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Association between Personal Burnout and Depression after First Stroke of Working-age patients in Thailand: A one-year follow-up study

Siripan Naknoi[1], Pongrama Ramasoota[1], Suparat Phuanukoonnon[1], Ngamphol Soonthornworasiri[2], Orawan Kaewboonchoo[3]

[1]Department of Social and Environmental Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand.

[2]Department of Tropical Hygiene, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand.

[3]Department of Public health Nursing, Faculty of Public health, Mahidol University, Bangkok, Thailand.

Correspondence: Orawan Kaewboonchoo, Department of Public health Nursing, Faculty of Public health, Mahidol University, Bangkok, Thailand, 10400. E-mail: Orawan.kae@mahidol.ac.th

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Abstract

Background: Personal burnout is characterized by physical, emotional, and mental exhaustion due to prolonged stress or excessive demands. Individuals recovering from a stroke often experience significant physical and cognitive challenges during their recovery process, which can lead to increased fatigue and emotional strain. This physical and emotional exhaustion can contribute to the development or worsening of depressive symptoms.

Objective: To investigate the relationship between personal burnout at baseline and depressive symptoms after stroke over one-year

Methods: The study enrolled 103 participants who experienced their first stroke during working-age patients. The study period was 12 months. Personal burnout was assessed using the Copenhagen Burnout Inventory (CBI) at baseline, while depressive symptoms were measured using the Thai Hospital Anxiety and Depression Scale (HADS) at baseline, six months, and 12 months during the follow-up period. The study employed Generalized Estimating Equations to

investigate the longitudinal relationship between personal burnout at baseline and depression over the course of one year.

Results: High personal burnout showed a significant association with depression scores over a 1-year period, (coefficient 3.257; 95% CI: 2.299, 4.215).

Conclusions: The high personal burnout score predicted worsen depressive symptoms after stoke onset. These results suggest that healthcare workers, families, and co-workers should prioritize mental health support and early detection of depressive symptoms, treatment, and coping strategies among working-age individuals who have experienced a stroke.

Keywords: Personal burnout, Depression, First stroke, Working-age patients, Thailand

What was Known

- Previous studies have found an association between burnout and depression, especially among health workers and stroke patients.

What's New and Next

- The new finding from present study, personal burnout have association to depression after stroke onset that focused on working-age individuals, which is quite unique.
- The future research should be a larger sample size and different samples in other setting to confirm external validity.

Introduction

Depression is the most prevalent psychological disorder among stroke survivors with disability impairment[1]. Post-stroke patients who experience depression face an increased risk of recurrent stroke and mortality[2,3]. Importantly, depression poses a notable concern within the demographic of young stroke patients[4], who present elevated levels of depression in comparison to their older counterparts[5]. Younger stroke patients have long-term prevalence rates of depression ranging from 11% to 41%[3]. These findings suggest that post-stroke patients may experience persistent depressive symptoms. The impacts of post-stroke depression extend extensively, given the fact of unfavorable health outcomes[6] such as diminished functionality[7], compromised mental well-being[8], and an increased likelihood of stroke recurrence and mortality in first-time stroke patients with high depression scores[9]. The traditional causes of stroke are

sociodemographic factors such as age, sex, chronic disease, and behavioral health risks such as alcohol consumption and smoking[10]. Psychosocial elements, including chronic stress, play a significant role in elevating the risk of stroke[11]. Personal burnout, which includes sources of psychological and physical fatigue[12], is a significant factor. Personal burnout is an important source of burnout stemming from prolonged emotional and interpersonal stressors that impede effective coping, consequently influencing a number of health outcomes[13]. Additionally, personal burnout can occur and is most commonly experienced by people who have a critical health condition[14] or a stressful home life[15]. Previous studies conducted on burnout and depression among healthcare workers[16,17] have found a correlation between burnout and depression. Therefore, personal burnout is a source of chronic stress, and we hypothesize it may contribute to long-term depressive symptoms after stroke.

