ORIGINAL ARTICLE

CONTENTS

Prevalence and severity of depression in patients after cerebral stroke

Oleksandr M. Mishchenko[1], Maryna M. Mishchenko[2], Volodymyr I. Ponomaryov[1], Valeria V. Ponomaryova[1], Oleksandr O. Zlobin[1], Oleksandr M. Shevchenko[1], Tetyana V. Chastii[1]

[1]EDUCATIONAL AND SCIENTIFIC MEDICAL INSTITUTE OF THE NATIONAL TECHNICAL UNIVERSITY «KHARKIV POLYTECHNIC INSTITUTE», KHARKIV, UKRAINE

[2]KHARKIV NATIONAL MEDICAL UNIVERSITY, KHARKIV, UKRAINE

ABSTRACT

Aim: To analyze the prevalence and severity of depression in patients who suffered from cerebral stroke (CS).

Materials and Methods: A psychological study enrolled 300 patients after CS (main group [MG]: mean age [mean ± standard deviation] 56,7 ± 10,37 years; 134 [44,7%] males and 166 [55,3%] females) and 200 people without CS (control group [CG]: 57,2 ± 10,79 years; 64 [32,0%] males and 136 [68,0%] females). The levels of depression (LD) were assessed using the T.I. Balashova Depression Scale.

Results: The MG, as compared to the CG, demonstrated a higher depression score (52,6 ± 7,46 vs. 47,6 ± 6,88 points, respectively; $p < 0,001$) and had fewer patients without depression (35,7% vs. 68,0%, respectively; $p < 0,001$), as well as a higher frequency of mild depression (36,7% vs. 24,0%, respectively; $p = 0,003$) and subdepressive state (27,7% vs. 8,0%, respectively; $p < 0,001$). There were no significant associations between LD and factors such as age, sex, and dwelling in the MG. In contrast, CG males were more prevalent in the mild depression and subdepressive state categories compared to those free from depression. Also, mild depression in the CG was more frequently observed among urban dwellers than in the group without depression.

Conclusions: Patients who suffered from CS demonstrated a higher prevalence of more significant depressive disorders, namely mild depression and subdepression, compared to their CS-free counterparts.

KEY WORDS: cerebral stroke, depression, subdepressive state

Wiad Lek. 2025;78(6):1066-1070. doi: 10.36740/WLek/207366 DOI

INTRODUCTION

Many studies confirm that cerebral stroke (CS) is a global public health problem due to its significant medical and social consequences [1]. According to research, CS is a leading cause of morbidity, mortality, and disability in the global population [2–4], ranking third among the causes of death worldwide and accounting for more than 795 000 annual cases [5, 6]. CS is more common in low- and middle-income countries than in high-income countries [7]. More than 70% of deaths and 87% of disabilities caused by CS occur in low- and middle-income countries.

According to existing data, patients who have suffered a stroke experience motor, sensory, and communication deficits, as well as cognitive impairments [8], a low quality of life, and significant deterioration in both mental and physical health [9]. The consequences of these impairments primarily affect patients' social activity, provoking marked social isolation, which may lead to post-stroke depression and anxiety [10].

CS causes significant changes in a patient's socio-psychological orientation and personal psychological characteristics. This is directly determined by the nature of the pathology: a forced change in the individual's relationship with society, a substantial reduction in physical and social activity, the loss of numerous social contacts, and the disruption of the individual's social integration and environment. Such individuals often experience a form of "isolation" from their familiar social surroundings. These factors collectively provoke a transformation of the person's entire psychosocial sphere. As a result, various psychological disorders may develop, primarily characterised by depression, persistent low mood, anxiety, fears, obsessive focus on the illness, and worries about the future [11].

Thus, according to leading scientists, depressive manifestations are the most common mental symptoms that occur after CS and have negative consequences for the physical and mental health of affected individuals [11], which significantly reduces their quality of life [12].

Table 1. The demographic characteristics and levels of depression in the MG and CG according to the results of psychological testing

Parameters		MG N=300	CG N=200	p
Age, years		56,7±10,37	57,2±10,79	0,870
Sex, n (%)	Males	134 (44,7)	64 (32,0)	0,005
	Females	166 (55,3)	136 (68,0)	
Dwelling, n (%)	City	151 (50,3)	88 (44,0)	0,172
	Village	149 (49,7)	112 (56,0)	
Depression Scale, points		52,6±7,46	47,6±6,88	*<0,001*
LD, n (%)	Without depression$^{z/*}$	107 (35,7)	136 (68,0)	*<0,001*
	Mild depression$^{z/**}$	110 (36,7)	48 (24,0)	
	Subdepressive state$^{z/*}$	83 (27,7)	16 (8,0)	

Note: z – statistically significant difference by z-test (p<0,05); * – Fisher`s exact test: p<0,001; ** – Fisher`s exact test: p=0,003

