

COPING MECHANISMS AND STRESS AMONG INFORMAL CAREGIVERS OF ISCHEMIC STROKE PATIENTS

Nur Alfiah Lailan ^{1*}, Suhermi S ², Wa Ode Sri Asnaniar ³, Rahmawati Ramli ⁴,
Nur Wahyuni Munir ⁵

^{1, 2, 3, 4, 5} Universitas Muslim Indonesia, Indonesia

Corresponding Email: ^{1*} ich.alfiahlailan@gmail.com

ABSTRACT

Ischemic stroke patients are at risk of recurrence, which may increase dependency and require the role of informal caregivers in patient care. "This condition can cause stress that may be influenced by the caregivers' coping mechanisms. This study aimed to determine the relationship between coping mechanisms and stress levels among informal caregivers of ischemic stroke patients at RSKD Dadi Makassar. This quantitative study used a non-probability sampling technique with a consecutive sampling method involving 138 informal caregivers of recurrent ischemic stroke patients. Data were collected using the Brief COPE Scale and Perceived Stress Scale-10 (PSS-10), then analyzed using the Chi-square test because the data were not normally distributed. The results showed no significant relationship between coping mechanisms and stress levels among informal caregivers of ischemic stroke patients ($p = 0.110$). However, descriptively, caregivers with adaptive coping mechanisms tended to experience lower stress levels compared to those with maladaptive coping mechanisms. This study indicates that caregiver stress levels may also be influenced by other factors such as patient characteristics, the number of caregivers involved in patient care, and social support.

Keywords: coping mechanisms, stress levels, informal caregivers, ischemic stroke.

INTRODUCTION

Stroke is a neurological disorder that can cause significant impairment in motor and cognitive function due to disruption of brain performance (Liu et al., 2025). Stroke may potentially lead to death even when no other medical causes are identified and may occur locally or extensively (Familah et al., 2024). Ischemic stroke recurrence refers to repeated stroke attacks occurring more than 29 days after the initial event (Krishnamurthi & Feigin, 2021). Impaired blood flow to the brain for more than 24 hours reduces oxygen and nutrient supply required for brain cell survival (Wahyuni et al., 2023). Without immediate intervention, approximately 1.9 million brain neurons may be damaged every minute (Ministry of Health of the Republic of Indonesia, 2024).

The global burden of stroke continues to increase. According to the Global Burden of Disease (GBD) analysis reported by the Lancet Neurology Commission on Stroke and the World Stroke Organization (WSO) in 2023, stroke-related mortality is projected to increase by approximately 50% between 2020 and 2050, reaching an estimated 9.7 million deaths annually (Feigin et al., 2025). Most stroke-related deaths and disabilities remain concentrated in low- and middle-income countries. Data from the World Stroke Organization reported approximately 12.2 million new stroke cases annually, with more than 101 million stroke survivors worldwide (Feigin et al., 2022). In Indonesia, stroke prevalence reached 8.3 per 1,000 population according to the Indonesian Health Survey (SKI) 2023, equivalent to approximately 2.3 million stroke cases nationally (Ministry of Health of the Republic of Indonesia, 2023). Stroke prevalence in South Sulawesi was reported at 10.6% based on Riskesdas 2018 data (Ministry of Health of the Republic of Indonesia, 2018).

As a major referral center for neurological disorders in Makassar, Regional Special Hospital (RSKD) Dadi Makassar has experienced an increasing number of recurrent stroke patients in the Medical Rehabilitation Unit (Jabessa et al., 2025). The increasing dependency of stroke patients during recovery often requires long-term assistance from informal caregivers (Husni et al., 2024). Greater patient dependency is associated with higher caregiver stress levels (Cejalvo et al., 2025). More than one-third of caregivers of stroke patients experience psychological problems, including stress, anxiety, and depression (Ramadia et al., 2023). Previous studies reported that approximately 50–74% of informal caregivers experience emotional, psychological, and physical burden due to caregiving responsibilities (Tunsi et al., 2025).

Psychological well-being among family caregivers of stroke patients is closely related to coping mechanisms (Lenggogeni et al., 2024). Previous studies have shown that coping mechanisms may mediate the relationship between stress and anxiety among caregivers of acute stroke patients (Lee & Song, 2022). Furthermore, approximately 57% of stroke caregivers reported experiencing stress, indicating the need for interventions to reduce caregiver burden (Batkulwar & Mhaske, 2021).

