ORIGINAL RESEARCH

Psychological distress scale among caregivers in delivering care of patients with post-stroke rehabilitation: A validity and reliability testing study

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Abstract
A stroke is a condition of blockage in the cardiovascular system. Patients who have passed the stroke phase are post-stroke rehabilitation patients who receive outpatient care. Caregivers help patients carry out daily activities during the rehabilitation process. Workload as a caregiver is a cause of psychological distress. The physical and emotional domains affect caregivers experiencing psychological distress, so caregivers become less psychologically healthy and less optimal in helping post-stroke rehabilitation patients. Researchers adapted the scale, namely Kessler's 10 Psychological Distress Scale (K-10), to see the level of psychological distress in caregivers of post-stroke rehabilitation patients—adaptation using Indonesian with the research participation of 43 people from Yogyakarta. Data were taken using accidental sampling on caregivers of post-stroke rehabilitation patients in Yogyakarta. Reliability testing was conducted using Cronbach's alpha, with the final result of p = 0.884, and construct validity testing using confirmatory factor analysis (CFA) with a measurement model. The results of this scale indicate that Cronbach's alpha is 0.884, and the CFA model is considered appropriate. Based on this, the results of this study suggest that the Psychological Distress Scale is reliable and valid so that it can be used for caregivers of post-stroke rehabilitation patients in Indonesia. In addition, this research scale can be used in health psychology, especially psychological distress.

Keywords: Stroke; caregiver; nursing care; community care; rehabilitation care

Introduction

Stroke is the first leading cause of mortality across all age groups and the third leading cause of death globally (Donkor, 2018). Moreover, stroke is the third most significant cause of death and disability (Feigin et al., 2022). The primary cause of dementia and depression, stroke results in the rapid extinction of some brain cells due to a lack of oxygen when blood flow to the brain is compromised by a blockage or rupture of an artery to the brain (Owolabi et al., 2015). In one study, those living in low- and middle-income nations were shown to have a higher rate of stroke deaths (Owolabi et al., 2015). Stroke victims and their relatives bear an equal burden. According to research, the patient's condition and length of care impact caregiver strain (Nurjannah & Setyopranoto, 2018). This is because stroke victims may experience a decrease in their ability to move independently, which affects their ability to carry out daily tasks. The one who looks after them is referred to as a caregiver. Caregivers help with the daily activities of individuals who need care assistance, including clinical nurses, family, or people who help sufferers carry out their daily activities ("2015 Annual Report of the American Psychological Association.," 2016). Because stroke victims spend much time at home, the family plays a far more significant part in their e than medical professionals.

One of the burdens experienced by stroke patients is psychological pressure, which raises the risk of arthritis, lung illness, and cardiovascular disease in stroke survivors (McLachlan & Gale, 2018). Future psychological anguish among individuals with coronary artery disease is anticipated to be greater in women (Pimple et al., 2019). A stroke can result in paralysis, slowed thinking, decreased awareness, mental changes, decreased concentration, decreased learning ability, and other intellectual functions. A stroke can also result in communication problems and emotional disturbances, which are made worse by a lack of training and expertise in providing care for stroke patients. Although

a companion is required in caring for these patients, caregivers may experience negative impacts on their physical and emotional health, disruptions to social activities, and deteriorating financial situations. This is the caregiver's burden (Nurjannah & Setyopranoto, 2018). The degree to which caregivers and patients are closely related, the number of caregivers, the length of time that patients have been suffering from strokes, and the length of time that caregivers have been providing care for them are all factors that can affect the occurrence of caregiver burden (Morimoto et al., 2003). In addition, other factors include the patient's perspective of the caregiver, missing family events, and the nature of the relationship between the caregiver and the patient (Jaracz et al., 2015).

The psychological state of the caregiver is affected by the caregiver's burden, which results in psychological discomfort. Psychological discomfort is an adverse condition with two main symptoms: sadness and worry. A person with depression tends to feel down, lose excitement, feel lonely, hopeless, or unworthy, struggle to fall asleep and cry a lot. Anxiety is a unique emotion that frequently manifest as tension, worry, anxiety, fear, and rage. Mood and malaise are the manifestations that result from depression and nervousness. According to Kessler, psychological distress is an unstable situation that affects emotional discomfort, cognition, and individual behavior, such as anxiety, low mood, exhaustion, the drive to constantly move without resting, and personal self-worth (Kessler et al., 2002). The study aimed to develop an instrument focusing on the psychological distress scale among caregivers in delivering care to patients with post-stroke rehabilitation. The finding of the study may help community nurses in optimizing care.