Table 2. The demographic characteristics in the MG according to the results of psychological testing

Parameters		LD			p
		Without depression N=107	Mild depression N=110	Subdepressive state N=83	
Age, years, n (%)	<45	14 (13,1)	14 (12,7)	10 (12,0)	0,730
	46-55	26 (24,3)	36 (32,7)	25 (30,1)	
	≥56	67 (62,6)	60 (54,5)	48 (57,8)	
Sex, n (%)	Men	42 (39,3)	51 (46,4)	41 (49,4)	0,341
	Women	65 (60,7)	59 (53,6)	42 (50,6)	
Dwelling, n (%)	City	54 (50,5)	54 (49,1)	43 (51,8)	0,932
	Village	53 (49,5)	56 (50,9)	40 (48,2)	

Other researchers [13] have noted that depressive disorders are the most common and significantly burdensome complication following CS. It is known that post-stroke depression leads to a considerable impairment of patients' functional capabilities, cognitive abilities, and quality of life [11].

AIM

The aim of the study was to analyze the prevalence and severity of depression in patients suffered from CS.

MATERIALS AND METHODS

A single-centre cross-sectional study was conducted based on the results of a psychological assessment of 300 patients after CS (main group [MG]), who received rehabilitation services at the Clinical Sanatorium "Roshcha" of PJSC "Ukrprofozdorovnytsia", and 200 individuals without a history of CS (control group [CG]) in 2022–2023.

The MG included 134 (44,7%) males and 166 (55,3%) females, with a mean age (hereinafter – mean ± standard deviation) of 56,7 ± 10,37 years (n = 300). The CG included 64 (32,0%) males and 136 (68,0%) females, with a mean age of 57,2 ± 10,79 years (n = 200). There were 151 (50,3%) urban and 149 (49,7%) rural residents in the MG. In the CG, there were 88 (44,0%) urban and 112 (56,0%) rural residents.

The study fully complies with the fundamental bioethical principles set forth in the Council of Europe Convention on Human Rights and Biomedicine, the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects, as well as in the relevant national regulations. The ethical protocol of this study was approved by the local ethics committee. Written informed consent was obtained from all study participants.

The inclusion criteria were as follows: reaching the age of 18 years, a history of CS (for MG), and consent to participate in the study. The exclusion criteria were: being underage (not reaching the age of 18), a history of CS (for CG), acute conditions, severe comorbidities, poor physical condition, pregnancy and lactation, alcoholism, and refusal to participate in the study.

The study of the levels of depression (LD) after CS was conducted using the Depression Scale by T.I. Balashova [12]. The results were evaluated as follows: up

Table 3. The demographic characteristics in the MG according to the results of psychological testing

Parameters		LD			p
		Without depression N=136	Mild depression N=48	Subdepressive state N=16	
Sex, n (%)	Men	12 (8,8)	42 (87,5)	10 (62,5)	p_{1-2}<0,001
	Women	124 (91,2)	6 (12,5)	6 (37,5)	p_{1-3}<0,001
Age, years, n (%)	<45	22 (16,2)	3 (6,3)	3 (18,8)	0,385
	46-55	35 (25,7)	17 (35,4)	5 (41,4)	
	≥56	79 (58,1)	28 (58,3)	8 (50,0)	
Dwelling, n (%)	City	50 (36,8)	31 (64,6)	7 (43,8)	p_{1-2}<0,001
	Village	86 (63,2)	17 (35,4)	9 (56,3)	

Note: p_{1-2} – statistically significant difference between the goups without depression and with mild depression; p_{1-3} – statistically significant difference between the goups without depression and with subdepressive state

to 50 points – a state without depression; from 50 to 59 points – mild depression of situational or neurotic genesis; from 60 to 69 points – subdepressive state or masked depression; more than 70 points – a real depressive state.

Statistical data analysis was performed using IBM SPSS Statistics v. 27.0 (Armonk, NY: IBM Corp., USA) and MedStat v. 5.2. Quantitative variables were presented as mean ± standard deviation, and qualitative ones as absolute and relative (%) frequency. To compare quantitative variables, we used the Mann-Whitney U-test. To compare qualitative variables, we used the χ^2 test (with post hoc Marascuilo-Liakh-Gurianov procedure for binary variables in three independent groups) and Fisher's exact test («2 × 2» tables). In the case of qualitative rank variables, and statistically significant differences between the study groups according to the χ^2 test, certain categories (ranks) were compared using the z-test. A 2-tailed p<0,05 was considered statistically significant.

RESULTS

The formed research groups were comparable in terms of age and residence. At the same time, females were more prevalent in CG (Table 1).