Although several studies have been conducted to investigate the factors that contribute to depression after stroke[18,19], it is not clear whether personal burnout during the onset of stroke can accurately predict depression in the long term, particularly in the working-age population. Consequently, researchers have shown a longstanding interest[20] in studying personal burnout as a predictor of depression after stroke in working-age individuals who are diagnosed with stroke for the first time.

Materials and Methods

Study design and participants

The research methodology utilized in this study involves a follow-up survey approach. The study encompassed patients admitted to Bangkok's primary stroke unit, located within a tertiary hospital, spanning from December 2020 to August 2022. All participants were employed individuals, aged 20 to 59 years, prior to hospitalization. Patients with TIA, minor stroke, or ischemic stroke were recruited. The sample size required was 126 cases by applying accepted method for studies with repeated measures[21]. However, due to the Covid-19 pandemic lock down and social distancing policies during the data collection period, 103 patients were finally recruit. Information regarding sociodemographic factors, depression, personal burnout was gathered before discharge (i.e., the baseline of this study); in addition, depression was measured during the subsequent six- and twelve-month follow-up intervals, as well. Prior to data collection, informed consent was obtained from all participants. The project received approval

from the Ethics Committee of the Faculty of Tropical Medicine, Mahidol University (MUTM 2020-066-01).

Collection of sociodemographic data

Sociodemographic data was collected using a questionnaire, which included information such as age, sex, marital status, monthly income, and education level, body mass index (BMI) (kg/m2), current smoking status, and alcohol consumption. Additionally, medical records were reviewed to gather information on family history of stroke, the National Institutes of Health Stroke Scale (NIHSS) score at admission, and the chronic diseases (such as hypertension, diabetes mellitus, and dyslipidemia), which were defined as clinical characteristics data at baseline.

Assessment on personal burnout

Personal burnout was assessed using the Copenhagen Burnout Inventory (CBI)[12]. The personal burnout component was measured by asking individuals to respond to simple questions that evaluated their levels of fatigue and exhaustion, both physically and psychologically.

The assessment of personal burnout comprised six items. For example, an item for physical burnout asked “How often are you physically exhausted?” while the item for psychological burnout inquired “How often are you emotionally exhausted?” Each item was evaluated on a five-point Likert scale spanning from 0 to 100: "always" (100), "frequently" (75), "occasionally" (50), "rarely" (25), and "never" or "almost never" (0). Cumulatively adding up the scores of these items yielded a total score within the range of 0 to 100. A score exceeding 50 indicated a high degree of personal burnout. The Cronbach's alpha coefficient for personal burnout in this study was 0.907.

Evaluation of Depression

Depression was assessed using the Hospital Anxiety and Depression Scale (HADS) in its Thai version[22]. The HADS has demonstrated good internal consistency and is suitable for evaluating psychometrics across all age groups. In the previous study that used the HADS scale in stroke patients, the Cronbach’s alpha was 0.742 for depression[23]. The depression subscale within the HADS encompasses seven items. This study focuses on analyzing individual scores pertaining to the depression component. Each item employs a response scale featuring four

alternatives, ranging from 0 to 3. Total scores on the HADS span from 0 to 21[24]. The Cronbach's alpha coefficient for depression in this study was 0.804.

Statistical analyses

The data were analyzed using SPSS. Firstly, continuous variables were presented as mean and standard deviation, and while categorical variables were presented as frequencies and percentages. To compare characteristics differences between low and high levels of personal burnout at baseline, independent t-tests were conducted for continuous variables, and chi-square tests were used for categorical variables. Secondly, t-tests were employed to examine the depression scores and differences between individuals with low and high personal burnout at baseline, at 6-month and 12-month follow-ups, respectively. Thirdly, the analysis employed generalized estimating equations (GEEs) to examine longitudinal associations between personal burnout at baseline and post-stroke depression over a one-year follow-up duration. This approach accommodated the interrelatedness of observations within the same subject[25]. The models were adjusted for potential confounding variables, including age, sex, monthly income, marital status, and education level in model I. Model II also accounted for smoking status, alcohol consumption, and BMI. Lastly, model III included family history of stroke, NIHSS score at admission, and chronic diseases as additional variables.