Method

The caregivers of post-stroke rehabilitation patients in multiple hospitals in Yogyakarta were recruited for this study using an incidental sampling strategy distributed via the Google Form link. Forty-three participants in total were included in this investigation. Thirty women (69.77%) and thirteen males (30.23%) participated in this study. Participants are Yogyakarta residents. Participants ranged in age from 15 to 85, including teenagers and seniors. Participants in this study are the family members or friends of patients receiving rehabilitation and their caregivers. The Kessler et al., Psychological Distress scale was modified by researchers (2002). The respondent experienced ten items on the scale over the previous four weeks. The scale for determining the degree of psychological distress ranges from 1 to 5. A respondent receives a score of 1 if they have never had this condition and a score of 5 if, according to the item question, they have always had it. Options for Yogyakarta bans include never (1), seldom (2), occasionally (3), frequently (4), and always (5). There are no unfavorable statements in this adaptation. The psychological distress scale has been used in several studies to assess the degree of psychological distress in various contexts, including resilience, mental health, the association between marital status and sex, and many more. The changes are shown in Indonesian. After adaptation, data is gathered by using social media tools to disseminate the Google Form URL. The extent to which this measurement tool is valid and appropriate for further research is then assessed using IBM SPSS Statistics 26 and AMOS.

Participants in this study were relatives or family members of patients receiving post-stroke therapy. Participants' ages ranged from 15 to 85, and their characteristics included youth and older people. Respondents may take on lead or support roles as caregivers. Most parenting responsibilities, including providing emotional support, fall under the purview of primary caregivers. While this happens, the secondary caregivers help the primary caregiver with their obligations. The responsibilities of primary and secondary caregivers differ. This study was constrained to a wide age range because of the caregivers' varying ages, activities, and degrees of resilience. A suitable measuring device must first be tested for validity and reliability. How consistently similar the results are when the same group of people is calculated throughout several tries determines the degree to which a measurement's results may be believed. In this case, it is acceptable for there to be some slight differences between the effects of different measures. If there are occasionally very considerable fluctuations, it is impossible to believe the measurement results (Azwar, 2015). The IBM SPSS Statistics 26 tool and the Alpha Cronbach technique measure dependability. The researcher then carried out a validity test to see whether the scale could produce accurate results consistent with its measuring goals (Azwar, 2015). Construct validity will be the standard for this study's validity. According to Azwar (2015), the evolution of the trait being measured is a continual process affecting construct validity.

A confirmatory factor analysis (CFA) employing structural equation modeling will be used to examine the construct validity. Assessing the construct validity of a suggested measurement theory is one of the critical advantages of CFA. Measured by construct validity, an indicator's capacity to reflect its theoretical latent constructs is assessed (Ghozali, 2017). The psychological distress scale model was tested to see how closely it matched field-based actual

data. A confirmatory factor analysis (CFA) employing structural equation modeling will be used to examine the construct validity. Assessing the construct validity of a suggested measurement theory is one of the critical advantages of CFA. Measured by construct validity, an indicator's capacity to reflect its theoretical latent constructs is assessed (Ghozali, 2017). The psychological distress scale model was tested to see how closely it matched field-based actual data—the Goodness of Fit Index (GFI), which is greater than or equal to 0.9. The Root Mean Square Error of Approximation (RMSEA), which is in the range of 0.05 to 0.08, the Tucker-Lewis Index (TLI), which is equal to or above 0.9, and the Adjusted Goodness Fit Index (AFGI), which is greater than or equal to 0.9, are used to evaluate the fit of the model.

Results

The online technique is used for statistical retrieval. Links to the survey were made available to the general public, while the survey itself was supplied to Yogyakarta-based post-stroke rehabilitation patients' caregivers. The researchers recruited forty-three people. A data processing program was used to do the statistical analysis. Researchers utilized Cronbach's alpha to gauge dependability using the IBM SPSS Statistics 26 application. Then, AMOS 24.0 will perform CFA. The reliability coefficient for the 10 items on the Psychological Distress scale is 0.857, according to the findings of the reliability test on 43 individuals using Cronbach's Alpha technique. According to Azwar (2015), this scale is trustworthy because the resulting Cronbach's alpha coefficient is above 0.7. The 10 items on this scale have a corrected item-total correlation coefficient (rit) that ranges from 0.102 to 0.740. The researcher chose items with a regularity value of less than 0.30 to obtain an excellent measuring instrument (Azwar, 2015). The table displays the distribution of items on the psychological distress scale **(Table 1)**.

