ASSESSMENT OF DEPRESSIVE DISORDERS AND STATES OF ANXIETY IN PATIENTS FOLLOWING CEREBROVASCULAR ACCIDENTS IN CONNECTION WITH HEALTH CARE PROVISION

Miriam Ištoňová[1], Erik Dorko[3], Viliam Knap[1, 2], Beáta Stehlíková[4], Anna Murgová[2], Perla Ondová[1, 2], Kvetoslava Rimárová[3]

[1]Department of Physiatry, Balneology, and Medical Rehabilitation, Faculty of Medicine, Pavol Jozef Šafárik University in Košice, Košice, Slovak Republic

[2]St. Elizabeth University of Health and Social Work, Bratislava, Slovak Republic

[3]Department of Public Health and Hygiene, Faculty of Medicine, Pavol Jozef Šafárik University in Košice, Košice, Slovak Republic

[4]Institute of Control and Informatization of Production Processes, Faculty of Mining Ecology, Process Control and Geotechnologies, Technical University in Košice, Košice, Slovak Republic

SUMMARY

Objective: Anxiety and depression in patients following cerebrovascular accidents are among frequently occurring complications of the medical condition. The consequences affect personal, family, professional, and social life. They cause severe functional and cognitive impairments, limit the ability to perform normal daily activities, which can result in complete disability. The aim of the study was to monitor the occurrence of anxiety and depression in patients following cerebrovascular accidents hospitalized in neurological departments in the region of eastern Slovakia.

Methods: A total of 101 patients following cerebrovascular accidents, aged from 48–86 years, were included in the descriptive study. Demographic and clinical data were obtained from patients and from medical records. We determined the occurrence of anxiety disorders, depression and emotional distress in patients following cerebrovascular accidents using a standardized Hospital Anxiety and Depression Scale (HADS) questionnaire.

Results: Data analysis confirms a high incidence of anxiety in the HADS-A subscale (9.23 ± 4.13) and depression in the HADS-D subscale (9.09 ± 4.43) during the hospitalization phase of the disease. It demonstrates the pathological occurrence of anxiety states in 37%, depression in 36%, emotional distress in 36%, and a serious degree of combination of pathological values of the anxiety subscale and the depression subscale in 27% of patients. The existence of a strong positive correlation between anxiety and depression indicators was confirmed.

Conclusion: The results confirm a high prevalence of anxiety and depression in the acute phase of the disease. The findings indicate that patients recovering from cerebrovascular accidents not only face physical difficulties and loss of independence but also struggle with anxiety and depression, which can negatively impact and slow their recovery. Given the high frequency of these psychological conditions, further research is needed to enhance the quality and effectiveness of care provided to patients with cerebrovascular accidents.

Key words: anxiety disorders, depression, cerebrovascular accident, screening, comprehensive health care

Address for correspondence: E. Dorko, Department of Public Health and Hygiene, Faculty of Medicine, Pavol Jozef Šafárik University in Košice, Šrobárova 2, 041 80 Košice, Slovak Republic. E-mail: erik.dorko@upjs.sk

https://doi.org/10.21101/cejph.a7888

INTRODUCTION

Cerebrovascular accidents (CVA) affect approximately 15 million people worldwide each year. They are the main cause of death in people over 60 years of age. In Slovakia, CVA ranks 3rd in total patient mortality (1).

Cerebrovascular accidents are among the most common causes of depressive states in neurology. It is the most common affective disorder after stroke with an estimated prevalence of 30–50% (2, 3). Depressive and anxiety disorders are among the most common mental illnesses and appear in approximately two thirds of patients together as comorbidities (4). According to the meta-analyses, depressive disorders occurred in 34% of patients during the COVID-19 pandemic, while anxiety disorders were observed in 25–38% of patients (5, 6).

According to ICD-11 and the Diagnostic and Statistical Manual of Mental Disordes (DSM-5), the concept of depressive disorders and anxiety states encompasses several depressive and anxiety types (7). Certain common features are characteristic of these disorders They are manifested by changes in mood with feelings of sadness, tiredness, emptiness, hopelessness, or irritability, feelings of fear, restlessness, and worries that have no concrete basis (8). Patients affected by this diagnosis may experience a loss of interest in any activity that was a favourite before the illness.

Sleep disorders or changes in appetite are typical. Cognitive and specific executive functions may also be impaired. One of the

symptoms is also thoughts of death or suicide. These symptoms can affect a person to the extent that they limit their normal life. For a clinical diagnosis of a depressive disorder according to DSM-5, we must identify at least 5 of the listed symptoms in the patient for more than two weeks, one of which must be a mood disorder or loss of interest in meaningful activities. The DSM-5 criterion for an anxiety disorder is the presence of at least three of the listed symptoms, and one of them must persist every day (8).

