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Narrative Review on Self-Efficacy and Physical Functioning of Stroke Patients

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Abstract
In the past decade, numerous studies on the effect of self-efficacy on stroke recovery, with an emphasis on physical functioning, have been done. Self-efficacy provides an individual with a sense of control over their surroundings because it measures an individual's capability to engage in healthy behaviours. Self-efficacy and locus of control are hence connected. This review aims to examine the association between self-efficacy and physical functioning after stroke. The method of narrative review was utilised in the analysis of the current paper. Computerized searches of databases such as Medline, Scopus, and ISI Web of Science revealed the relevant publications. These studies must be written in English and must include individuals with a diagnosis of stroke who are at least 19 years old and of either gender. The findings of this study indicate that self-efficacy contributes to the improvement of patients' physical functioning. Also discovered to be a mediator between activity and involvement is self-efficacy. Physical functioning is influenced by demographic and clinical characteristics such as age, gender, and the damaged lesion side of the brain, in addition to self-efficacy. These findings may be beneficial for building self-efficacy-based therapies to enhance physical functioning.
Keywords: Self-Efficacy, Locus of Control, Physical Functioning, Stroke

Introduction

Stroke is one of the main causes of death and disability in the world, and the expense of post-stroke treatment is significant (Rajsic et al., 2019). It is a fast progressing syndrome with a sudden onset that is caused by neurovascular disease (Liu et al., 2011). It has been determined that stroke survivors suffer from severe disability, and its global prevalence is expected to double by 2035 (World Health Organization, 2018; Feigin et al., 2014). Additionally, six new stroke cases are reported every hour in Malaysia (Krishnamoorthy, 2007). The figures are disturbing and demonstrate the considerable burden that stroke survivors endure as a result of their disease, which significantly limits their everyday activities (Warlow et al., 2003). Additionally, stroke can impair overall physical function and psychological well-being (Roger et.al, 2011).

Stroke is extremely challenging for sufferers, particularly in terms of daily living activities (ADL). Stroke patients frequently lose their ability to manage themselves following a stroke (Zulkifly et al., 2015). Hence, the recovery process varies according to individual (Zulkifly et al., 2015). The rehabilitation process will be substantially improved if patients are able to perceive their self-control in a positive way and overcome negative thoughts about stroke. (Thompson, 1991). Self-efficacy can assist patients in gaining greater control over critical areas of their sickness (Jones, 2006). Therefore, the purpose of this narrative review is to present an overview of the studies on the influence of self-efficacy on the physical functioning of stroke patients. This review will address general literatures on physical functioning and self-efficacy in stroke patients, as well as the influence of self-efficacy on the physical functioning of stroke patients utilizing self-efficacy measures.

Physical Functioning in Stroke Patients

Physical function refers to the capacity to carry out both fundamental and instrumental daily activities (Garber et al., 2010). As an older person's physical performance deteriorates, he or she may experience greater difficulty doing instrumental activities of daily living and may attempt to alleviate these difficulties by avoiding or reducing these activities (Steinman & Berger, 2009). Stroke causes great difficulty towards patients, especially their daily living activities (ADL). Impairment of physical function is a frequent occurrence in stroke patients (Robinson, 1998). Consequently, stroke patients experience psychological challenges such as a change toward a dependent lifestyle, loss of roles, impaired self-esteem, passive health management and diminished self-efficacy, which all lead to a lower quality of life (Choi et al., 2004).

According to reports, 20% to 25% of patients with stroke require constant physical assistance to walk. (Hendricks et al., 2002). A study in Korea by Lee, Bae, Hwang and Kim (2017) found that 52.9% of stroke patients had moderate to severe disability in physical function that was measured using Modified Rankin Scale (MRS). 44.8% of stroke patients who had unilateral cerebral hemispheric lesions in Japan require supervision and total dependence in toileting was reported in a study by (Soto and colleagues, 2016). In Malaysia, 147 stroke patients were reported to have a 30.6% severe impairment rate in a research done by (Zulkifly and colleagues, 2015). The prevalence was higher compared to a study by Wang et al (2011) among stroke patients in a city in United Kingdom, which was 19%.

Measures of physical functioning

Given the critical nature of daily activities for stroke patients to live independently, patients with a greater degree of ADL would require less assistance from others and would have a more positive psychological state. Physical function is essential for patients recovering from a stroke to perform daily tasks. Stroke survivors were more likely to have abnormal motor movement (Divani et al., 2011) and trouble completing activities of daily living (ADLs) independently on a physical level (Alghwiri, 2016). In addition, imbalance has been shown to impair patients' capacity to execute activities of daily living and increase their risk of falling following stroke (Kwakkel et al., 1996).