Table 1. Psychological Distress Scale (K-10) Before Item Selection

Aspect	Item Number	Amount
Depression	2, 3, 5, 6	4
Anxiety	1, 4, 7, 8, 9, 10	6
Total		10 item

The test result for item 8 on the anxiety aspect is 0.102<0.30. Hence this item is discarded. After examining the second batch of reliability values, the researcher discovered that nine things had a Cronbach's alpha score of 0.884. The table displays the distribution of the items on the psychological distress scale following item selection **(Table 2)**.
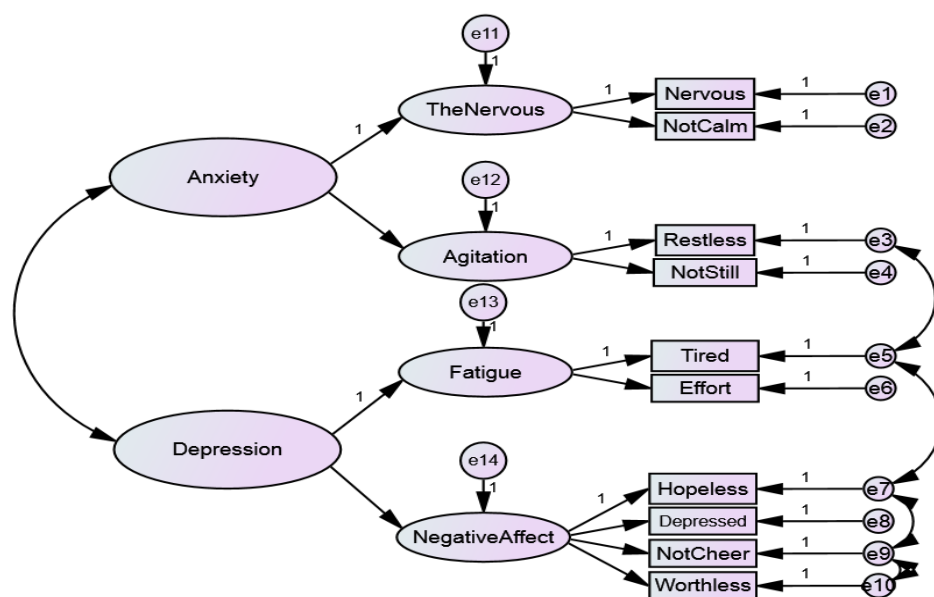
Table 2. Psychological Distress Scale (K-10) After Item Selection

Aspect	Item Number	Amount
Depression	2, 3, 5, 6	4
Anxiety	1, 4, 7, 9, 10	5
Total		9 item

After item selection, the psychological distress scale had 9 items, the lowest of which scored 0.458 and a Cronbach's alpha value of 0.884. There are 4 items for features of depression and 5 items for components of anxiety based on the results of rhythm analysis on 10 items using IBM SPSS Statistics 26. Depression symptoms include being agitated, weary, and confident. On the other hand, the questions about being depressed were removed, leaving only the ones about feeling uneasy, restless, hopeless, and worthless.

Validity

Confirmatory factor analysis (CFA), used by researchers who used SPSS to conduct their investigation, was used to assess construct validity. However, 10 items were still considered, with item 8 on the psychological distress scale remaining unchanged. This is to see pure CFA from the Psychological Distress scale (K–10) completed by 43 post-stroke rehabilitation patients and caregiver responders. The obtained Chi square's p-value is 31.599 0.05. The psychological distress scale model, provided with covariant lines, was considered adequate, so the researcher did not eliminate any item categories. After that, the researcher examined the fit model's output for the CFA results for the 43 items on the psychological distress scale. The table below shows the appropriate index for the PPT scale model based on Ghozali (2017) **(Table 3)**.

Figure 1. Psychological Distress Scale Fit Model

Table 3. Fit Psychological Distress index

Indeks	Standar Fit	Acquisition
Chi-Square	*p* > 0.05	31.599
GFI	*p* ≥ 0.9	0.839
AGFI	*p* ≥ 0.9	0.731
TLI	*p* ≥ 0.9	0.948
RMSEA	*p* > 0.05 – 0.08	0.072

Table 4. Psychological Distress Scale (K-10) after CFA testing

Aspect	Item Number	Amount
Depression	2, 3, 5, 6	4
Anxiety	1, 4, 7, 8, 9, 10	6
Total		10 item