According to the data obtained from the Depression Scale by T.I. Balashova [12], a significant difference was observed between the studied groups both in terms of depression score and the prevalence of different LDs. In general, the MG demonstrated a higher depression score and was characterized by fewer patients without depression, as well as a higher frequency of mild depression and subdepressive state cases (Table 1).

There were no statistically significant associations between the degree of depression and such factors as age (under 45 years, 46-55 years and 56 years and over), sex and dwelling (Table 2).

At the same time, we revealed sex differences between the studied LDs in the CG. In particular, the group of people without depression was predominantly represented by females, who were more prevalent compared to the groups with mild depression and subdepressive state. In addition, males constituted the vast majority of cases in the mild depression group (Table 3).

Also, in the CG, a significant difference (in terms of indicators between the state of no depression and mild depression) in LD by place of residence was observed (Table 3). It was determined that the mild depression group was represented by urban residents to a greater extent than the group without depression. Correspondingly, freedom from depression was more frequently self-reported by rural dwellers, in contrast to people with mild depression.

DISCUSSION

Our data are fully consistent with similar studies conducted by other researchers. Thus, L. Liu et al. [11], based on the results of the literature data meta-analysis, determined that patients after a CS, which was accompanied by the development of early (within 3 months after the CS) depression, had a significant risk of maintaining this condition in the future. Quantitatively, two-thirds of patients had manifestations of depression within 1 year after CS. As a result, the researchers pointed out the need for continuous clinical monitoring of people with depression that developed after a CS.

Based on the results of a meta-analysis that included 77 studies on the prevalence of post-stroke depression, they determined that the overall prevalence of post-stroke depression was 27 % (95 % confidence interval [CI] 25-30 %) [11]. The prevalence of post-stroke depression was 24 % (95% CI 21-28 %) based on clinical interview and 29 % (95% CI 25-32 %) based on rating scales. The

study found that among patients who had a CS that was accompanied by the development of post-stroke depression within 3 months after the disease, 53 % (95 % CI 47-59 %) of patients had persistent depression, and 44 % (95 % CI 38-50 %) showed recovery. At the same time, the incidence of post-stroke depression in later periods (3 to 12 months) was 9 % (95 % CI 7-12 %). The cumulative incidence within 1 year after a CS was 38 % (95 % CI 33-43 %), the vast majority (71 % [95% CI 65-76 %]) of cases of post-stroke depression developed within 3 months after a stroke [11].

Other studies [14, 15] have also confirmed a significant prevalence of depression among patients after a stroke, in most cases determined by clinical interviewing [16].

In turn, C. Albus et al [17] confirmed that psychosocial factors such as low socioeconomic status, acute or chronic stress, depression or anxiety are significantly prevalent among cardiac patients and are associated with behavioral and biological risk factors that provoke an increased risk of cardiovascular disease (directly CS) and unfavorable disease outcome.

Thus, our results regarding the significant prevalence of post-stroke depressive manifestations were confirmed by other studies.

CONCLUSIONS

When determining the prevalence of depressive manifestations among patients after CS, a significantly higher prevalence of more severe depressive disorders was found compared to the CS-free controls. Patients who suffered from CS demonstrated a higher prevalence of mild depression and subdepression, in contrast to their CS-free counterparts.

