Original paper

Patients' strategies of coping with stress after stroke

Barbara Gradowicz-Prajsnar[1,2], Jerzy Słowiński[2]

[1]Department of Epidemiology and Population Studies, Jagiellonian University Medical College, Krakow, Poland
[2]Department of Epidemiology and Biostatistics, Medical University of Silesia, Katowice, Poland

Medical Studies
DOI: https://doi.org/10.5114/ms.2026.158865

Key words: stress, cerebral stroke, perceived stress, coping strategies for stress.

Abstract

Introduction: Stress is an inherent aspect of everyone's life, particularly for individuals who have experienced a cerebral stroke and face the resultant physical and mental challenges.
Aim of the study: The study aimed to assess the perceived stress and coping strategies of patients in the neurological rehabilitation ward who had experienced a stroke.
Material and methods: The study involved 201 stroke patients, comprising 87 (43%) women and 114 (57%) men. The study was carried out at the Rehabilitation Department, which encompasses the Department of Neurological Rehabilitation in the Podkarpackie Province. The research methods included the Mini-Mental State Examination Scale (MMSE), the Perceived Stress Scale-10 (PSS-10), and the Mini Coping Orientations to Problems Experienced (Mini-COPE).
Results: A high level of stress was observed in 57.5% of the women and 64.9% of the men. Women most frequently reported using the following methods to cope with stress: *Acceptance*, *Turning to religion*, and *Seeking emotional support*. Men, on the other hand, reported employing strategies such as *Active coping* and *Acceptance*.
Conclusions: Following a cerebral stroke, most patients experienced high levels of stress. The study revealed that older patients were less likely to employ stress-coping strategies, such as *Active coping*, *Planning*, *Positive revaluation*, and *Sense of humour*. However, as patients aged, they tended to favour methods like *Turning to religion*, *Denial*, and *Withdrawal from activities*. A statistically significant relationship was found between the location of the stroke and strategies such as *Sense of humour*, *Unloading*, and *Blaming oneself*. It is important to emphasise that stress should be routinely addressed in clinical practice.

Introduction

Modern society is grappling with a variety of crises that present challenges for humanity and contribute to the prevalence of stress. Stress is a natural physiological response that arises when there is an imbalance between demands and an individual's capacity to manage them. This phenomenon is essential for human development as it prompts full mobilisation, facilitates decision-making, and helps overcome potential obstacles. The concept of stress and significant contributions to its research have been attributed to Canadian endocrinologist Hans Selye, who is often referred to as 'the father of stress' [1, 2].

A distinction is drawn between positive stress (acute, eustress) and negative stress (chronic, distress). Acute stress is short-term and acts as a driving force, helping to address challenging situations. In contrast, chronic stress is long-term, arises in emergencies, and can lead to mental or somatic disorders and the onset of disease. While an increase in stress levels can be beneficial, surpassing the optimal level renders stress harmful [2, 3].

It is often observed that a particular stressor may trigger stress in one person, while another person may remain unaffected. This difference in reactions arises because the situation itself does not inherently cause stress; rather, it is the individual who assigns it a positive or negative meaning. There is a subjective evaluation of the events experienced, which involves a primary assessment – evaluating the significance of an event for the individual – and a secondary assessment, which involves judging a person's ability and resources to cope with the stressors. Physiological and psychological reactions occur when an individual evaluates an incident in terms of risk, challenge, damage, or loss [2, 4–9].

The research contributions of Lazarus and Folkman have significantly advanced our understanding of stress and the methods for managing it. Coping with challenging stressful situations involves secondary assessment and encompasses process, strategy, and style. According to Lazarus and Folkman, the process of coping with stress is defined as "the cognitive and behavioural efforts of a subject to cope with specific external and internal demands judged to exhaust or exceed the resources of the individual" [10]. Strategies are characterized as typical actions or ways of managing given stressful situations. The style of coping with stress is described as a permanent and characteristic personality disposition aimed at eliminating

or reducing stress by contending with the occurring stressors [4, 7, 10].