Results

Characteristic of study participants

A total of 103 patients (68 males and 35 females) were enrolled in the analytic sample, with a mean age of 46.8±9.2 years and an age range of 21 to 59 years. There were no significant differences observed between individuals with high and low personal burnout regarding age, marital status, monthly income, education level, body mass index (BMI), current smoking status, alcohol consumption, family history of stroke, National Institutes of Health Stroke Scale (NIHSS) score at admission, and chronic diseases. However, a significant difference was found in terms of female sex among those with low personal burnout (Table 1).

Changes of depression scores over one-year follow-up

Figure.1 displays the depression scores over a 1-year period following stroke. It reveals a significant difference in individuals with high personal burnout, who exhibited increased depression levels at baseline, 6 months, and 12 months during the follow-up (all $p < 0.05$). The depression scores slightly increased from baseline (8.2) to 6 months (9.8) and slightly decreased at 12 months (8.9) for those with high personal burnout. In contrast, the depression scores dramatically increased from baseline (4.9) to 6 months (7.4) and slightly increased at 12 months (7.7) for those with low personal burnout. However, the depression scores for those with low personal burnout were within the normal range, while the depression scores for those with high personal burnout were borderline abnormal.

Personal burnout and depression over one-year follow-up

High personal burnout showed a significant association with depression scores (all $p < 0.05$) over a 1-year period, even after adjusting for sociodemographic factors (coefficient 3.328; 95% CI: 2.409, 4.248), behavioral factors (coefficient 3.290; 95% CI: 2.343, 4.236), and clinical characteristics (coefficient 3.257; 95% CI: 2.299, 4.215), as demonstrated in Table 2

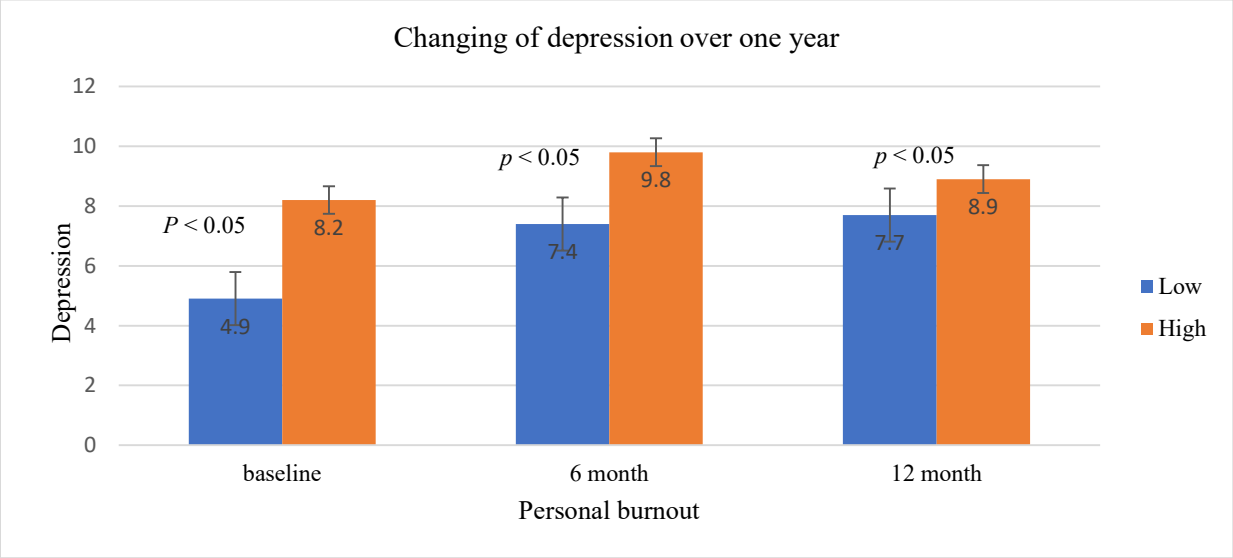
Table 1 Sociodemographic and clinical characteristics at baseline (n= 103)