Most previous studies focused on caregivers of stroke patients in general without specifically examining caregivers of recurrent ischemic stroke patients, who may experience greater psychological burden due to repeated stroke episodes and prolonged dependency (Khomarun et al., 2025). Therefore, this study aims to determine the relationship between coping mechanisms and stress levels among informal caregivers of recurrent ischemic stroke patients at RSKD Dadi Makassar.

METHOD

Participant characteristics and research design

This study applied a quantitative correlational method with a cross-sectional design to identify the relationship between coping mechanisms and stress levels among informal caregivers of stroke patients. Respondent characteristics included age, gender, relationship with the patient, occupation, education level, and duration of caregiving. The study involved informal caregivers of recurrent ischemic stroke patients undergoing medical rehabilitation at RSKD Dadi Makassar. Inclusion criteria were informal caregivers who had provided routine care for at least three months, accompanied patients diagnosed with ischemic stroke, and were able to communicate, read, and write independently. The patients assisted by caregivers used mobility aids such as crutches, canes, or walkers in daily activities. Exclusion criteria included caregivers who refused to participate, only accompanied patients to the hospital without being involved in daily care, failed to complete the questionnaire, or had psychiatric or cognitive disorders.

Sampling procedures

This study used a consecutive sampling technique and was conducted at RSKD Dadi Makassar from November 2025 to January 2026. Primary data were collected directly from respondents using questionnaires to assess coping mechanisms and stress levels among informal caregivers of stroke patients, while secondary data were obtained from the medical records of stroke patients at RSKD Dadi Makassar. Prior to the study, the researcher submitted a research permit to the hospital's Education and Training Department and conducted a preliminary study to determine the research location and identify the study population. All respondents received an explanation regarding the study procedures, and participation was voluntary without any coercion. Respondents who agreed to participate signed an informed consent form before data collection. This study obtained ethical approval from the Nursing

Research Ethics Committee of Universitas Muslim Indonesia with ethical clearance number 1019/A 1/KEP-UMI/XII/2025.

Sample size, power, and precision

Sample size was determined using G*Power version 3.1.9.7 with a Pearson correlation test (bivariate normal model). The calculation used a correlation coefficient (r) of 0.30 based on a previous study by (Z. Liu & King, 2021), a significance level (α) of 0.05, and a statistical power ($1-\beta$) of 0.95. Based on the calculation, the minimum required sample size was 138 respondents. Therefore, this study involved 138 informal caregivers of recurrent ischemic stroke patients.

Measures and covariates

Coping mechanisms and stress levels were the primary variables measured in this study. Coping mechanisms were measured using the Brief COPE Scale developed by (Carver, 1997) and translated into Indonesian by (Siaputra et al., 2023). The instrument consists of 28 items with 14 subscales categorized into three coping strategy dimensions. Responses were assessed using a four-point Likert scale ranging from 1 ("never") to 4 ("very often"). The Indonesian version demonstrated good validity using Discriminant Content Validity (DCV), with 21 valid items, and showed high reliability with a Cronbach's alpha value of 0.85. Coping mechanisms were categorized into adaptive coping (total score <70) and maladaptive coping (total score >70).

Stress levels were measured using the Perceived Stress Scale-10 (PSS-10) developed by (Cohen et al., 1983) and adapted into Indonesian by (Hakim et al., 2024), through forward–backward translation. The instrument consists of 10 items rated on a five-point Likert scale ranging from 0 ("never") to 4 ("very often"). Validity testing using Confirmatory Factor Analysis (CFA) identified two dimensions: Perceived Helplessness and Perceived Self-Efficacy, with a Construct Reliability value of 0.93. Previous studies also reported high reliability with a Cronbach's alpha value of 0.888. Higher total scores indicate higher stress levels among informal caregivers of stroke patients. Stress levels were categorized into mild stress (total score 1–20) and severe stress (total score 21–40).

Data analysis

Data were analyzed using IBM SPSS software. Univariate analysis was performed to describe respondent characteristics, including age, gender, relationship with the patient, occupation, education level, and duration of caregiving, as well as the distribution of coping mechanisms and stress levels among informal caregivers of ischemic stroke patients. Data normality was tested prior to bivariate analysis, and the results showed that the data were not normally distributed. Therefore, the Chi-square test was used to determine the relationship between coping mechanisms and stress levels. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Respondent Characteristics

Table 1 shows that most respondents were aged 36–45 years (38.4%), female (62.3%), and the patients' children (38.4%). Most respondents were housewives (38.4%), had completed senior high school education (48.6%), and had provided care for more than six months (42.8%).

