93.6	289	4.8	95	1.6	< 0.001
Female		5698	88.9	526	8.2	183	2.9	
Age (yr)								
20-29		1517	98.2	22	1.4	6	0.4	< 0.001
30-39		1719	97.6	36	2.0	7	0.4	
40-49		1893	95.6	69	3.5	19	1.0	
50-59		2054	92.7	119	5.4	42	1.9	
60-69		2263	88.7	220	8.6	68	2.7	
70-79		1324	82.5	198	12.3	82	5.1	
80+		576	73.8	151	19.3	54	6.9	
Average age ± SD		51.6±17.4		65.3±15.1		66.9±14.4		<0.001**
Marital status								
Unmarried/unmarried		2160	96.5	62	2.8	17	0.8	< 0.001
Married		7269	92.7	432	5.5	143	1.8	
Widower		1309	78.3	267	16.0	96	5.7	
Divorced		583	88.6	54	8.2	21	3.2	
Region								
Vojvodina		2505	89.7	204	7.3	84	3.0	< 0.001
Šumadija and Central Serbia		3642	91.6	257	6.5	78	2.0	
Southern and Eastern Serbia		2452	88.9	232	8.4	73	2.6	
Belgrade		2747	94.3	122	4.2	43	1.5	
Level of Education								
Primary and lower school		2945	81.3	429	14	146	4.8	
High School		6585	94	313	4.5	73	1.6	
College and university		2259	96	73	3.1	20	0.9	
Employment Status								
Employed		4523	97.3	100	2.2	25	0.5	
Unemployed		2122	93.4	111	4.9	38	1.7	
Retired		3501	83.7	508	12.1	174	4.2	
Unable to work		63	66.3	22	23.2	10	10.5	
Students		436	99.1	4	0.9	0	0	
Household chores		566	87.8	57	8.8	22	3.4	
Other		115	85.2	12	8.9	8	5.9	
Well-being index								
Bad	4394	87.5		452	9.0	176	3.5	< 0.001
Middle	2321	91.9		157	6.2	47	1.9	
Good	4631	94.7		206	4.2	55	1.1	

* Chi-square test

**Anova

If the male gender is observed, the depressive episode was more frequent in the elderly population 80+ (3.7%), and respondents who declared themselves widowed (3.8%). The highest percentage of respondents with a depressive episode in relation to regional affiliation refers to the area of Vojvodina (2.3%). The depressive episode was the most common among respondents with primary and lower school education (3.8%), while 11.4% of respondents with secondary education

had mild depressive symptoms. In relation to work status, respondents who declared themselves unable to work had the most frequent depressive episode (9.1%). In the same group, the most common occurrence of mild depressive symptomatology was recorded (15.9%). In terms of material status, 3.7% of respondents who declared themselves poor had a depressive episode, Table 3. In relation to the female gender, the situation is similar to men, Table 4.

Table 3: Frequency of depressive symptoms in relation to sociodemographic characteristics of respondents, male

Variables	*No Symptoms Of Depression*		*Mild Depressive Symptoms*		*Depressive Episode*		*P*
	N	%	N	%	N	%	
Total	5648	93.6	289	4.8	95	1.6	< 0.001
Average PHQ-8 Score				0,91±2,36			
			Age(Yr)				
20-29	790	97.9	14	1.7	3	0.4	< 0.001
30-39	882	97.8	17	1.9	2	0.3	
40-49	988	96.9	23	2.2	8	0.9	
50-59	1001	94.6	40	3.8	17	1.6	
60-69	1103	91.8	69	5.7	29	2.5	
70-79	632	87.1	70	9.6	24	3.3	
80+	252	78.8	56	17.5	12	3.7	
Average Age ± SD	50.9±17.3		64.2±16.7		64.1±14.2		< 0.001
			Marital Status				
Unmarried/Unmarried	1355	96.2	40	2.8	14	1	< 0.001
Married	3702	93.9	179	4.5	60	1.6	
Widower	317	83.8	47	12.4	14	3.8	
Divorced	263	89.7	23	7.8	7	2.5	
			Region				
Vojvodina	1232	91.7	81	6	30	2.3	< 0.001
Šumadija And Central Serbia	1855	93.8	93	4.7	29	1.5	
Southern And Eastern Serbia	1251	92.7	71	5.3	27	2.0	
Belgrade	1310	96.1	44	3.2	9	0.7	
			Level Of Education				
Primary And Lower School	996	84.8	134	11.4	44	3.8	< 0.001
High School	3573	95.6	123	3.3	43	1.1	
College And University	1072	96.4	32	2.8	8	0.8	
			Employment Status				
Employed	2535	98.0	39	1.5	12	0.5	< 0.001
Unemployed	1096	93.8	50	4.3	22	1.9	
Retired	1661	87.6	181	9.6	53	2.8	
Unable To Work	33	75.0	7	15.9	4	9.1	
Students	190	98.9	2	1.1	0	0	
Household Chores	37	92.5	1	2.5	2	5	
Other	86	88.6	9	10.3	2	1.1	
			Well-Being Index				
Bad	2184	89.7	162	6.6	88	3.7	< 0.001
Middle	1148	95.2	44	3,6	14	1.2	
Good	2316	95.7	83	3.4	13	0.9	