Depression is one of the affective mental disorders in which mood disorder is at the forefront of the clinical picture. Lifetime prevalence in the general population is reported to be 4–6% for depression meeting standard diagnostic criteria. With a broader understanding of depression, an average lifetime prevalence of 16–17.1% was found. Depressive disorders occur more often in women than in men (2:1), the highest prevalence is in the age group of 40–55 years (9).

Symptoms of depression are often mistakenly considered part of the underlying disease (10, 11). Depression often remains undiagnosed and untreated; the patient is repeatedly and needlessly examined (12).

The pathophysiological mechanisms that underlie the development of anxiety and depression after a cerebrovascular accident remain unclear (13).

The aim of this paper is to assess the occurrence of anxiety and depression in patients after cerebrovascular accidents hospitalized at neurological departments in Eastern Slovakia.

MATERIALS AND METHODS

Characteristics of the Group

The group consists of 101 patients with a diagnosis of cerebrovascular accident (CVA), 47 (47%) men and 54 (53%) women aged between 45–86 years, with an average age of 68 years; 92 patients (91%) were diagnosed with ischaemic CVA and 9 patients (9%) with haemorrhagic CVA; 56 patients (55%) had right-sided hemiparesis and 45 patients (45%) had left-sided hemiparesis. Demographic and clinical data were collected from the patients and from the medical records. The entry criterion for inclusion in the research was the ability to cooperate.

Research Methods

The research was carried out by using the cross-sectional descriptive study. We monitored the incidence of anxiety disorders and depression in patients after cerebrovascular accidents hospitalized in selected neurological departments of 4 private hospitals in Eastern Slovakia in the period from March to October 2022. The average length of hospitalization was 21 days (5–28 days).

To monitor the incidence of anxiety and depression, we used a standardized questionnaire, the Hospital Anxiety and Depression Scale (HADS) (14, 15). It evaluates how was the patient feeling during the past week. The HADS questionnaire contains 14 entries. Seven entries are for the anxiety subscale (HADS-A) and 7 for the depression subscale (HADS-D). Score for each entry ranges from 0 to 3, with a higher score indicating worse condition. For analytical purposes, patients were divided into various categories. Score of 0–7 points is considered a norm, 8–10 points as mild impairment, and a score of 11–21 points as clinically significant impairment.

All statistical tests were performed using MS Excel and R. The following methods were used: reliability coefficient, descriptive statistics, graphs, and statistical tests. A significance level of 0.05 was chosen for all statistical tests.

The calculation using the Cronbach's coefficient (Cronbach's alpha) has a value of 0.897, that is 90%, which means that the results are applicable for formulating and testing statistical hypotheses and drawing conclusions based on the results of statistical tests.

The population from which the selection originates has a normal distribution in terms of age. This was confirmed by the Shapiro-Wilk normality test; test criterion $W = 0.979$, and p-value $= 0.145$.

The population to which the conclusions of this study and statistical evaluation should be valid are patients after cerebrovascular accidents in Eastern Slovakia. The representation by age in our group proportionally corresponds to the occurrence of cerebrovascular accidents in the population.

RESULTS

The assessment of the HADS is based on the analysis of evaluation subscales data for patients after cerebrovascular accident hospitalized at neurological departments. The score of the depression subscale has a normal distribution, which was confirmed by the result of the Shapiro-Wilk normality test, the test criterion is $W = 0.982$, p-value $= 0.205$. The basic descriptive statistics of the score of the depression subscale are shown in Table 1. The first quartile is 6 and the third quartile is 12. We can state that the distribution is symmetrical with respect to the average.

The basic descriptive statistics of the score of the anxiety subscale are shown in Table 1. The first quartile is 6.5 and the third quartile is 12 (Fig. 1).

The box plot (Fig. 1) corresponds to the calculated statistics and presents findings on the similarity of total scores for anxiety and depression. For anxiety scores and depression scores are the

Table 1. *Descriptive statistics of age on the occurrence of anxiety and depression in the monitored group*

Name	Mean	Standard deviation	Median	Minimum	Maximum	Range	Skewness	Kurtosis
Age	67.82	9.01	68.0	48	86	38	−0.16	0.52
HADS-A	9.23	4.20	9.0	0	19	19	0.11	−0.47
HADS-D	9.15	4.51	9.0	0	19	19	0.03	−0.72

HADS-A – hospital anxiety and depression scale – anxiety subscale; HADS-D – hospital anxiety and depression scale – depression subscale