		Personal burnout		*p* value
		Low (n=80)	High (n=23)	
Age (years)		47.01 ± 9.04	46.21 ± 10.06	0.72
Female, n (%)		19 (54.3)	16 (45.7)	<0.001[a]
Marital status, n (%)	Single	11 (73.3)	4 (26.7)	0.70
	Married	65 (79.3)	17 (20.7)	
	Divorced/Widowed	4 (66.7)	2 (33.3)	
Monthly Income (Thai bath)		16716.88 ± 8792.73	16304.35 ± 10772.16	0.85
Education level, n (%)	Less than Bachelor's degree	67 (77.9)	19 (22.1)	0.90
	Bachelor degree or more	13 (76.5)	4 (23.5)	
Current smokers, n (%)		24 (77.4)	7 (22.6)	0.97
Alcohol drinkers, n (%)		45 (83.3)	9 (16.7)	0.15
BMI (Kg/m^2)		24.14 ± 3.16	24.77 ± 5.56	0.61
Family history of stroke, n (%)		8 (72.7)	3 (27.3)	0.68

Chronic disease (HT, DM, DLP, CHD), n (%)	62 (76.5)	19 (23.5)	0.60
NIHSS at admission	45.20 ± 4.17	5.78 ± 3.67	0.55

BMI: Body mass index (kg/m^2); NIHSS: national institutes of health stroke scale

[a]$P < 0.05$



Differences in continuous variables were examined by t-test

Figure 1 Depression scores over one year among high and low personal burnout groups

Table 2 The regression coefficients and 95%CIs of repeated measures of depression by personal burnout over one-year follow-up

		Model I		Model II		Model III	
		Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
Personal burnout	Low	0.00		0.00		0.00	
	High	3.328 (2.409, 4.248)	<0.001	3.290 (2.343, 4.236)	<0.001	3.257 (2.299, 4.215)	<0.001

Model I: adjusted for age, sex, marital status, income, and education level

Model II: Model I + additionally adjusted for smoking, alcohol drinking, and BMI

Model III: Model II + additionally adjusted for family history of stroke, chronic diseases, and NIHSS at admission

Discussion

The objective of this study was to investigate the associations between personal burnout at baseline and depression over a one-year period following the first time stroke onset among working-age individuals in Thailand. Our study hypotheses found supportive evidence, demonstrating that personal burnout indeed influences the presence of long-term depressive symptoms.

Based on personal experience, burnout significantly contributes to mental exhaustion, which includes sources of psychological fatigue[12], is a significant factor. It occurs as a response to prolonged stress or excessive demands, affecting one's ability to cope and leading to mental health issues[13]. As noted introduction part, several studies support burnout to predict mental health, including depression on healthcare workers[16, 17] did not encompass stroke patients or other patients. However, our results in longitudinal study among worker after stroke was supported this evidence. Similarly, a study examining burnout in patients with depressive symptoms suggested an association between high burnout scores and the severity of depression in clinically depressed patients [26]. As well as study with maladaptive coping was association with burnout and depression[27]. To interpret, Stroke patients who suffer more from their disease may experience more severe conditions, particularly on a psychosocial level[18]. The long-term disability experienced by working-age individuals due to stroke is a significant burden and results in lost DALYs (disability-adjusted life years) among young stroke patients[28]. This can lead to increased fatigue and emotional strain[29,30], ultimately contributing to the development or worsening of depressive symptoms[20].

Furthermore, stroke in working-age often undergo significant life changes, including the loss of independence, functional impairments, and alterations in social roles[28,31]. The stroke patients usually experience psycho-emotional difficulties[32] and have cognitive and emotional impairments[30], and persist over a year[32]. As the previous study was confirmed burnout is associated with cognitive impairments[33], including general working population[34]. This is confirmed stroke patients would high personal burnout and contribute to depressive symptoms. Furthermore, the process of adapting to these emotional and psychological challenges may activate an immune response[35], which poor adaptive individual and contribute to feelings of burnout. The resulting emotional distress and difficulty in coping with these changes increase the risk of developing depression. This can lead to increased fatigue and emotional strain after their

first stroke[29,30], ultimately contributing to the development or worsening of depressive symptoms[20]. As study in Germany that focused on personal burnout and maladaptive among employee, the results found that high personal burnout was related to depressive symptoms, including younger-age[36]. It is plausible that after experiencing a stroke, patients may grapple with mental health issues such as stroke-related anxiety, difficulties in coping with their disability, fears of recurrence, and role limitations[37]. These are a reasonable enhance high level burnout and contribute to depression for long-term after stroke.