Every day, individuals face numerous stressors, but not everyone is equipped to manage them effectively. The variety of coping strategies is influenced by factors such as age, perception of a situation, lifestyle, life experiences, and the sense of control over the circumstances. While sudden stressful events are unavoidable, being aware of how to control the stress response can help mitigate the negative effects of stress. Methods for mastering and controlling stress include gaining experience, gradually acclimating to the stressor, seeking information about stressors, and employing appropriate strategies for managing stress. A negative attitude and inability to handle stressors can lead to uncontrolled stress, which in turn increases the likelihood of disease. It is crucial to recognize that while disease can be a stressor, chronic stress can also lead to disease. For instance, persistently high blood pressure over an extended period in someone experiencing consistently the high level of stress can result in uncontrolled hypertension, potentially leading to a heart attack or stroke [2, 11–14].

Stroke represents a significant neurological and societal challenge, as it ranks among the leading causes of morbidity and mortality and frequently results in permanent disability. The likelihood of experiencing a stroke increases with age [12–15]. A key prognostic indicator for stroke is a transient ischaemic attack (TIA), characterised by a temporary disruption of blood flow to specific brain regions lasting no more than 24 hours. It is estimated that nearly half of the patients who experience a TIA will suffer a full stroke within 5 years [16].

Following a stroke, patients often experience mental tension and face both somatic and psychological challenges, including memory impairment, slowed thinking, and mental disorders such as anxiety or post-stroke depression (PSD). PSD is among the most prevalent neuropsychiatric complications, affecting approximately one-third of stroke survivors [12, 13, 15, 17].

Clinical rationale for the study

The most effective way to restore a patient's physical and mental efficiency after a stroke is through rehabilitation. Unfortunately, stress is not routinely addressed in clinical practice. In terms of health recovery, rehabilitation efforts primarily focus on motor disabilities and speech and language deficits, while psychological stressors are often neglected and omitted. The best outcomes are achieved when prompt treatment is combined with early and comprehensive rehabilitation, incorporating various methods of maintenance psychotherapy and strategies against depression. To effectively cope with stress, it is essential to understand its mechanism of action and be aware of the possibility of controlling the stress response, as well as strategies to alleviate the negative effects of stress activity [12, 13, 15, 17–19].

Aim of the study

The aim of the present study was to assess the perceived stress and strategies of coping with stress by patients after stroke. The following specific objectives have been set:

1. Measuring the severity of stress induced by illness in the last month and examining the statistical relationship with gender and age.
2. Determining the frequency of undertaking stressful activities by gender and age.
3. The assessment of typical ways of reacting in situations of experiencing severe stress by patients after stroke and the determination of statistical dependence on age.
4. Exploring the relationship between the overall stress intensity and strategies for coping with stress.
5. Exploring the connection between the hemisphere of the brain affected by a stroke (left or right) and the perceived stress levels, as well as the coping strategies employed.

Material and methods

The study was conducted among patients after stroke treated in the Rehabilitation Department, including the Department of Neurological Rehabilitation of the Podkarpackie Voivodeship Hospital. A response was received that ethical approval was not necessary for the preparation of this article. The inclusion criteria included patients who have suffered a cerebral stroke and, according to the Depth of Dementia Rating Scale, the Mini-Mental State Examination Scale (MMSE), who received a minimum of 24/30 points, and agreed to participate in the study. In turn, the exclusion criterion was speech disorders (aphasia), hearing disability, and dementia, i.e. the respondents were excluded from the study who obtained ≤ 23 points in the MINI-MENTAL Scale. From April 2019 to December 2022, 344 respondents were examined. From this pre-selected group of patients after stroke, after application of the exclusion criteria, a group of 143 persons was excluded. Ultimately, therefore, the work was based on a study of a group of 201 respondents, consisting of 87 (43%) women and 114 (57%) men, including 188 patients after ischaemic stroke and 13 patients after haemorrhagic stroke.

To determine a stroke patient's eligibility for the study and assess the severity of dementia, the Mini-Mental State Examination Scale was employed. This screening tool evaluates the degree of cognitive impairment in individuals, covering aspects such as orientation to place and time, comprehension, naming, memory, recall, arithmetic, language abilities, reading, and the execution of complex written and oral instructions. Following the evaluation of the patient's cogni-

tive impairments, the research utilised the following questionnaires (in the Polish version): Perceived Stress Scale-10 – PSS-10, Mini Coping Orientations to Problems Experienced – Mini-COPE.