Table 1
Distribution of Characteristics of Informal Caregivers of Patients with Ischemic Stroke at RSKD Dadi Makassar

Characteristics	<i>n</i>	%
Age		
17-25 years	3	2.2
25-35 years	23	16.7
36-45 years	53	38.4
46-55 years	40	29
56-65 years	19	13.8
Gender		
Male	52	37.7
Female	86	62.3
Relations with Patient		
Housewife	53	38.4
Student	3	2.2
Entrepreneur	35	25.4
Retired	17	12.3
Civil Servant	11	8
Laborer	19	13.8
Education		
Junior High School	40	29
Senior High School	67	48.6
Higher Education	31	22.5
Duration of Ceregiving		
3-6 months	47	34.1
> 6-12 months	59	42.8
> 12 months	32	23.2
Total	138	100

These findings indicate that caregiving responsibilities were predominantly undertaken by middle-aged female family members. The dominance of children as caregivers may reflect strong family responsibility and emotional attachment in caregiving practices.

Coping Mechanisms Among Informal Caregivers

Table 2 shows that the majority of respondents had adaptive coping mechanisms (70.3%), while 29.7% had maladaptive coping mechanisms.

Table 2
Frequency Distribution of Respondents Based on the Coping Mechanisms of Informal Caregivers of Patients with Ischemic Stroke

Coping Mechanism	<i>n</i>	%
Adaptive Coping	97	70.3
Maladaptive Coping	41	29.7
Total	138	100

The findings suggest that most caregivers were able to manage caregiving demands using constructive coping strategies. According to Lazarus and Folkman’s stress and coping theory, adaptive coping strategies may help individuals regulate emotions, solve problems, and seek social support during stressful situations. This finding is consistent with previous studies reporting that adaptive coping is associated with better psychological adjustment among caregivers of stroke patients.

Stress Levels Among Informal Caregivers

Table 3 indicates that most caregivers experienced mild stress levels (58%), whereas 42% experienced severe stress.

Table 3

Frequency Distribution of Respondents Based on the Stress Levels of Informal Caregivers of Patients with Ischemic Stroke

Stress level	<i>n</i>	%
Mild Stress	80	58
Severe Stress	58	42
Total	138	100

The predominance of mild stress levels may indicate that caregivers gradually adapted to long-term caregiving responsibilities through experience and emotional adjustment. Previous studies have also reported that caregivers of stroke patients commonly experience mild to moderate stress during the rehabilitation process.

Relationship Between Coping Mechanisms and Stress Levels

Based on Table 4, among respondents with adaptive coping mechanisms, 53.6% experienced mild stress and 46.4% experienced severe stress. Meanwhile, among respondents with maladaptive coping mechanisms, 68.3% experienced mild stress and 31.7% experienced severe stress. The Chi-square test showed no significant relationship between coping mechanisms and stress levels among informal caregivers of ischemic stroke patients ($p = 0.110$).

Table 4

The Relationship Between Coping Mechanisms and Stress Levels Among Informal Caregivers of Patients with Ischemic Stroke

Caregivers of Patients with Ischemic Stroke							
Coping Mechanism	Stress Level				Total		<i>p</i>
	Mild		Server				
	n	%	n	%	n	%	
Adaptive	52	53,6	45	46,4	97	100	0.110
Maladaptive	28	68,3	13	31,7	41	100	
Total	80	58	58	42	138	100	

This finding indicates that caregiver stress may not be influenced solely by coping mechanisms. The result is consistent with previous studies showing that stress levels among caregivers are also affected by social support, caregiving burden, patient dependency, and family involvement. However, this finding differs from several previous studies that reported a significant relationship between coping mechanisms and caregiver stress.

The findings may be explained using the Transactional Model of Stress and Coping, which states that stress responses are influenced by individual appraisal of stressful situations and available coping resources. Therefore, although coping mechanisms contribute to stress adaptation, other situational and environmental factors may also influence caregiver stress levels.

This study contributes to the understanding that stress among informal caregivers of recurrent ischemic stroke patients is multifactorial. Therefore, healthcare providers should strengthen caregiver education, family support systems, and psychosocial support programs to reduce caregiver burden and stress.