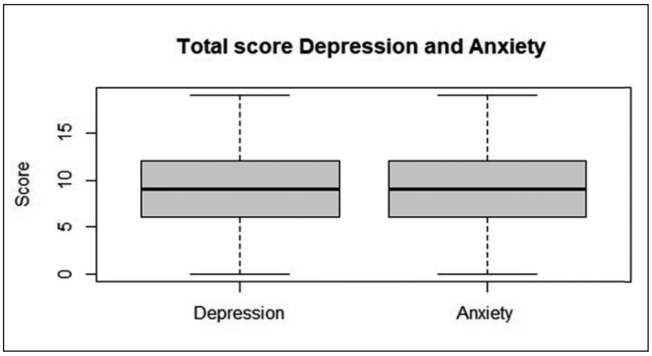

Fig. 1. *Box chart showing depression subscale HADS-D and anxiety subscale HADS-A values.*

minimum, maximum, median, the first quartile and third quartile the same. Anxiety and depression occurred in comparable agreement in a selected sample of patients with CVA. This was also confirmed by the t-test of the agreement of mean values. The test criterion value is t = 0.115, and p-value = 0.91.

In order to visualize how the respondents feel in terms of anxiety and depression, we displayed the correlation between indicators of depression and anxiety in a scatter plot (Fig. 2).

The black horizontal line at y = 8 separates normal scores from borderline and at y = 10 from baseline values of the anxiety subscale, and the vertical line at x = 8 separates normal scores from borderline and at x = 10 separates borderline from similar subscale of depression value. The dashed line is the diagonal that passes through the same values of the final depression subscale score and the anxiety subscale score. Adjacency of points to the diagonal corresponds to the correlation coefficient between the depression subscale score and the anxiety subscale score. The Pearson correlation coefficient is 0.788. The Pearson correlation test has a p-value < 0.001. The result confirmed that the correlation coefficient is statistically significant. The left square for the anxiety score is less than 8 and the value of the depression score is also less than 8 and borders the normal values of both indicators. Between the lines including the values on the final anxiety score line 8 and 10 are the anxiety subscale score cutoffs. In Figure 2 we can see that there are combinations where one indicator has a normal value, and the other is in the borderline or pathological area (dotted line). However, it is possible to state that higher values of one indicator predict higher values of the other indicator as well.

The analysis of the obtained data of the anxiety and depression subscales does not statistically significantly differ by gender (Fig. 3, Fig. 4). The verification of the graphic result was performed with a t-test with the following result: for the anxiety subscale, test criterion t = 1.82, p-value = 0.072, and for the depression subscale, test criterion t = 0.036, p-value = 0.971.

In Tables 2 and 3 and Figures 5 and 6 we present more detailed assessment by age. For this evaluation, we created age categories up to 49 years, 50 to 59 years, 60 to 69 years, 70 to 79 years, and over 80 years. We used ANOVA test for statistical evaluation.