The PSS-10 (Perceived Stress Scale-10), developed by Cohen, Kamarck, and Mermelstein, is used to assess perceived stress related to personal issues, behaviours, and the burdens of life situations experienced over the past month. It comprises 10 questions, each with a corresponding 5-point response scale ranging from 'never' to 'very often'. The PSS-10 score is the sum of all the scores from the questions, with a maximum of 40 points. To interpret the overall indicator, the adopted tens standards were used. A higher score indicates a greater severity of stress experienced [4].

The Inventory Mini-COPE (Mini Coping Orientations to Problems Experienced), developed by Carver, is a tool designed to assess situational coping mechanisms for stress. It comprises 28 statements that are categorised into 14 coping strategies: *Active coping*, *Positive revaluation*, *Planning*, *Acceptance*, *Sense of humour*, *Turning to religion*, *Seeking emotional support*, *Dealing with something*, *Unloading*, *Denial*, *Using psychoactive substances*, *Blaming oneself*, and *Withdrawal from activities*. These strategies are grouped into categories such as problem-focused behaviour, active coping methods, emotion-oriented strategies, or what is termed 'other behaviour'. Each strategy's scale is evaluated separately, with the score for a strategy being the sum of the scores of its two constituent statements, divided by 2. The possible score range for each strategy is 0–3 [7].

The questionnaire interview was conducted individually with each respondent.

Statistical analysis

The statistical analysis was carried out using Statistica 13.3 and R 4.2.2 software. To verify the assumed hypotheses, the chi-square test, Fisher's exact test, and the Mann-Whitney *U* test were used. Statistical significance was set at $p < 0.05$. To assess the relationship between the scales (PSS-10, Mini-COPE) and age, Spearman's rank correlation was used. The study results are presented in tables.

Results

A total of 201 patients were included in the analysis, comprising 87 (43%) women and 114 (57%) men. Among the respondents, the largest group consisted of women over the age of 75 (43.7%) and men aged 66–75 (42.1%) years. The smallest proportion of both women and men were those aged 55 years and under, comprising 6.9% women and 9.6% men. Of the respondents, 70.1% of women and 61.4% of men resided in the countryside, while the smallest percentage lived in towns with fewer than 10,000 inhabitants. The study did not include residents of cities with populations exceeding 100,000 inhabitants. Among the participants, ischaemic stroke was predominant, affecting 95.4% of women and 92.1% of men (Table 1).

Table 1. Characteristics of the studied group

Category	Women	Men
Age, *n* (%)	87 (43)	114 (57)
≤ 55	6 (6.9)	11 (9.6)
56–65	12 (13.8)	31 (27.2)
66–75	31 (35.6)	48 (42.1)
> 75	38 (43.7)	24 (21.1)
Place of residence, *n* (%)		
Countryside	61 (70.1)	70 (61.4)
City, less than 10 000 inhabitants	9 (10.4)	4 (3.5)
City, 10 000–100 000 inhabitants	17 (19.5)	40 (35.1)
Education, *n* (%)		
Primary	33 (37.9)	19 (16.6)
Secondary school	28 (32.2)	37 (32.5)
Vocational	21 (24.1)	43 (37.7)
Bachelor or master degree	5 (5.8)	15 (13.2)
Type of stroke, *n* (%)		
Ischemic	83 (95.4)	105 (92.1)
Hemorrhagic	4 (4.6)	9 (7.9)

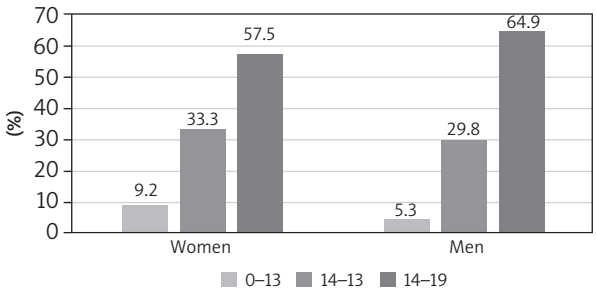

Figure 1. The level of perceived stress by gender

Stress levels were slightly higher among men, with 64.9% experiencing high stress, compared to 57.5% of women across all age groups. Only 9.2% of women and 5.3% of men exhibited low stress levels (Figure 1). The highest incidence of high stress was found in participants aged 55 years and under, at 70.6%, while the lowest was in the 56–65 age group, at 55.8%. On average, about 6–8% of participants across all age groups reported low stress levels (Figure 2).