LIMITATION OF THE STUDY

This study had several limitations. During questionnaire completion, some respondents experienced difficulty concentrating because they needed to simultaneously pay attention to the patients or family members under their care, causing interruptions during the data collection process. In addition, this study only examined the relationship between coping mechanisms and stress levels using limited demographic variables. Therefore, other factors that may influence caregiver stress levels were not explored in this study.

CONCLUSIONS AND SUGGESTIONS

Most informal caregivers of ischemic stroke patients at RSKD Dadi Makassar demonstrated adaptive coping mechanisms and experienced mild stress levels. Statistical analysis showed no significant relationship between coping mechanisms and stress levels among informal caregivers of ischemic stroke patients. However, adaptive coping strategies may still help caregivers maintain psychological well-being during the caregiving process. Therefore, caregivers are encouraged to continue developing adaptive coping strategies, while future studies are recommended to explore other factors related to caregiver stress, such as patient characteristics, duration of caregiving, and family support.

Acknowledgment

The authors would like to thank RSKD Dadi Makassar and all respondents who participated in this study.

ETHICAL CONSIDERATIONS

This study was conducted in accordance with research ethical principles and academic integrity standards. Ethical approval was obtained from the Nursing Research Ethics Committee of Universitas Muslim Indonesia with ethical clearance number 1019/A 1/KEP-UMI/XII/2025. All respondents participated voluntarily and provided informed consent prior to data collection. The confidentiality and privacy of participants were maintained throughout the study, and all research procedures considered respect for human dignity, autonomy, and participants' rights.

Funding Statement.

The authors did not receive support from any organization for the submitted work.

Conflict of Interest Statement

The authors declare no conflict of interest.

REFERENCES

- Batkulwar, G. T., & Mhaske, G. C. (2021). Evaluation of Perceived Stress in Family Members of Stroke Patients. *International Journal of Health Sciences and Research*, 11(8), 131–136. Retrieve from: <https://doi.org/10.52403/ijhsr.20210819>
- Carver, C. S. (1997). You want to measure coping but your protocol' too long: Consider the brief cope. *International Journal of Behavioral Medicine*, 4(1), 92–100. Retrieve from: https://doi.org/https://doi.org/10.1207/s15327558ijbm0401_6
- Cejalvo, E., Martí-Vilar, M., Gisbert-Pérez, J., & Badenes-Ribera, L. (2025). Stress as a Risk Factor for Informal Caregiver Burden. *Healthcare*, 13(7), 1–14. Retrieve from: <https://doi.org/10.3390/healthcare13070731>
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 385–396. Retrieve from: <https://doi.org/https://doi.org/10.2307/2136404>
- Familah, A., Arina Fathiyyah Arifin, K., Harun Muchsin, A., & Erwin Rachman, M. (2024). Characteristics of ischemic and hemorrhagic stroke patients [in Indonesian]. *FAKUMI Medical Journal*, 4(6). Retrieve from: <https://doi.org/https://doi.org/10.33096/fmj.v4i6.468>
- Feigin, V. L., Brainin, M., Norrving, B., Martins, S. O., Pandian, J., Lindsay, P., F Grupper, M., & Rautalin, I. (2025). World Stroke Organization: Global Stroke Fact Sheet 2025. In *International Journal of Stroke* (Vol. 20, Number 2, pp. 132–144). SAGE Publications Inc. Retrieve from: <https://doi.org/10.1177/17474930241308142>
- Feigin, V. L., Brainin, M., Norrving, B., Martins, S., Sacco, R. L., Hacke, W., Fisher, M., Pandian, J., & Lindsay, P. (2022). World Stroke Organization (WSO): Global Stroke Fact Sheet 2022. In *International Journal of Stroke* (Vol. 17, Number 1, pp. 18–29). SAGE Publications Inc. Retrieve from: <https://doi.org/10.1177/17474930211065917>
- Hakim, A. R., Mora, L., Leometa, C. H., & Dimala, C. P. (2024). Psychometric Properties Of The Perceived Stress Scale (PSS-10) In Indonesian Version. *Jurnal Pengukuran Psikologi Dan Pendidikan Indonesia*, 13(2), 117–129. Retrieve from: <https://doi.org/10.15408/jp3i.v13i2.35482>
- Husni, H., Asmawati, A., & Dharma, K. K. (2024). Family caregiver behavior in caring for post-stroke patients and related factors [in Indonesian]. *Jurnal Keperawatan Raflesia*, 6(1), 9–20. Retrieve from: <https://doi.org/10.33088/jkr.v6i1.1077>
- Jabessa, M. H., Adem, B. M., Tekle, M. G., Fata, G. A., & Weldemariam, H. H. (2025). Prevalence and associated factors of depression among stroke family caregivers on follow up at Jimma medical center, southwest, Ethiopia: A cross-sectional study. *Plos One*, 20(6), e0307068. Retrieve from: <https://doi.org/10.1371/journal.pone.0307068>
- Ministry of Health of the Republic of Indonesia. (2018). *National Report of Basic Health Research 2018* [in Indonesian]. Retrieve from: <https://repository.kemkes.go.id/book/1323>
- Ministry of Health of the Republic of Indonesia. (2023). *Indonesian Health Survey (SKI) 2023 in figures* [in Indonesian]. Retrieve from: https://kemkes.go.id/app_asset/file_content_download/17169067256655eae5553985.98376730.pdf
- Ministry of Health of the Republic of Indonesia. (2024, October 25). *Prevent stroke with physical activity* [in Indonesian]. Kementerian Kesehatan Republik Indonesia. Retrieve from: <https://kemkes.go.id/id/cegah-stroke-dengan-aktivitas-fisik>
- Khomarun, Subijanto, A. A., Nurhidayah, N., & Probandari, A. (2025). Devotion to Family: Coping Strategy to Reduce Burden of Caregiving Stroke Patients. *Occupational Therapy International*, 2025(1). Retrieve from: <https://doi.org/10.1155/oti/5517436>