Moreover, the incapacity to carry out everyday tasks, fulfill work responsibilities, or partake in previously cherished activities due to limitations stemming from a stroke can lead to a decline in self-esteem and a diminished sense of purpose. These factors contribute to feelings of burnout and may also trigger or worsen depressive symptoms[38,39]. In addition, post-stroke fatigue with minor strokes, especially in young adults, is a predictor of psychiatric disorder[40]. Therefore, these factors are crucial in understanding the elevated levels of personal burnout in stroke patients and their contribution to the development of depressive symptoms over a one-year period, as supported by recent studies.

It is interesting to observe the changes in depression scores over a one-year follow-up period. Depression scores increased over the year for those with low personal burnout. However, the trend of higher scores was still within the normal range, while those with high personal burnout showed higher depression scores at six months after the stroke, and slightly lower scores at 12 months. Nevertheless, the depression scores in this group were abnormal, implying that post-stroke patients may experience persistent symptoms. The previous studies have found that in the young stroke group, depression is prevalent in 11-41%[3], and they may experience persistent depressive symptoms, especially within 12 months after the stroke[41]. Furthermore, common problems associated with stroke include mental health issues such as cognitive and emotional impairment[42], particularly among young stroke patients. It is also plausible that after experiencing a stroke, patients may grapple with mental health issues such as stroke-related anxiety, difficulties in coping with their disability, fears of recurrence, and role limitations[37]. These factors could contribute to mental health challenges after a stroke. Therefore, stroke patients with low personal burnout may tend to have an increased risk of depression. However, our study showed high personal burnout can contribute to depression symptoms among working-age

stroke over one-year follow-up. So, further studies should investigate the other variables to confirm the results of study.

The limitations of this study include a small sample size, which should be addressed in future research by using a larger sample. Additionally, personal burnout was assessed in this study, other domains of burnout, such as work-related burnout, in relation to depression after stroke over a year is needed for further investigation. Despite these limitations, this study was conducted longitudinally with three repeated assessments, and the results showed a strong and stable relationship. Furthermore, the study utilized the Generalized Estimating Equations (GEE) method, a powerful and widely used approach for analyzing longitudinal data, offering robustness and flexibility in handling correlated observations.

Conclusion

This study examined the association between personal burnout at baseline and depression among working age patients after a stroke over a one-year period. The findings revealed a positive association between personal burnout and depression. Given the seriousness of burnout and its potential impact on well-being, it is crucial to address it proactively. Consequently, this study underscores the importance of healthcare professionals, families, and co-workers prioritizing mental health support, early identification of depressive symptoms and personal burnout, and the adoption of proficient treatment and coping strategies. Such measures can effectively facilitate the recovery journey for working-age individuals who have undergone a stroke.

Ethical Approval Statement

The study was conducted by the Ethics Committee of the Faculty of Tropical Medicine, Mahidol University (protocol code: MUTM 2020-066-01 and date of approval: 18 November 2020). All subjects in the study provided informed consent: Written informed consent was obtained from the patients to publish this paper.

Author Contributions

OK, and SN designed the study and formulated the content of the tools and knowledge questionnaire. SN designed the tools and knowledge questionnaire, with guidance from OK, PM, SP and NS conducted the study under the supervision of OK, PM, SP and NS carried out reliability testing and the initial statistical analysis of data, following advice from NS re-analyzed

the data and wrote the manuscript. SN and OK produced the original draft, and SN, OK, PM, SP and NS helped to revise it. All authors read and approved the manuscript prior to submission for publication.

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Conflicts of Interest

The authors declare no conflict of interest.

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