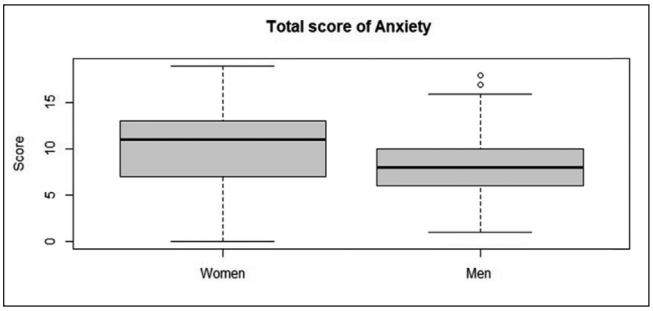

Fig. 3. *Comparison of anxiety symptoms between genders.*

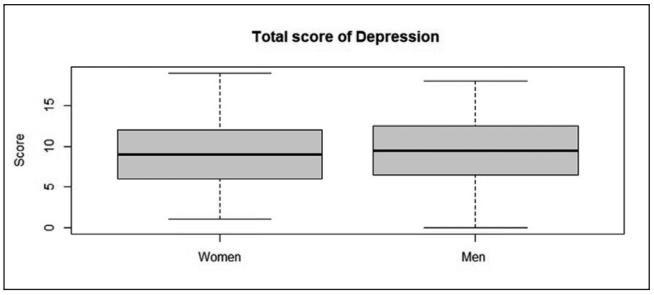

Fig. 4. *Comparison of depressive symptoms between genders.*

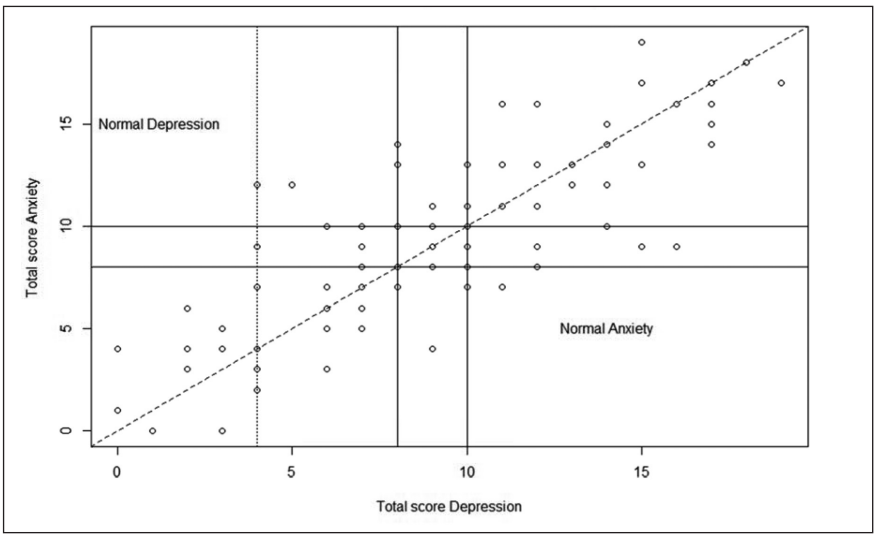

Fig. 2. *Point chart showing correlation between depression and anxiety.*

Table 2. *Descriptive statistics for anxiety subscale for individual age categories of patients after cerebrovascular accident*

Age category	Mean	Standard deviation	Median	Minimum	Maximum	Range	Skewness	Kurtosis
Under 50 years	7.67	4.27	8	1	14	13	−0.09	−1.20
50–59 years	8.71	4.08	8.5	0	17	17	−0.12	−0.06
60–69 years	8.91	3.81	8.5	3	16	13	0.27	−0.80
70–79 years	8.57	4.18	9	0	17	17	0.12	−0.58
80 years and older	12.42	6.62	12.5	4	19	15	−0.21	−1.30

Table 3. *Descriptive statistics for depression subscale for individual age categories of patients after cerebrovascular accident*

Age category	Mean	Standard deviation	Median	Minimum	Maximum	Range	Skewness	Kurtosis
Under 50 years	6.17	4.02	6	0	11	11	−0.19	−1.58
50–59 years	9	4.56	11	2	17	15	−0.18	−1.31
60–69 years	8.69	4.60	8.5	0	17	17	0.04	−0.95
70–79 years	8.40	4.06	9	1	19	18	0.34	−0.11
80 years and older	12.67	4.10	13	6	18	12	−0.22	−1.55

For the anxiety subscale score, the test criterion is F = 2.312 and p-value = 0.064. This means that age category is not a statistically significant criterion for differences on the anxiety subscale.

Figure 5 shows that for the population of 80 years and older the score of the anxiety subscale is shifting higher, but ANOVA test found that this difference compared to other age categories is not statistically significant. The average, minimum, maximum, and standard deviation in the anxiety subscale for individual age categories are shown in Table 2.

Having analysed the obtained data for the evaluation score of the depression subscale, the result of the test criterion was F = 2.977 and p-value = 0.023. We can conclude that age is a statistically significant criterion for depression. Figure 6 shows that for the population of 80 years and older, the analysed values of the depression subscale are shifting higher. The statistical test of ANOVA and then Tukey multiple comparisons of means confirmed a statistically significant difference in the mean value between age categories up to 49 years and over 80 years and between categories 70 to 79 years and over 80 years (Table 4).

Table 4 presents a pairwise comparison of pairs of age categories for HADS-D. The comparison was made by Tukey multiple comparisons of means. In each row, for two age categories, the difference between individual age category and the value of adjusted p-value, compared with the significance level of 0.05, is given. In addition to the mean value of HADS-D for individual age categories, this comparison also takes into account its variability.

Table 5 presents the frequency and percentage of occurrence of normal and abnormal levels of anxiety and depression in the monitored group.

Since the number of patients in individual categories for the indicators of the depression subscale score and the anxiety subscale score look similar, we verified whether the number of the same categories of both indicators can be considered the same. The result of the analysis of the homogeneity of the contingency table using the Pearson chi-square test is as follows: test criteria $\chi^2 = 0.394$, df = 2, p-value = 0.821. Based on the obtained results, we can conclude that there are no differences between the classes of the two variables, namely between the scores of the anxiety subscale and the scores of the depression subscale in the population. We have shown the combinations of frequencies of categories for anxiety subscale scores and depression subscale scores in Figure 7.