The activities that require assistance are grooming, food, toilet usage, bowel control, mobility, clothing, stair use, and showering, which are the key physical activities that stroke patients encounter on a daily basis (Mahoney & Barthel, 1965). These activities are measured by using

Barthel Index (BI) of Activity of Daily Living by Mahoney and Barthel (1965) which then reconstructed by Wade and Collin (1988) to be applied to research of stroke in clinical settings. It has ten measures that assess ten distinct activities performed by respondents, including personal care and mobility. The total score ranges from 0 to 100, with 100 representing functional competence in all ten categories and 0 representing total dependence. It is simple to administer and has a high level of internal consistency (=.96) along with concept and criteria validity (Gresham, Phillips, & Labi, 1980; Wade & Hewer, 1987). The ability to execute activities without assistance independently is evaluated. As a typical stroke-specific tool that measures functional capacities in daily activities, the BI has been widely implemented in a variety of settings.

The determination of threshold for BI among stroke patients has been determined in a study by (Nakao and colleagues, 2010). The purpose of the study was to clarify the usefulness of using BI during acute rehabilitation after stroke and to establish whether the acute BI may be a meaningful prognosticator of later ADL levels for patients at other hospital (Nakao et al., 2010). They determined that BI thresholds of 40 and 60 were critical in determining stroke patients' ADL independence with BI ≤ 40 had no independence and BI ≥ 60 had no dependence except for controlled items which were grooming, bathing and stair climbing (Nakao et al., 2010). Patients with BI ≥ 60 during discharge showed no significant difference of ADL skill level after 6 months while patients with BI ≤ 40 showed two distinct result after 6 months, a significant improvement and no change at 6 months. This proves that BI during the acute phase can predict the ADL skills during 6 months post-stroke recovery.

Musa and Keegan (2018) looked at the change of BI scores among acute stroke patients with a mean age of 60.7 years in Malaysia. BI was measured across three different periods: a) at discharge, b) at 1-month post-discharge and c) at 3-month post-discharge. They set a maximum follow-up period of three months since the most significant recovery from neurological impairments following a stroke occurs in the first three months or ten weeks (Musa & Keegan, 2018). Overall, the mean BI score increased by approximately 83.5 percent (from 35.1 to 64.4) and 104 percent (35.1 to 71.5) from discharge to one month and three months, respectively. This suggests that acute stroke patients made significant progress during these times, especially between discharge and one month. This rapid recovery is a result of neurological processes that occur on their own (Tveiten, Ljøstad, Mygland & Naess, 2014) that occur within three months of stroke (Kong & Lee, 2014).

Sociodemographic and clinical factors of physical functioning in stroke patients

Age is negatively correlated with physical functioning. This is shown in the several studies by (Musa and Keegan, 2018; Tveiten et al., 2014; Gunathilake et al., 2014; Chindaprasirt et al., 2013; Knoflach et al., 2012). The negative correlation might be due to a variety of mechanisms that can be classified as follows: a) selective survival and/or cohort effect, b) physiologically related phenomenon, and c) growing level of comorbidity associated with ageing (Al-Saeed et al., 2016; Coelho & Giraldi-Guimarães, 2014). It was expected that as the body weakened with age, recovery became slower, brain tissue was destroyed, and the protective actions of the endothelium and astrocytes in the brain were dysregulated (Sohrabji et al., 2013), resulting in a detrimental influence on sensory-motor recovery (Coelho et al., 2014).

Gender may affect the physical functioning. However, the findings regarding gender and physical functioning are contradicting. Male is shown to have poor outcome of post-stroke than female, however it does not affect post-stroke recovery (Nazzal et al., 2006). However, compared to male patients, female patients had a more difficult time regaining function after an acute stroke (Nazzal et al., 2006). Female patients had major difficulties and handicaps three months after their stroke (Dušica et al., 2015; Nichols-Larsen et al., 2005). Women who have suffered a stroke recover at a slower rate in terms of activities of daily life and physical functioning (Sue-Min et al., 2005).