The women in the study achieved the highest median values on scales indicating a preference for emotion-focused strategies, such as *Turning to religion* or *Seeking emotional support*, as well as the problem-oriented strategy of *Acceptance*. Among the men, the most commonly chosen strategies were *Acceptance* and, additionally, *Active coping* with stress. Notably,

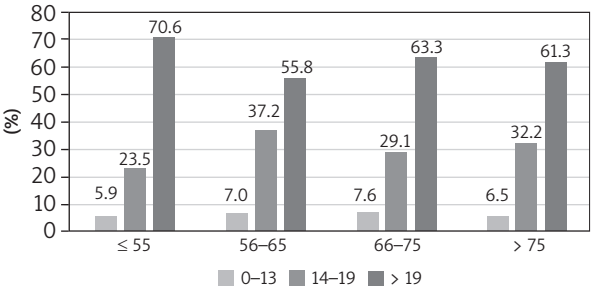

Figure 2. The level of perceived stress by age group

no participant indicated *Using psychoactive substances* as a stress-coping strategy. Similar to the women, the men in the study recorded the lowest median values on scales indicating a preference for 'other behaviour' strategies, such as *Sense of humour* and *Withdrawal from activities*. Additionally, men rarely chose *Denial* as a strategy (Table 2).

Regardless of age, stroke patients most frequently opted for strategies of *Acceptance* and *Seeking emotional support*, while they were least inclined to adopt avoidance-oriented strategies for coping with stress, such as *Sense of humour* or *Withdrawal of activities*. Additionally, individuals under 65 years old were equally likely to engage in *Active coping* with stress, whereas those over 65 often preferred *Turning to religion*. Respondents aged 55 years and under seldom indicated *Denial* as a strategy (Table 2).

The age of the study participants influenced how often they opted for problem-oriented strategies, such as *Active coping*, *Planning*, and *Positive revaluation*. This relationship was negative, indicating that as the participants' age increased, their use of these strategies decreased. Additionally, age had a statistically significant impact on the frequency of employing emotion-focused strategies, like *Turning to religion* or *Denial*. However, these correlations were quite weak, and for the strategy of *Turning to religion*, no linear relationship was observed. The effect of age on strategy choice was also evident in the so-called 'other behaviours' (*Sense of humour, Withdrawal from activities*). For the *Sense of humour* strategy, the relationship was negative, whereas for *Withdrawal of activities*, it was positive (Table 3).

It was shown that as perceived stress levels increased, the frequency of using strategies such as *Active coping*, *Planning*, *Positive revaluation*, *Seeking instrumental support*, *Denial*, *Unloading*, and *Blaming oneself* decreased. Nonetheless, the strength of the relationship for these strategies was very weak (Supplementary Table S1).

Analysis revealed a statistically significant association between the location of the stroke focus in the left versus the right hemisphere of the brain and the respondents' coping strategies for stress, such as *Sense of humour, Unloading*, and *Blaming oneself*. These strategies were slightly more common among patients who experienced an ischaemic stroke in the right hemisphere. However, the median values (Me = 1, and for *Sense of humour*, Me = 0.5) suggest that these coping methods are generally infrequently used (Supplementary Table S2).

Discussion

Numerous studies have demonstrated a cause-and-effect relationship between stress and disease conditions, with some diseases showing this link in 80–90% of cases [2, 12–14]. Adjusting to a serious illness involves accepting many changes, and the diagnosis is often associated with life-threatening experiences, which, according to stress theory, can become significant sources of stress [20]. Conversely, stress itself can lead to various diseases. The ever-increasing challenges of modern civilization contribute to chronic stress, which in turn fosters the development of diseases of civilization, such as heart disease, cancer, stroke, depression, and addictions [20–23]. Stroke, a neurological disease, has numerous adverse health effects, with reduced mobility being the most noticeable consequence, often exacerbating stress levels. Individuals with disabilities face numerous challenges, such as the inability to perform basic daily activities or maintain social contacts, which frequently result in emotional instability, diminished self-esteem, and a lower quality of life, ultimately leading to severe stress.