Table 4: Frequency of depressive symptoms in relation to sociodemographic characteristics of respondents, female

Variables	*No symptoms of depression*		*Mild depressive symptoms*		*Depressive episode*		*P*
	N	%	N	%	N	%	
Total	5698	88.9	526	8.2	183	2.9	
Average PHQ-8 score			1,47±2,98				
Age (yr)							
20-29	727	98.5	8	1.1	3	0.4	< 0.001
30-39	837	97.2	19	2.2	5	0.6	
40-49	905	94.1	46	4.8	11	1.1	
50-59	1053	91.0	79	6.8	25	2.2	
60-69	1160	85.9	151	11.2	39	2.9	
70-79	692	78.8	128	14.5	58	6.7	
80+	324	70.3	95	20.6	42	9.1	
Average age ± SD	52.3±17.8		65.9±14.2		68.5±14.2		< 0.001
Marital status							
Unmarried/unmarried	805	96.9	22	2.6	3	0.5	< 0.001
Married	3567	91.4	253	6.5	83	2.1	
Widower	992	76.7	220	17	82	6.3	
Divorced	320	87.7	31	8.5	14	3.8	
Region							
Vojvodina	1273	87.7	123	8.5	54	3.8	< 0.001
Šumadija and Central Serbia	1787	89.4	164	8.2	49	2.4	
Southern and Eastern Serbia	1201	85.3	161	11.4	46	3.3	
Belgrade	1437	92.7	78	5.0	34	2.3	
Level of Education							
Primary and lower school	1449	78.5	295	16.0	102	5.5	< 0.001
High School	3012	92.1	190	5.8	68	2.1	
College and university	1187	95.7	41	3.3	12	1.0	
Employment Status							
Employed	1988	96.4	61	3.0	13	0.6	< 0.001
Unemployed	1026	93.0	61	5.5	16	1.5	
Retired	1840	80.4	327	14.3	121	5.3	
Unable to work	30	58.8	15	29.5	6	11.7	
Students	246	99.2	2	0.8	0	0	
Household chores	529	87.4	56	9.2	20	3.4	
Other	29	76.3	3	7.9	6	15.8	
Well-being index							
Bad	2210	84.7	290	11.1	108	4.2	< 0.001
Middle	1173	88.9	113	8.6	33	2.5	
Good	2315	93.3	123	4.9	42	1.8	

In the univariate regression model, depressive symptomatology is 1.9 times more frequent in women (OR=1.909), 6.6 times more frequent in persons over 80 years of age (OR=6.610), 3.1 times more frequent in divorced or without a partner (OR=3.143), 6.6 times more frequent in persons with low education (OR=6.609), 3.3 times more frequent in persons with a poor well-being index (OR=3.373), 3.6 times more frequent in persons inactive (OR=3.649) and 1.9 times more frequent in persons from Vojvodina (OR=1.902). The predictors of importance in the

multivariate regression model are gender, age, marital status, level of education, well-being index, employment status and region (Table 5).

Table 5: Cross-correlation (OR) and 95% confidence interval (CI) association of sociodemographic characteristics of respondents with depressive symptoms