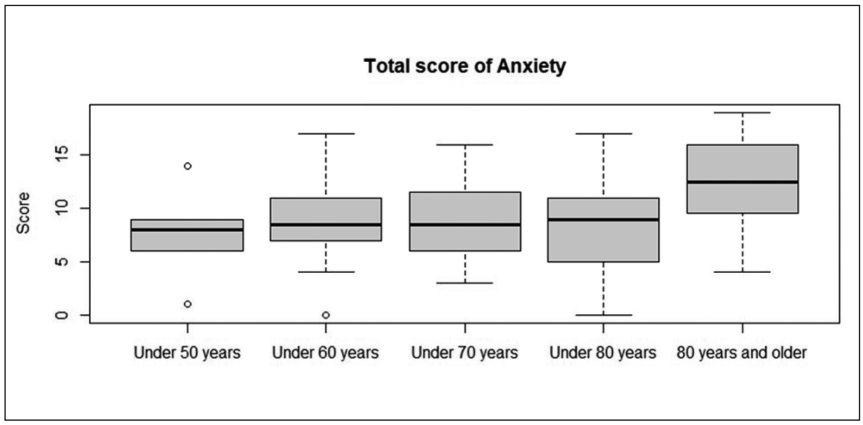

Fig. 5. *Comparison of anxiety symptoms for individual age categories.*

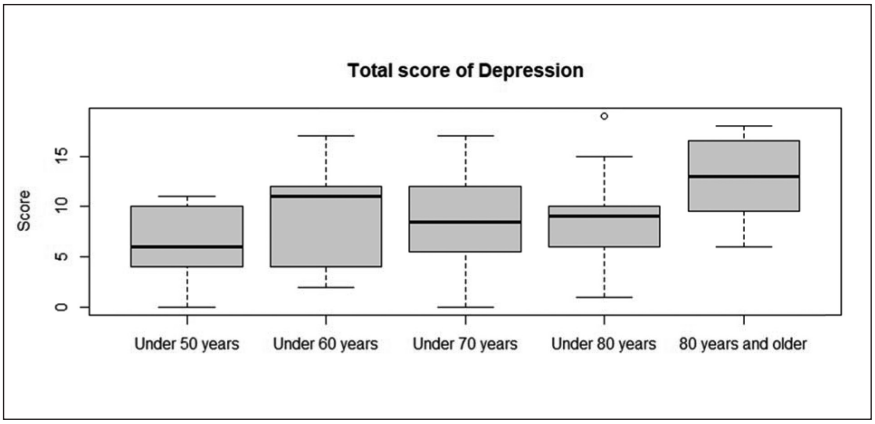

Fig. 6. *Comparison of depression symptoms for individual age categories.*

Table 4. *Pairwise comparison of pairs of age categories for depression subscale HADS-D*

Age	Difference	p - adj
Up to 50 – up to 60	−2.83	0.667
Up to 50 – up to 70	−2.52	0.687
Up to 50 – up to 80	−2.23	0.778
Up to 50 – over 80	−6.50	0.028*
Up to 60 – up to 70-	0.31	0.999
Up to 60 – up to 80-	0.60	0.993
Up to 60 – over 80-	−3.67	0.208
Up to 70 – up to 80	0.29	0.999
Up to 70 – over 80	−3.98	0.060
Up to 80 – over 80	−4.27	0.039*

Numbers in bold indicate statistically significant values.

In Figure 7, we can see that the most numerous categories are the combination of normal values of the anxiety subscale and normal values of the depression subscale (28%), approximately the same representation has the combination of pathological values of the anxiety subscale and pathological values of the depression subscale (27%). Borderline values of anxiety and depression have lower representation (15%). Combinations when one indicator is at a borderline level and the other is at a normal or abnormal level occur in 5% to 7% of cases, and the combination of normal level of one indicator and an abnormal level of the other indicator has a representation of 2% to 3%.

In our observations, 36 respondents had HADS depression score of 11 or higher, which is considered abnormal. Based on the exact binomial test (number of successes = 36, number of trials = 101, p-value = 0.320), the alternative hypothesis that the probability of success is greater than 0.33 was confirmed. With

Table 5. *Evaluation of frequency for individual categories in HADS*

HADS Score	Normal n (%)	Borderline n (%)	Abnormal n (%)
Anxiety (HADS-A)	35 (34.65)	29 (28.71)	37 (36.63)
Depression (HADS-D)	39 (38.61)	26 (25.74)	36 (35.64)
Total score (HADS-T)	38 (37.63)	27 (26.73)	36 (35.64)

HADS – hospital anxiety and depression scale; HADS-A – hospital anxiety and depression scale – anxiety subscale; HADS-D – hospital anxiety and depression scale – depression subscale