According to this study, most post-stroke patients perceived high stress levels, which is probably mainly due to physical and social limitations and lack of faith in the improvement of health. This is consistent with the findings of previous studies [24, 25]. In the study by Ostwald *et al.* regarding the stress experienced, the PSS-10 questionnaire was also used. This study describes the stress levels in stroke survivors and spousal caregivers at discharge and at 3, 6, 9, and 12 months and identified predictors of stress in couples. Social support, good health, and coping are associated with less stress [25]. Santosa *et al.* showed that higher perceived stress was significantly related to more depressive symptoms and less functional independence [26]. Analysing the results of our research, it was found that a high level of stress affects people aged 55 years and under more often than older people. Perhaps it is difficult for them to come to terms with the experience of illness and limitations related to it at a younger age.

The problem of stress and ways of coping with stress are undoubtedly of growing interest to researchers. The most effective and efficient strategies for coping with stress are considered to be problem-focused strategies; whereas, less effective strategies are avoidance strategies and so-called 'other behaviours' [27]. A study on a group of women with breast cancer showed that coping with stress through an emotional approach was significantly associated with stress reduction and with improvements in the subjective as-

Table 2. Descriptive statistics of strategies for coping with stress (Mini-COPE) of studied group by gender and age

Strategies for coping with stress	N	Me	Q_1	Q_3
Gender				
Women				
Active coping	87	2.0	1.0	2.5
Planning	87	1.0	0.0	1.5
Positive revaluation	87	1.0	0.0	2.0
Acceptance	87	2.5	2.0	3.0
Sense of humour	87	0.0	0.0	0.5
Turning to religion	87	3.0	2.0	3.0
Seeking emotional support	87	2.5	2.0	3.0
Seeking instrumental support	87	2.0	1.5	2.5
Dealing with something	87	1.5	1.0	2.5
Denial	87	1.0	0.5	2.0
Unloading	87	1.0	0.5	2.0
Using psychoactive substances	87	0.0	0.0	0.0
Withdrawal from activities	87	0.0	0.0	1.5
Blaming oneself	87	1.0	0.0	2.0
Men				
Active coping	114	2.5	1.5	3.0
Planning	114	1.25	0.0	2.0
Positive revaluation	114	1.5	0.5	2.0
Acceptance	114	2.5	2.0	3.0
Sense of humour	114	0.0	0.0	1.0
Turning to religion	114	2.0	1.0	3.0
Seeking emotional support	114	2.0	1.5	3.0
Seeking instrumental support	114	2.0	1.0	2.5
Dealing with something	114	2.0	1.0	2.5
Denial	114	0.0	0.0	1.0
Unloading	114	0.5	0.0	1.0
Using psychoactive substances	114	0.0	0.0	0.0
Withdrawal from activities	114	0.0	0.0	1.0
Blaming oneself	114	0.75	0.0	1.5
Age				
≤ 55				
Active coping	17	2.5	1.5	3.0
Planning	17	1.5	1.0	2.5
Positive revaluation	17	2.0	0.0	2.0
Acceptance	17	3.0	2.0	3.0
Sense of humour	17	0.5	0.0	1.0
Turning to religion	17	2.0	1.0	3.0
Seeking emotional support	17	3.0	2.0	3.0

Table 2. Cont.

Seeking instrumental support	17	2.0	1.0	2.5
Dealing with something	17	2.0	1.5	2.5
Denial	17	0.0	0.0	1.0
Unloading	17	0.5	0.0	1.0
Using psychoactive substances	17	0.0	0.0	0.0
Withdrawal from activities	17	0.0	0.0	0.0
Blaming oneself	17	1.0	0.0	1.5
56–65				
Active coping	43	2.5	1.5	2.5
Planning	43	1.0	0.0	2.0
Positive revaluation	43	1.5	0.0	2.0
Acceptance	43	2.5	2.0	3.0
Sense of humour	43	0.0	0.0	1.0
Turning to religion	43	2.0	0.0	3.0
Seeking emotional support	43	2.5	1.5	3.0
Seeking instrumental support	43	2.0	1.5	2.5
Dealing with something	43	2.0	1.0	2.5
Denial	43	0.5	0.0	1.5
Unloading	43	1.0	0.0	1.5
Using psychoactive substances	43	0.0	0.0	0.0
Withdrawal from activities	43	0.0	0.0	1.0
Blaming oneself	43	0.5	0.0	2.0
66–75				
Active coping	79	2.0	1.0	3.0
Planning	79	1.0	0.5	2.0
Positive revaluation	79	1.5	1.0	2.0
Acceptance	79	2.5	2.0	3.0
Sense of humour	79	0.0	0.0	1.0
Turning to religion	79	2.5	2.0	3.0
Seeking emotional support	79	2.0	2.0	3.0
Seeking instrumental support	79	2.0	1.0	2.5
Dealing with something	79	2.0	1.0	2.5
Denial	79	0.5	0.0	1.5
Unloading	79	1.0	0.0	1.5
Using psychoactive substances	79	0.0	0.0	0.0
Withdrawal from activities	79	0.0	0.0	1.0
Blaming oneself	79	1.0	0.0	1.5
> 75				
Active coping	62	2.0	1.0	2.5
Planning	62	1.0	0.0	1.5
Positive revaluation	62	1.0	0.0	1.5