Chi-Square, TLI, and RMSEA satisfy the fit requirement based on the findings of the CFA test, which has been assigned a covariance line (Ghozali, 2017). The Chi-Square p-value of 31.599 > 0.05 meets the fit criterion. The reasonable requirement is met by the p-value of TLI 0.948 > 0.9. The p-value of RMSEA of 0.072 complies with the appropriate condition. At the same time, no fit model is indicated by the GFI and AGFI coefficient values. Joreskog and Sorbom created the GFI (Ghozali, 2017), which is a non-statistical measure with values ranging from 0 (poor fit) to 1.0 (perfect fit). A high GFI value indicates better fit, so a value of 0.839 on the GFI of the Psychological Distress scale indicates that this index is not fit. The degree of freedom for the suggested model compared to the degree of space for the null model is considered when creating AGFI, which is a development of GFI. The ideal value is greater than or equal to 0.9; the better the value, the more appropriate the model. The psychological distress scale does not fit this index, as seen by the score of 0.731 (Ghozali, 2017). No items were reduced following the CFA testing. The table lists the remaining 10 articles for the Psychological Distress Scale **(Table 4)**.

Discussion
Based on the results of the scale analysis, the psychological distress scale (K–10) is considered to be used for screening caregivers of post-stroke rehabilitation patients. This is expected to help medical personnel, especially nurses, provide screening to caregivers to help maintain caregiver health while caring for patients, especially psychological health. The health of patients, caregivers, and even medical personnel who care for post-stroke rehabilitation patients is considered equally important, so they must be maintained together for mutual benefit. Several studies have discussed

the interventions carried out to help deal with the psychological problems of the caregivers of post-stroke rehabilitation patients. Then it is necessary to know the causes of caregivers' difficulties and effective interventions to reduce caregiver emotional turmoil.

According to studies, family carers are at an increased risk of acquiring depression, low quality of life, and health issues (Saban et al., 2010). The burden of care for caregivers grows as stroke severity rises (Kumar et al., 2022). These fundamental problems put carers under a lot of stress: extended caring hours, anxiety, restless nights, money-related stress, younger age, and caregivers becoming daughters-in-law (Kumar et al., 2022). Services for integrated stroke therapy should address caregiver difficulties and patient issues (Kumar et al., 2022). This is consistent with research that found that female caregivers perform most childcare tasks (Menon et al., 2017). Female caregivers and severely damaged stroke patients are particularly burdened because stress occurs at the financial, psychological, and physical levels that caregivers must manage (Menon et al., 2017). Evaluation of the literature revealed a paucity of studies on caregiver stress risk and the resulting health damage resulting in not many evidence-based care interventions designed to reduce the burden on nurses (Camak, 2015). Most frequently, the final institutionalization of the stroke survivor is caused by caregiver stress that eventually becomes a commitment (Camak, 2015). Stroke caregivers' daily burden can be reduced by critically evaluating and meeting their physical, psychosocial, and educational support needs (Camak, 2015). The stress of caring for others frequently affects the caregiver's mental and physical health (Camak, 2015). As evidenced by the study of 92 families, the burden is another factor that is thought to be connected to depression; specifically, the greater the stress placed on families in caring for stroke victims, the more severe the depression will be (Pahria & Mambang Sari, 2019). Other studies have also conducted research and found that the burden of caregiver care on stroke patients is also related to depression, anxiety, and stress, so the burden experienced by caregivers will be high in line with the increasingly weak and chronic condition of the patient.

Caregivers will have a negative impact when caring for stroke patients, so a strategy is needed to manage the problems caregivers face to improve the quality of life by maintaining the welfare of patients and their caregivers (Efi et al., 2017). One of the interventions that can relieve the burden on caregivers is to reduce emotional levels, such as psychoeducational therapy, which is considered to have an effect if done for stroke caregivers (Agusthia, 2018). According to research, including a strength-oriented psychoeducational program in the current stroke rehabilitation protocol can promote a good transition for family members of stroke survivors into caregiving (Cheng et al., 2018)— several findings related to emotional research on caregivers at RSJ.HB.Saanin Padang (Erwina et al., 2016) can be learned for caregivers who handle post-stroke rehabilitation patients. Based on this research, the majority ethnicity or tribe comes from the Minang tribe, with an average age of 46. Most outpatients were schizophrenic patients with an average age of 37 years and a length of illness of approximately 11.21 years. 37.2% of caregivers are patients' mothers, and 75.6% live at home with patients. Caregivers supervise patients in meeting their basic needs, and the conditions experienced cause high emotional distress for caregivers.