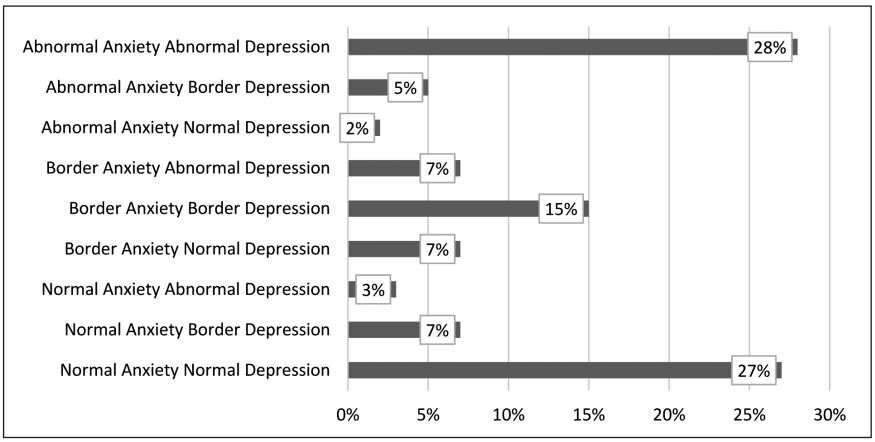

Fig. 7. *Bar chart of frequency of individual combinations of anxiety and depression.*

an estimated 95% confidence interval (0.277; 1.0), we confirmed that in the population, this percentage could be 27% or higher. If we include respondents who showed borderline HADS in the probability calculations, the same test (number of successes = 62, number of trials = 101, p-value = 0.430), the alternative hypothesis that the probability of success is greater than 0.6 was confirmed. Confidence interval (0.527; 1.0) indicates that the probability of having HADS of 8 or higher would be 53% or more in the population.

DISCUSSION

Depression and physical illness are closely related. It is assumed that depression contributes to the development and progression of certain diseases, while physical illnesses may in turn increase the risk of depression (16, 17).

Studies suggest that the prevalence of depression in the general population ranges between 5% and 10%. Depressive symptoms and anxiety states worsen the quality of life not only in patients after cerebrovascular accidents, but also in cardiac patients, diabetics, and patients with other chronic diseases (4, 11, 18). Cerebrovascular accidents are among the most common causes of depressive states in neurology. The highest incidence of depressive symptomatology is recorded in the period 1–6 months after the cerebrovascular accident, but the risk of developing depression persists for at least another two years (3, 19).

Analysis of data in the presented pilot study conducted on patients after cerebrovascular accidents (N = 101) hospitalized in neurology departments who were examined after stabilization of their health condition (1st–28th day) using the Hospital Anxiety and Depression Scale questionnaire confirms the high incidence of anxiety in the HADS-A subscale (9.23 ± 4.20) and depression in the HADS-D subscale (9.15 ± 4.51) in the acute phase of the disease. It shows the pathological occurrence of anxiety in 37%, depression in 36%, emotional distress in 36%, and a serious degree of combination of pathological values of the anxiety subscale and the depression subscale in 27% of patients. Furthermore, we confirmed the existence of a strong positive correlation r = 0.788 by Pearson's correlation ($p < 0.001$) between anxiety (HADS-A) and depression (HADS-D) indicators.

High depression scores based on division into age groups were observed in two groups of patients, namely in the 50–59 years old category, where the minimum, median and average HADS-D values were higher than in the younger group (in the category under 49 years) and in the older group (in the category of 60–69 years). In the group over 80 years of age, the minimum, median, and mean HADS-D values were the highest of all groups. Depression in old age differs from depression in younger age groups in the course and representation of individual clinical forms and prognosis. Other authors have reached similar conclusions.

Sollár et al. evaluated the incidence of depression (HADS-D) and anxiety (HADS-A) in 79 patients after cerebrovascular accident, where depression and anxiety were measured by HADS questionnaire, depressive disorders were present 7.42 ± 3.22 and anxiety states 8.66 ± 3.47 (20). In another study, the authors Kubovičová and Bartko evaluated 63 patients after cerebrovascular accident with depressive disorder in relation to the stage of cerebrovascular accident. The results show that patients in the chronic stage of the disease suffered more from depressive disorder compared to those with acute stage, which is in agreement with the findings of other studies. In the acute phase, 39% of patients from the evaluated sample experienced depression, while in the group of chronic patients it was up to 70% (3). These results are comparable to those of our study.