Table 2. Cont.

Acceptance	62	2.5	2.0	3.0
Sense of humour	62	0.0	0.0	0.5
Turning to religion	62	3.0	2.0	3.0
Seeking emotional support	62	2.25	1.5	3.0
Seeking instrumental support	62	2.0	1.0	2.5
Dealing with something	62	1.5	1.0	2.5
Denial	62	1.0	0.0	1.5
Unloading	62	1.0	0.0	1.5
Using psychoactive substances	62	0.0	0.0	0.0
Withdrawal from activities	62	0.5	0.0	2.0
Blaming oneself	62	1.0	0.0	2.5

Mini-COPE – Mini Coping Orientations to Problems Experienced, N – number of respondents, Me – median, Q1 – lower quartile, Q3 – upper quartile.

Table 3. Correlation of strategies for coping with stress (Mini-COPE) with age

Strategies for coping with stress	Correlation with age			
	Correlation coefficient	*P*-value	Direction of dependence	Strength of dependence
Active coping	–0.156	0,03	Negative	Very weak
Planning	–0.186	0,01	Negative	Very weak
Positive revaluation	–0.209	0,01	Negative	Very weak
Acceptance	–0.135	0,06	–	–
Sense of humour	–0.209	0,01	Negative	very weak
Turning to religion	0.135	0,05	Positive	no linear relationship
Seeking emotional support	–0.075	0,29	–	–
Seeking instrumental support	–0.031	0,66	–	–
Dealing with something	–0.124	0,08	–	–
Denial	0.207	0,01	Positive	Very weak
Unloading	0.072	0,31	–	–
Using psychoactive substances	–0.063	0,38	–	–
Withdrawal from activities	0.225	0,01	Positive	Very weak
Blaming oneself	0.020	0,77	–	–

Mini-COPE – Mini Coping Orientations to Problems Experienced.

sessment of health; however, after three months, there was an increase in stress levels. Coping with stress using emotion-focused strategies can only be effective for a short time [7, 28]. In this study, the respondents most often declared the use of an adaptation strategy, meaning accepting the situation, and just as often emotion-focused strategies (*Turning to religion, Seeking emotional support*). The experience of illness, especially among older people, often urges them to find solace in their religion and seek social support. The least frequently indicated strategies were those involving giving up efforts to achieve a given goal (*Sense of humour, Using psychoactive substances, Withdrawal from activities).* The experience of illness may have influenced the addiction. In the conducted study, correlation analyses showed that the older the age of the participants, the less often *Active strategies* or *Sense of humour* were undertaken. Perhaps the reason for choosing such ways of coping with stress was physical limitations, which prevented active coping with stress, as well as the poor mental condition of some patients, which led to a lack of a sense of humour.

Various causes of stress have been described in the literature. After stroke, patients are often depen-

dent, which was also observed in patients participating in this study. Rai *et al*. indicated that among the respondents with disabilities, the highest scores were seen for *Avoidance* coping, while the lowest score was seen in strategic of *Planning* [29].

We examined the relationship between stroke focus in the left and right brain hemispheres and strategies to cope with stress. A statistically significant relationship was found between the location of the stroke and the strategies undertaken by the respondents. The listed ways of coping with stress were slightly more often taken up by participants after an ischaemic stroke of the right brain hemisphere. However, these strategies have rarely been implemented. This is probably because, in the case of a stroke of the left brain hemisphere, language difficulties and logical thinking problems occur, so a stroke occurring in this location of the brain could deprive the patient of these skills. However, when stroke affects the right brain hemisphere, there are more frequent problems with understanding contexts, speech, receiving allusions, and imagination, so that the jokes and contexts are understood. Perhaps this is why these patients rarely cope with stress through a sense of humour and jokes. Despite the dominance of the left brain hemisphere in the regulation of language functions, Syta's study confirms the important role of the right brain hemisphere in specific speech disorders, termed as pragnosia, including dysfunctions in perception, difficulties in understanding language jokes, and the realisation of prosodic aspects of speech [30].