REFERENCES

1. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 354 Diseases and Injuries for 195 Countries and Territories, 1990–2017: A Systematic Analysis for the Global Burden of Disease Study 2017. Lancet Lond. Engl. 2018;392:1789–1858. doi: 10.1016/S0140-6736(19)31047-5. DOI
2. Shuranova L, Vacková J, Rimárová K et al. Life after stroke and the key role of coordinated rehabilitation from the perspective of the stroke survivor families. Clinical and Preventive Medicine. 2024;6:44–50. doi: 10.31612/2616-4868.6.2024.06. DOI
3. Khan F, Chevidikunnan MF. Prevalence of Balance Impairment and Factors Associated with Balance among Patients with Stroke. A Cross Sectional Retrospective Case Control Study. Healthcare. 2021;9(3):320. doi: 10.3390/healthcare9030320. DOI
4. Hasan F, Gordon C, Wu D et al. Dynamic Prevalence of Sleep Disorders Following Stroke or Transient Ischemic Attack: Systematic Review and Meta-Analysis. Stroke. 2021;52(2):655–663. doi: 10.1161/STROKEAHA.120.029847. DOI
5. Zeng H, Chen J, Guo Y, Tan S. Prevalence and Risk Factors for Spasticity After Stroke: A Systematic Review and Meta-Analysis. Front Neurol. 2021;11:616097. doi: 10.3389/fneur.2020.616097. DOI
6. Virani S, Alonso A, Benjamin E et al. Heart disease and stroke statistics-2020 update: a report from the American heart association. Circulation. 2020;141:e139–596. doi: 10.1161/CIR.0000000000000746. DOI
7. Jones SP, Baqai K, Clegg A et al. Stroke in India: A systematic review of the incidence, prevalence, and case fatality. International Journal of Stroke. 2021;17(2):132–140. doi: 10.1177/17474930211027834. DOI
8. Kalashnikov VY, Stoyanov OM, Vastyanov RS et al. Otsinka stanu kohnityvnykh funktsii ta autorehuliatsii mozkovoho krovoobihu u patsiientiv z tserebrovaskuliarnoiu patolohiieiu na tli naslidkiv COVID-19. [Assessment of the status of cognitive functions and autoregulation of cerebral blood circulation in patients with cerebrovascular pathology against the consequences of COVID-19]. Klinichna ta profilaktychna medytsyna. 2024;6:58–63. doi: 10.31612/2616-4868.6.2024.08. (Ukrainian) DOI
9. Park J, Kim TH. The Effects of Balance and Gait Function on Quality of Life of Stroke Patients. NeuroRehabilitation. 2019;44:37–41. doi: 10.3233/NRE-182467. DOI
10. Mishchenko MM, Ognev VA, Mishchenko OM, Ponomaryov VI. Poshyrenist' tryvohy ta depresiyi u patsiyentiv pislya insul'tu holovnoho mozku. [Prevalence of anxiety and depression in patients after brain stroke]. Klinichna ta profilaktychna medytsyna. 2023;4:41-47. doi: 10.31612/2616-4868.4(26).2023.06. (Ukrainian) DOI
11. Liu L, Xu M, Marshall IJ et al. Prevalence and natural history of depression after stroke: A systematic review and meta-analysis of observational studies. PLoS Med. 2023;20(3):e1004200. doi: 10.1371/journal.pmed.1004200. DOI
12. Tangney JP, Baumeister RF, Boone AL. High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. Journal of Personality. 2004;72(2):271-324. doi: 10.1111/j.0022- 3506.2004.00263.x. DOI
13. Towfighi A, Ovbiagele B, El Husseini N et al. Poststroke Depression: A Scientific Statement for Healthcare Professionals from the American Heart Association/American Stroke Association. Stroke. 2017;48(2):e30–e43. doi: 10.1161/STR.0000000000000113. DOI
14. Uphoff EP, Newbould L, Walker I et al. A systematic review and meta-analysis of the prevalence of common mental disorders in people with non-communicable diseases in Bangladesh, India, and Pakistan. J Glob Health. 2019;9(2):020417. doi: 10.7189/jogh.09.020417. DOI

15. Dalvand S, Gheshlagh RG, Kurdi A. Prevalence of poststroke depression in iranian patients: A systematic review and meta-analysis. Neuropsychiatr Dis Treat. 2018;14:3073–3080. doi: 10.2147/NDT.S184905. DOI
16. Mitchell AJ, Sheth B, Gill J et al. Prevalence and predictors of post-stroke mood disorders: A meta-analysis and meta-regression of depression, anxiety and adjustment disorder. Gen Hosp Psychiatry. 2017;47:48–60. doi: 10.1016/j.genhosppsych.2017.04.001. DOI
17. Albus C, Waller C, Fritzsche K et al. Significance of psychosocial factors in cardiology: update 2018 : Position paper of the German Cardiac Society. Clin Res Cardiol. 2019;108(11):1175–1196. doi: 10.1007/s00392-019-01488-w. DOI

The work is a fragment of the research work of the Department of Public Health and Health Care Management of Kharkiv National Medical University of the Ministry of Health of Ukraine "Medical and Social Aspects of the Quality of Life of Young People with Overweight and Obesity" (State registration No. 0121U112044; term of implementation: 2023-2025).

CONFLICT OF INTEREST

The Authors declare no conflict of interest

CORRESPONDING AUTHOR

Oleksandr M. Mishchenko
Kharkiv Polytechnic Institute
79 Hryhorii Skovoroda St, 61022, Kharkiv, Ukraine.
e-mail: alex_mischenko1976@ukr.net

ORCID AND CONTRIBUTIONSHIP

Oleksandr M. Mishchenko: 0000-0003-0043-2252 A B C D E F
Maryna M. Mishchenko: 0000-0002-4755-9384 A B C D E F
Volodymyr I. Ponomaryov: 0000-0003-2513-3187 D E F
Valeria V. Ponomaryova: 0000-0001-8623-0971 D E F
Oleksandr O. Zlobin: 0000-0002-8897-1017 D E F
Oleksandr M. Shevchenko: 0000-0002-1176-1687 D E F
Tetyana V. Chastii: 0000-0002-4745-5737 D E F

A – Work concept and design, B – Data collection and analysis, C – Responsibility for statistical analysis, D – Writing the article, E – Critical review, F – Final approval of the article

RECEIVED: 11.02.2025
ACCEPTED: 01.06.2025