- Krishnamurthi, R. V., & Feigin, V. L. (2021). Global Burden of Stroke. In J. C. Grotta, G. W. Albers, J. P. Broderick, S. E. Kasner, E. H. Lo, R. L. Sacco, L. K. S. Wong, & A. L. Day (Eds.), *Stroke: Pathophysiology, Diagnosis, and Management* (7th ed., pp. 163–178). Elsevier Health Sciences. Retrieve from: <https://doi.org/10.1016/C2018-0-02267-7>
- Lee, Y., & Song, Y. (2022). Coping as a Mediator of the Relationship between Stress and Anxiety in Caregivers of Patients with Acute Stroke. *Clinical Nursing Research*, 31(1), 136–143. Retrieve from: <https://doi.org/10.1177/10547738211021223>
- Lenggogeni, R. P., Aristawati, A. R., & Pratikto, H. (2024). Coping strategies and psychological well-being among family caregivers of stroke patients [in Indonesian]. *Jurnal Penelitian Psikologi*, 5(1), 63–72. Retrieve from: <https://doi.org/10.30996/sukma.v5i1.11590>
- Liu, X., Song, G., Zhuang, X., Zhang, Y., Wang, X., & Qin, Y. (2025). Altered brain dynamics in post-stroke cognitive and motor dysfunction. *Frontiers in Aging Neuroscience*, 17. Retrieve from: <https://doi.org/10.3389/fnagi.2025.1640378>
- Liu, Z., & King, M. (2021). The influencing factors and coping styles of mental health stress responses of stroke caregivers. *Work*, 69(2), 499–513. Retrieve from: <https://doi.org/10.3233/WOR-213495>
- Ramadia, A., Ekaputri, M., & Sumandar, S. (2023). Implementation of progressive muscle relaxation among caregivers to reduce anxiety in patients at risk of stroke [in Indonesian]. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, 6(12), 5477–5485. Retrieve from: <https://doi.org/10.33024/jkpm.v6i12.12524>
- Siaputra, I. B., Rasyida, A., Ramadhanty, A. M., & Triwijati, N. K. E. (2023). Exploring the usefulness of the Brief COPE in clinical and positive psychology: A discriminant content validity study. *Psikohumaniora*, 8(1), 163–180. Retrieve from: <https://doi.org/10.21580/pjpp.v8i1.15063>
- Tunsi, A. Y., Tammar, A., Wahbah, J., Al-Marhoon, F., Al-Mashjary, J., Alaamri, M., Alhofaian, A., & Alharazi, R. (2025). An Exploration of the Experiences of Informal Caregivers of Stroke Patients in Saudi Arabia; A Qualitative Study. *SAGE Open Nursing*, 11. Retrieve from: <https://doi.org/10.1177/23779608251354903>
- Wahyuni, Y. D., Pristianto, A., & Efendi, E. N. (2023). Foot-core stability in non-hemorrhagic stroke: A case report. *Physical Therapy Journal of Indonesia*, 4(2), 203–208. Retrieve from: <https://doi.org/10.51559/ptji.v4i2.138>