The affected lesion side of brain is significantly correlated with physical functioning (Zulkifly et al., 2015). Chakrabarty and colleagues (2020) also found the same findings in which in their exploratory lesion study revealed an association between reduced perceived physical functioning and lesions impacting mostly the right motor cortex. However, this finding is confusing, given that the dominant right hand is controlled by the left hemisphere and the majority of the patients were right-handed (Chakrabarty et al., 2020).

Self-Efficacy in Stroke Patients

A psychological concept known as self-efficacy (SE) has attracted a lot of attention in the treatment of many chronic diseases. Bandura (1977) proposed self-efficacy as a foundation of his Social Learning Theory. He defined SE as “people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (Bandura & Ramachaudran, 1994). Self-efficacy affects how people feel, think, and behave (Schwarzer & Fuchs, 1996). For instance, self-efficacy has an effect on motivation, and hence on health behaviours, by determining the objectives individuals set, the amount of effort they invest in obtaining those goals, and their resilience in the face of problems or failure (Dixon et al., 2007).

Self-efficacy is a situation- and task-specific term that can be generated through four primary sources of influence (Bandura, 1977). The experience of mastery gained from completing a task successfully has the greatest impact on self-efficacy (Korpershoek et al., 2011). Vicarious experience is the second source, where the person watches others perform the task (modelling), verbal (social) persuasion or encouragement from family or friends is the third source, and physiological state is the fourth source, where the understanding of physiological signs, such as anxiety, stress, arousal, and mood states, also provides information about efficacy beliefs.

Bandura’s Social Learning Theory comprises of three components which are behaviour, environmental and personal factors. The interactions between the three elements make up the triangular model which is known as reciprocal determinism. The theory suggests that in addition to environmental factors, such as an individual's cognitive processing, behaviour can also be influenced by personal factors (Bandura, 1978). SE can be associated with the locus of control, and it can be classified under the cognitive domain (Bandura, 1989). SE can be classified under personal factors in SCT which is one of the important elements in determining the outcome behaviour. People who feel highly in control of themselves have a strong internal locus of control (Korpershoek et al., 2011).

When experiencing a stroke, the patient typically loses their self-control (Zulkifly et.al, 2015). If patients are able to view their level of self-control positively and are able to push over their

negative ideas about stroke, the rehabilitation process will go much more rapidly (Thompson, 1991). Self-efficacy is successfully targeted in stroke therapies and has been associated to a reduction in the course of cardiovascular illnesses (Alharbi, 2017). Self-efficacy provides a sense of control over one's environment because it is a measure of one's capability to carry out health actions. Therefore, SE is linked with locus of control. SE is one of the measures for perceived control. Perceived control is also measured by the Recovery Locus of Control (RLOC) which can be subdivided into an internal (IRLOC) and external (ERLOC) recovery locus of control (Johnston, Morrison, Macwalter & Partridge, 1999). The IRLOC is the belief that only the individual can determine their health condition, while ERLOC is the belief that surrounding factors such as fate or chance determine their health condition (Shaw, Mccoll, & Bond, 2003).

Measures of self-efficacy in stroke patients

There are quite a number of SE measures that are used in clinical setting. To maximise sensitivity and predictive value, it is recommended that self-efficacy assessments be connected to specific domains of functioning (Bandura, 1989). This review found three specific measures which are Stroke Self-Efficacy Questionnaire (SSEQ), Self-Efficacy for Symptom Management Scale (SESx) and Activities-specific Balance Confidence scale (ABC).

SSEQ was used in studies by Chen et al (2018); Lewin et al (2013) among stroke patients in China and Germany respectively. The Stroke Self-Efficacy Questionnaire (SSEQ) is a self-report measure of self-efficacy following a stroke that has a high degree of internal consistency and criterion validity (Jones et al., 2008). The objective of administering SSEQ to participants is to assess participants' confidence in their functional performance after stroke which consists of 13 items. The range of the score is 0–195, with 195 representing the highest level of self-efficacy following a stroke. The participants were asked to evaluate their level of confidence for each item (e.g. "Do your own exercise programme every day") on a scale of 0 to 10, with 10 representing a high level of confidence. SSEQ mean score of 156.41 was found in stroke patients in Lewin et al (2013) which depicts high in self-efficacy.

Self-Efficacy for Symptom Management Scale (SESx) was used in a study by (Aminu et al., 2021). The study adopted the measure from previous study by (Cicerone and Azulay, 2007). The 13-item SESx was created to assess perceived self-efficacy. The SESx items were scored on a 10-point scale (1 being extremely insecure to 10 being confident), adding up to a final score of 13–130. SESx is specifically tailored to measure self-efficacy in symptom management. The SESx score was low/moderate during baseline among 85% of participants (Aminu et al., 2021).