In adolescents, emotional intelligence affects the occurrence of distress (Campbell & Ntobedzi, 2007). Stressful situations make teenagers adapt using high emotional intelligence and have a positive influence on dealing with problems (Karim & Shah, 2014). Based on this research, adolescents who become caregivers tend to be better at dealing with emotionally problemssful situations making teenagers adapt using high emotional intelligence and positively influence coping with problems (Karim & Shah, 2014). Based on this research, adolescents who become caregivers tend to be better at dealing with emotional issues. By using their emotional intelligence, skills in managing emotional conditions are needed. Caregivers who go through various burdens that cause psychological distress finally learn to cope with these problems. Fahrunnisa and Mutingatu (2017) conducted research and found differences in coping strategies based on economic conditions and social support from outside the family. The first subject is that caregivers experience stress when caring for patients because patients are fussy and carry out multiple roles in the household. Problem-focused coping in the form of informational seeking and confronting coping is used because the caregiver is economically independent and has adequate social support. The second subject, caregivers, use emotion-focused dealing in the form of avoidance and seeking social help to survive psychological pressure without getting social support outside family members (Fahrunnisa & Solichach, 2017).

The caregiver's self-acceptance of living conditions is helped by the presence of religious coping (Fahrunnisa & Solichach, 2017). Appropriate coping will help the caregiver determine their attitude toward making life decisions. Likewise, appropriate alternative interventions will reduce distress in post-stroke rehabilitation patients. Religious cognitive behavioral therapy is an alternative intervention for dealing with distress problems. All difficulties in every life have a solution, and this therapy combines behavioral therapy and cognitive therapy, which contain Islamic religious values. Religious intervention in Islam is guided by the guidelines of the Koran and hadith, with various behavioral methods that can be used, such as gratitude and schizophrenia. Collaborative cognitive therapy using grateful behavior has also proven effective in reducing depression in adolescents (Mutia et al., 2010). Dzikir therapy

(Mulyanti & Massuhartono, 2018) is considered a therapy that can help a person be more calm and motivated, as a form of warning, and as part of worship to Allah SWT. Religious cognitive-behavioral therapy is a solution for distress or organ dysfunction. A study stated that schizophrenic rehabilitation patients became convinced that all difficulties would get help from God (Mulyanti & Massuhartono, 2018).

Religious cognitive behavior therapy can also use dhikr and solemn prayer. The use of dhikr increases religious belief and faith in a person so that they can control the events they experience and form a positive attitude and sense of self-acceptance (Yusuf et al., 2017). One's solemnity in prayer can also be a form of intervention by a caregiver. The elderly who perform solemn prayers have lower anxiety levels than those who do not receive this training (Wardani et al., 2016). Based on various existing studies, religious cognitive behavior therapy can reduce distress in caregivers. It's crucial to provide psychosocial support to stroke patients' family caregivers to lessen their workload. This is explained by the findings of a review of research articles by Rasyida, Silviani, Mildawati, and Puspitosari (2023), which show that there are interventions that can be used to reduce the burden on families and family caregivers. These interventions include active rehabilitation through social support, information-motivational behavior (IMB), and support programs based on the family stress resilience model (Rasyida et al., 2023). Based on the explanation above, it is known that psychological pressure can be overcome with various psychological interventions that can help nurses reduce the level of psychological distress after learning the magnitude of the level of pain from screening using the psychological distress scale (K-10). Psychoeducational therapy, therapy using emotional intelligence, coping strategies, cognitive religious behavior therapy, mindfulness therapy, and psychosocial support can reduce psychological distress, as described above. In addition, there are many other studies regarding therapeutic interventions that can reduce the level of psychological distress, of course, adjusted to the conditions of the nurse or caregiver for post-stroke rehabilitation patients.

Conclusion

The Psychological Distress Scale (K–10), adapted from English to Indonesian, was used for data collection. Respondents from the people of Yogyakarta generally used Indonesian, so this language was used as a reference for scale adaptation in Indonesian. The Psychological Distress Scale was given to caregivers of post-stroke rehabilitation patients who live in Yogyakarta. Data were collected using accidental sampling from caregivers of post-stroke rehabilitation patients in Yogyakarta. The results of this scale indicate that Cronbach's alpha is 0.884, and the CFA model is considered fit, so this psychological distress scale is suitable for use in Yogyakarta and throughout Indonesia. This research scale can be used for further research in the field of health psychology in nurses, especially psychological distress screening in caregivers of post-stroke rehabilitation patients. After screening is presented by the nurse using the psychological distress scale (K–10), caregivers who are experiencing distress can be given further psychological treatment by professionals.

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