The findings show that, in addition to physical problems, patients after cerebrovascular accidents also struggle with depression and anxiety due to loss of self-sufficiency, which slows down their treatment and recovery even more. This is consistent with the results of the statistical evaluation included in this study.

Depression reduces the willingness, as well as the very ability, to adhere to the treatment mode. These include, for example, impaired motivation, concentration and energy for activities in general, as well as weakening of social support and positive expectations (21). This can significantly affect rehabilitation, which begins after the patient's basic life functions have been stabilized, usually no earlier than 24 hours after the incident. Untreated depression can have a negative impact on rehabilitation and other aspects of quality of life in patients after cerebrovascular accidents (20, 22).

Moreover, Bjelland et al. in their review of 747 studies focused on the HADS rating scale, also state that this method is sufficiently validated in assessing the severity of symptoms and cases of anxiety disorders and depression in somatic, psychiatric and primary care patients in the population (14). The HADS method in the presented study is adequate to draw relevant conclusion.

A validation study focused on the assessment of anxiety and depression of the HADS in the Spanish population also confirmed the validity and sensitivity in the identification of psychiatric disorders (23). Brennan et al. report that this method is a useful screening tool to identify patients experiencing anxiety (24). This method can be considered the best available method for determining the presence or absence of anxiety. An advantage of the HADS rating scale is that the scale intentionally omits physical symptoms (15) in order to reduce the likelihood of false positive diagnosis, which is determining for its use in physically ill patients (25).

Results obtained in the monitored set also confirm the effectiveness of this tool suitable for rapid screening of anxiety and depression disorders. The results of the presented work, as well as the results of the studies published so far, confirm that the HADS is a suitable screening method for the assessment of anxiety disorders and depression also in patients after cerebrovascular accidents (20, 24, 26). Low time requirement of this screening tool is also a significant factor (16). Although this method does not replace clinical diagnosis, it is an important indicator in the further approach to the patient. In any case, effective screening measures can also prompt healthcare providers to further evaluate patients' mental health and refer patients who may have been overlooked to professionals specializing in this topic (27), which ultimately may lead to even more effective treatment.

All available studies confirm the need for early detection of depression and anxiety disorders since they act as negative factors in complex treatment. Mentioned disorders worsen functional and cognitive impairments, which ultimately significantly affect the treatment but also the quality of life of patients not only with cerebrovascular accidents (13, 19, 20, 28).

CONCLUSION

Analysis of the prevalence of anxiety and depression in patients after cerebrovascular accidents from a public health perspective is important for understanding the extent of the problems and for developing effective interventions in health care delivery. Anxiety and depression are common comorbidities in post-stroke patients and can profoundly affect their treatment, including long-term rehabilitation, and quality of life.

The present results in the cohort of patients after cerebrovascular accidents confirm a high prevalence of anxiety and depression already in the acute phase of the disease, which should be considered in the provision of specialised health care. Screening measures for early diagnosis should be a standard part of the comprehensive treatment of patients with cerebrovascular accidents in the first days of hospitalisation after stabilisation.

Acknowledgements

This work was supported by grants KEGA 008UPJŠ-4/2020, 010UPJŠ-4/2021, 001UPJŠ-4/2024, 003UPJŠ-4/2024 of the Ministry of Education, Research, Development and Youth of the Slovak Republic.