Activities-specific Balance Confidence scale (ABC) was used in three studies, (French et al., 2016; Kim and Park, 2014; Salbach et al., 2006). The ABC scale was created to evaluate older individuals' balance confidence (Powell & Myers, 1995). However, the ABC scale has been utilized to various demographics, including seniors and stroke patients (Salbach et al., 2006). This 16-item scale assesses self-efficacy balance, or an individual's confidence in accomplishing various tasks such as changing positions, walking on icy streets and sweeping the floor. An ordinal scale of 11 points, ranging from 0% ("no confidence") to 100% ("full confidence"), is used to evaluate each activity. Low scores indicate low level of confidence. The average of the item scores produces an overall balance confidence score ranging from 0 to 100%.

Methodology

The papers on this study are selected mainly through the MEDLINE, Scopus and Web of Science as the main search engine. The inclusion criteria are: 1) full text, 1) in English, and 3) all adult age 19 and above. Keywords used are “self-efficacy”, “physical functioning”, “locus of control”, “stroke patients” OR “stroke” OR “cerebrovascular disease” OR “cerebrovascular accident” OR “CVA”.

Results

This review has shown the proven correlation in between self-efficacy and physical functioning and how each factor plays a significant effect and interrelated roles with each other in stroke patients’ life.

Discussion

Self-Efficacy and Physical Functioning among Stroke Patients

Zulkifly et al (2015) studies the ability of RLOC to evaluate physical functioning among 147 stroke patients in Malaysia. They found that IRLOC and ERLOC were significant predictors of physical functioning with IRLOC being the most influential predictor (Zulkifly et al., 2015). This is because it makes a greater contribution to physical functioning prediction. Hence, greater IRLOC scores are associated with improved physical functioning in patients, possibly as a result of increased self-efficacy, which enables individuals to recover more quickly from disability.

French and colleagues (2016) investigated the associations between diverse outcome measures and stroke survivors' activity and participation. 59 subjects following stroke enrolled in an evaluation that included self-selected walking speed, the Timed "Up and Go" test, the 6-minute walk test, the Functional Gait Assessment, Walk 12, the Berg Balance Scale and the Activity-specific Balance Confidence Scale (French et al., 2016). "StepWatch" Activity Monitoring (SAM) was utilised as a measure of activity, while the Stroke Impact Scale-Involvement (SIS-P) was used as a way of measuring of participation (French et al., 2016). Physical capability was determined by performance-based assessments. The association between performance-based activity and participation was found to be moderated by self-efficacy. Consequently, physical capacity by itself is insufficient to determine activity and participation following a stroke. It appears that physical ability and SE are the greatest predictors of activity and participation (French et al., 2016).

Kim and Park (2014) found a causal association between balance self-efficacy, balance, and activities of daily living (ADL) in stroke patients living in the community. 105 Korean stroke patients participated in this correlational descriptive cross-sectional study. Path analysis was performed to establish the causal relationship between variables (Kim & Park, 2014). The path coefficients reveal that self-efficacy in balancing significantly influenced and contributed the variance in balancing (Kim & Park, 2014). This finding supports the idea that self-efficacy retraining can lead to functional ability enhancement (Kim & Park, 2014). Thus, this study demonstrates that balance self-efficacy and balance ability influence ADL (Kim & Park, 2014).

Conclusion

This review showed that self-efficacy has a significant influence on physical functioning of stroke patients. It is evident that self-efficacy and stroke patients' physical functioning are

related. Self-efficacy, however, is not the only element that affects physical functionality; age, gender, and the damaged lesion side of the brain also have an impact. The measures for self-efficacy and physical functioning also have been mentioned. For clinicians and healthcare professionals managing stroke survivors, knowing the relationship between self-efficacy and physical functioning may be helpful. This will provide the awareness and importance of self-efficacy as a predictor for physical functioning, apart from the numerous studies which focuses only on the medical part of the recovery of stroke patients. This will also assist in creating interventions plan based on self-efficacy in promoting physical functioning. Further research examining deeper association between self-efficacy and physical functioning discussed in this review is warranted. The results of this study might motivate nurses to focus more on stroke patients' self-efficacy during their recovery periods in order to improve clinical care.

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