After stroke, patients may not engage in coping strategies because of limitations related to the disease. Summarising the existing research on coping with stress after stroke is a difficult task. The reason for this is the small number of studies conducted among this clinical group as well as variations in the choice of research tools. The main reason is perhaps that the chosen research group is specific, and there are some exclusion criteria. This study was conducted through individual contact with each patient. In most cases, it cannot be performed in any other way because of physical limitations and their implications. In some cases, this was a cause of embarrassment and restraint for the patient due to the inability to write down the answers themselves and some awkward questions. Some participants withdrew from the study because the questions were sometimes difficult for them or because they were tired of the long duration of the study. Another important aspect that prevented the study from being conducted for approximately a year was the occurrence of the COVID-19 pandemic, which resulted in the study being completely suspended, and subsequent repeated restrictions during the pandemic.

Conclusions

The following conclusions were drawn from the study: Most patients with cerebral stroke experience high levels of stress. After stroke, women most often preferred problem-focused stress management strategy, such as *Acceptance* and emotion focused strategies, such as *Turning to religion* or *Seeking emotional support*. Men most frequently reported strategies for coping with stress, such as *Acceptance* and *Active coping*. Respondents were least likely to indicate undertaking strategies, such as *Using psychoactive substances*, *Sense of humour,* and *Withdrawal of activities*. The older the age of the patient, the less frequent the use of problem-focused strategies (*Active coping*, *Planning*, and *Positive revaluation)* and the more frequent the selection of emotion-focused strategies (*Turning to religion* or *Denial)*. The higher the level of perceived stress, the less frequently the following strategies were used: *Active coping*, *Positive revaluation*, *Planning*, *Seeking instrumental support*, *Unloading*, *Denial*, and *Blaming oneself*. A statistically significant relationship was confirmed between the location of stroke (left vs. right brain hemisphere) and some of the strategies used to cope with stress (*Sense of humour, Unloading*, *Blaming oneself*).

Funding

No external funding.

Ethical approval

Not applicable.

Conflict of interest

The authors declare no conflict of interest.

References

1. Dugiel G, Tustanowska B, Kęcka K, Jasińska M. Overview of theories of stress. Acta Sci Acad Ostroviensis. 2012; 1: 47-71.
2. Jośko J. Stress in chronic diseases. Wydawnictwo Lekarskie PZWL, Warsaw 2007 (in Polish).
3. Chudzik R, Jarosz K, Gołębiewska M, Gołębiewska B. Stress disease of the 21st century? J Educ Health Sport. 2017; 7(8): 20-26.
4. Juczyński Z, Ogińska-Bulik N. Tools for measuring stress and coping with stress. In: Perceived Stress Scale-10 – PSS-10. Cohen S, Kamarck T, Marmelstein R (eds.) Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego, Warsaw 2012; 11-22 (in Polish).
5. Kozłowski P, Kożuch K, Kozłowski M, Cuch B. Estimation of the frequency of occurrence of stress and its symptoms, and evaluation of causes and management of stress among students/learners. J Educ Health Sport. 2016; 6: 393-402.
6. Fink, G. Stress: Concepts, Definition and History. In: Reference Module in Neuroscience and Biobehavioral Psychology. Elsevier 2017; 10: 1-9.
7. Juczyński Z, Ogińska-Bulik N. Tools for measuring stress and coping with stress. In: Carver CS. Mini Coping Orientations to Problems Experienced – Mini-COPE. Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego, Warsaw 2012, 45-56 (in Polish).