Conflicts of Interest

None declared

REFERENCES

1. National Health Information Center. [Health statistics yearbook of the Slovak Republic 2022] [Internet]. Bratislava: National Health Information Center; 2023 [cited 2024 Apr 21]. Available from: https://www.nczisk.sk/Documents/rocenky/2022/Zdravotnicka_rocenka_Slovenskej_republiky_2022.pdf. Slovak.
2. Kořínková V, Novotný V. [Rational treatment of depression. Methodological sheet of the Central Commission of Rational Pharmacotherapy and Drug Policy of the Ministry of Health of the Slovak Republic]. 2007;11(3-4):1-8. Slovak.
3. Kubovičová K, Bartko D. [Depressive disorder in patients after stroke]. Slov J Health Sci. 2011;2(1):23-5. Slovak.
4. Melartin TK, Rytsälä HJ, Leskelä US, Lestelä-Mielonen PS, Sokero TP, Isometsä ET. Current comorbidity of psychiatric disorders among DSM-IV major depressive disorder patients in psychiatric care in the Vantaa Depression Study. J Clin Psychiatry. 2002 Feb;63(2):126-34.
5. Necho M, Tsehay M, Birkie M, Biset G, Tadesse E. Prevalence of anxiety, depression, and psychological distress among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Int J Soc Psychiatry. 2021 Nov;67(7):892-906.
6. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Global Health. 2020 Jul 6;16(1):57. doi: 10.1186/s12992-020-00589-w.
7. World Health Organization. ICD-11. International Statistical Classification of Diseases 11th revision [Internet]. Geneva: WHO [cited 2022 Nov 30]. Available from: https://icd.who.int/.
8. American Psychiatric Association. [DSM-5: Diagnostic and statistical manual of mental disorders]. Prague: Hogrefe - Testcentrum; 2015. Czech.
9. Kořínková V. [Options for diagnosis and treatment of depression in a general practitioner's office]. Via Pract. 2005;2(10):412-6. Slovak.
10. Kessler RC, Aguilar-Gaxiola S, Alonso J, Chatterji S, Lee S, Ormel J, et al. The global burden of mental disorders: an update from the WHO World Mental Health (WMH) surveys. Epidemiol Psichiatr Soc. 2009 Jan-Mar;18(1):23-33.
11. Ištoňová M, Palát M, Kociová K. [Psychosocial risk factors in cardiac rehabilitation]. Rehabil Fyz Lek. 2009;16(1):26-32. Slovak.
12. Slavíček J, Charvát J, Paclt I, Florian J. [Depression, cardiovascular disease and undesirable cardiovascular side effects of antidepressants - part 1st]. Inter Med Praxi. 2002;4(7):331-5. Czech.
13. Li W, Xiao Wm, Chen Yk, Qu Jf, Liu Yl, Fang Xw, et al. Anxiety in patients with acute ischemic stroke: risk factors and effects on functional status. Front Psychiatry. 2019 Apr 17;10:257. doi: 10.3389/fpsyt.2019.00257.
14. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale. An updated literature review. J Psychosom Res. 2002 Feb;52(2):69-77.
15. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983 Jun;67(6):361-70.
16. Stern AF. The hospital anxiety and depression scale. Occup Med (Lond). 2014 Jul;64(5):393-4.
17. Snaith RP. The hospital anxiety and depression scale. Health Qual Life Outcomes. 2003 Aug 1;1:29. doi: 10.1186/1477-7525-1-29.
18. Nefs G, Pouwer F, Denollet J, Pop V. The course of depressive symptoms in primary care patients with type 2 diabetes: results from the Diabetes, Depression, Type D Personality Zuidoost-Brabant (DiaDDZoB) Study. Diabetologia. 2012 Mar;55(3):608-16.
19. Robinson RG, Spalletta G. Poststroke depression: a review. Can J Psychiatry. 2010 Jun;55(6):341-9.
20. Sollár T, Dančová K, Solgajová M, Romanová M. Depression and anxiety as predictors of quality of life after a stroke. Kontakt. 2022;24(1):79-84.
21. Stapoe A. Depression and physical illness. London (UK): Cambridge Press; 2006.
22. Selvaraj S, Arora T, Casameni Montiel T, Grey I, Alfraih H, Fadipe M, et al. Early screening for post-stroke depression, and the effect on functional outcomes, quality of life and mortality: a protocol for a systematic review and meta-analysis. BMJ Open. 2021 Aug 17;11(8):e050451. doi: 10.1136/bmjopen-2021-050451.
23. Herrero MJ, Blanch J, Peri JM, De Pablo J, Pintor L, Bulbena A. A validation study of the hospital anxiety and depression scale (HADS) in a Spanish population. Gen Hosp Psychiatry. 2003 Jul-Aug;25(4):277-83.
24. Brennan C, Worrall-Davies A, McMillan D, Gilbody S, House A. The hospital anxiety and depression scale: a diagnostic meta-analysis of case-finding ability. J Psychosom Res. 2010 Oct;69(4):371-8.
25. Lam RW, Michalak EE, Swinson RP. Assessment scales in depression, mania and anxiety. Oxfordshire: Taylor & Francis; 2005.
26. Bennett HE, Thomas SA, Austen R, Morris AM, Lincoln NB. Validation of screening measures for assessing mood in stroke patients. Br J Clin Psychol. 2006 Sep;45(Pt 3):367-76. doi: 10.1348/014466505x58277. Erratum in: Br J Clin Psychol. 2007 Jun;46(Pt 2):following 251.
27. Short H, Al Sayah F, Ohinmaa A, Johnson JA. The performance of the EQ-5D-3L in screening for anxiety and depressive symptoms in hospital and community settings. Health Qual Life Outcomes. 2021 Mar 19;19(1):96. doi: 10.1186/s12955-021-01731-x.
28. Dimunová L, Sovariová Soósová M, Kardosová K, Červený M, Belovičová M. Quality of life in patients after stroke. Kontakt. 2020;22(3):157-61.

Received May 24, 2023
Accepted in revised form June 26, 2024