Variables	***Univariate model***		***Multivariate model***	
	OR (95%CI)	P	OR (95%CI)	P
	Gender			
Male	1		1	
Female	1.909 (1.486-2.453)	<0.001	1.506 (1.149-1.973)	0.003
	Age (yr)			
20-29	1		1	
30-39	0.420(0.180-0.990)	<0.001	0.870 (0.320-2.235)	<0.001
40-49	0.430 (0.200-0.960)	<0.001	1.110 (0.450-2.270)	<0.001
50-59	1.170 (0.630-1.810)	<0.001	1.269 (0.440-2.517)	<0.001
60-69	2.180 (1.440-3.330)	<0.001	1.468 (0.915-2.786)	0.004
70-79	3.210 (2.222-4.613)	<0.001	2.471 (1.315-3.707)	<0.001
80+	6.610 (4.620-9.447)	0.023	4.815 (3.562-8.181)	0.280
	Marital status			
Marriage/common-law union	1		1	
Divorce, separation, death of a partner	3.143 (2.449-4.034)	< 0.001	1,385(1,041-1,844)	<0.001
Never married/unmarried community	0.400 (0.241-0.663)	< 0.001	1,154 (0,648-2,058)	0.626
	Level of Education			
College and university	1		1	
High School	1.904 (1.180-3.072)	0.008	1.409 (0.860-2.308)	0.184
Primary and lower school	6.609 (4.128-10.583)	< 0.001	1.900 (1.143-3.161)	0.013
	Employment Status			
Employed	1		1	
Unemployed	2.570 (1.117-3.564)	0.001	1.253 (0.911-1.576)	0.001
Inactive	3.649 (1.313-4.346)	0.004	1.316 (1.144-2.694)	0.245
	Region			
Belgrade	1		1	
Šumadija and Central Serbia	1.368 (0.940-1.992)	0.102	0.965 (0.649-1.435)	0.860
Southern and Eastern Serbia	2.142 (1.478-3.106)	< 0.001	1.587 (1.076-2.340)	0.020
Vojvodina	1.902 (1.300-2.783)	0.001	1.111(0.738-1.671)	0.614
	Well-being index			
Good	1		1	
Middle	1.705 (1.152-2.525)	< 0.001	1.332 (0.888-1.999)	0.166
Bad	3.373 (2.485-4.578)	< 0.001	2.417 (1.719-3.397)	< 0.001

Discussion

Better SES was associated with better general health and mental health (8-12). The numerous studies that considered the impact of age on the depressive symptoms have proven the existence of the connection between them, especially in the older population (13-15). Results from our research agree with those findings where roughly 6.9% of people older than 80 had a depressive episode.

The higher prevalence of depressive symptoms among women compared to men at various stages of the life-course has been well documented (16). In addition, slightly higher levels of depressive symptoms in midlife were noticed (17). A more recent evaluation of depression prevalence over the life-course confirmed than women's higher odds of major depressive episodes was especially large at ages sixty-five and older (18). Our results also confirm that woman tend to have increased occurrence of depression episode with older age, noticeable increasing from the age 60+ with its peak at age 80+. A meta-analysis using 24 studies on samples ages 75 and older found the depression prevalence ratio of men to women was 1:1.4–2.2 (19). According to the results of odds ratio, our findings agree that the odds of occurrence of depression symptoms higher in female gender (male to female odds 1: 1.90). Women had higher depressive symptoms, but men's symptoms increased faster in the oldest ages (20).

Multiple studies have been done in Europe with a focus on the assessment of the prevalence of depression. These studies suggested that the prevalence of depression across Europe is between 5% and 10%, with differences between countries (21). The subgroups with the highest prevalence of current depressive disorder were generally those who were older (aged ≥75 years) (22).

In Serbia, the depression prevalence also showed that occurrence was twice higher in women (12.7%) than in men (6.5%) (23).

Education differences in depressive symptoms tend to have more prominent occurrence in the lowest education group showing the highest depressive symptoms (10). Relatively large inequalities were observed between both sexes (24). Our results share similar findings where females and males showed highest percentage of depressive episodes when having less education levels. Some European studies have found education level to be a more important factor related to depressive symptoms than socioeconomic status (24, 25-26). Schlax et al identified both household income, but not occupation, as important predictors of depressive symptoms in adults (27). Our results showed that for both gender, that depressive episode was most represented in the people incapable to work. Various studies suggest that household income inequality plays a remarkable role in the social gradient in depression among older adults (28). In our results, the people with lowest material status had higher occurrence of depression episodes.

Unmarried/non-cohabitating adults were 1.44 and 1.47 times more likely to have probable depression and depressed affect than married counterparts, respectively (29). Other studies, however, found increased risks associated with never married and widowed statuses on prevalent depression (30). Our results showed that highest percentage of depressive episodes was among the widowed.

Depression levels may vary between due to differences in urban levels. As the pace of urbanisation has accelerated, mental disorders have increased among city people. Recent findings indicate that depression risk is 44% higher in older urban adults than in rural counterparts (31). In our research, a significant difference was found between the level of depression and different regions.

This study is significant because it presents the results based on a national survey, which will enable comparison with the results of a future national survey to come, especially since our data shows the state of mental health before the Covid 19 pandemic. It will be very important when we receive the results of a new national survey because it will to show what consequences the pandemic had on the mental health status of the population over time.

Conclusion

The prevalence of depressive symptoms was 8.8% among adults in Serbia. Lower socioeconomic groups were more affected by depressive symptoms among adults of Serbia. These factors should be considered for policymaking and for the development of new interventions to lower prevalence of depressive symptoms in adults.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of Interest

The authors declare that there is no conflict of interests.

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