8. Ziarko M. Coping with the stress of chronic illness. In: Chronic disease as a source of stress. Wydawnictwo Naukowe Wydziału Nauk Społecznych Uniwersytetu im. Adama Mickiewicza w Poznaniu; 2014, 31-47 (in Polish).
9. Bhargava D, Trivedi T. A study of causes of stress and stress management among youth. Int J Manag Soc Sci. 2018; 11(3): 108-117.
10. Juczyński Z, Ogińska-Bulik N. Tools for measuring stress and coping with stress. In: Multidimensional Inventory for Measuring Coping with Stress – COPE. Carver CS, Scheier MF, Jagdish KW (eds.). Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego, Warsaw 2012; 23-43 (in Polish).
11. Sygit-Kowalkowska E. Coping with stress as a health behavior – psychological perspectives. Hygeia Public Health. 2014; 49(2): 202-208.
12. Kusz J. A disease as a stressful situation and the ways how people cope with it. Puls Uczelni. 2012; 6(1): 11-13.
13. Strepikowska A, Buciński A. Cerebral stroke – risk factors and prophylaxis. Post Farmakoter. 2009; 65(1): 46-50 (in Polish).
14. Surman M, Janik ME. Stress and its molecular consequences in cancer progression. Post Hig Med Dosw. 2017; 71: 485-499.
15. McCarthy MJ, Sucharew HJ, Alwell K, Moomaw CJ, Woo D, Flaherty ML, Khatri P, Ferioli S, Adeoye O, Kleindorfer DO, Kissela BM. Age, subjective stress, and depression after ischemic stroke. J Behav Med. 2016; 39(1): 55-64.
16. Tyrrell P, Swain S, Rudd A. Diagnostyka i początkowe leczenie przemijającego niedokrwienia mózgu (TIA). Med po Dypl. 2011; 20(5): 35-40.
17. Wysokiński A. Post-stroke depression. Psychiatr Psychol Klin. 2016; 16(3): 171-175.
18. Cebella A, Łucka I. Post-traumatic stress disorder – understanding and treatment. Psychiatria. 2007; 4(3): 128-137.
19. Rozpędek W. Neurobiology of posttraumatic stress disorder. Neuropsych Neuropsychol. 2015; 10(1): 27-39.
20. Basińska B. Coping with stress caused by different health hazard. Przegl Psychol. 2004; 47(1): 109-119 (in Polish).
21. Kaźmierczak M, Gebuza G, Gierszewska M, Mieczkowska E, Dombrowska-Pali A, Kłosowska M. Stress connected with the work of nurses and midwives and the styles of managing stress. Pol Przegl Nauk Zdr. 2019; 4(61): 295-311.
22. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. JAMA. 2007; 298(14): 1685-1687.
23. Kotlęga D, Gołąb-Janowska M, Masztalewicz M, Ciećwież S, Nowacki P. The emotional stress and risk of ischemic stroke. Neurol Neurochir Pol. 2016; 50: 265-270.
24. Ponczek D, Piątkowska A. Stress and anxiety in Neurosurgical Patients before surgery. J Neurol Neurosurg Nurs. 2023; 12(2): 55-62.
25. Ostwald SK, Bernal MP, Cron SG, Godwin KM. Stress experienced by stroke survivors and spousal caregivers during the first year after discharge from inpatient rehabilitation. Top Stroke Rehabil. 2009; 16(2): 93-104.
26. Santos EB, Rodrigues RA, Marques S, Pontes-Neto OM. Estresse percebido nos idosos sobreviventes do AVC após a alta hospitalar para casa. Perceived stress in elderly stroke survivors after hospital discharge to home. Rev Esc Enferm USP. 2015; 49(5): 797-803.
27. Wojcieszek A, Nawalana A, Majda A. Intensity of the stress and coping strategies in the group of the Małopolska officers from the State Fire Service. Nurs Probl. 2017; 25(1): 49-55.
28. Austenfeld JL, Stanton AL. Coping through emotional approach: a new look at emotion, coping, and health-related outcomes. J Pers. 2004; 72(6): 1335-1363.
29. Rai P, Rohatgi J, Dhaliwal U. Coping strategy in persons with low vision or blindness – an exploratory study. Indian J Ophthalmol. 2019; 67(5): 669-676.
30. Syta A. Right hemisphere cerebral dysfunctions in relation to language and communication deficits. Logopedia. 2019; 48(1): 79-90.

Address for correspondence

Barbara Gradowicz-Prajsnar
Department of Epidemiology and Population Studies
Jagiellonian University
Medical College
ul. Skawinska 8
31-531 Krakow, Poland
Phone: 12 43 32 837
E-mail: barbara.gradowicz@uj.edu.pl

Received: 14.07.2025
Accepted:17.08.2025
Online publication 26.01.2026