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Factors influencing stroke patient adherence to physical activity: a systematic review

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Background. Stroke leads to physical problems, commonly paralysis, cognitive, sensory, perceptual and communication problem. Physical inactivity among stroke patients is high in the acute and chronic stage. The adherence of them towards exercise and rehabilitation therapy declined after discharge, thus lead to poor outcomes of recovery.
Objective. To review the literature on the factors that influence stroke patients' adherence to physical activity (PA) and to identify the intrapersonal, interpersonal and environmental factors that affect the adherence of stroke patients' towards PA.
Methods. Four electronic databases (EBSCO: CINAHL Plus with Full text, Willey Online Library, and ScienceDirect) from 2008 to 2019 reporting any factors that affecting stroke people participate in the physical activity. The methodological quality of the studies was appraised using McMaster critical appraisal tools and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used for online searching strategy.
Results. 10 articles met the inclusion criteria. The intrapersonal factors include physical impairment, balance, and mobility, fear of fall, aging, forgetful, reduce in self-efficacy and exercise benefits. Interpersonal factors were social support, lack of attendant and support from healthcare, physiotherapist or gym trainer. Economic factors, transportation, and exercise facility were the environmental factors that influence stroke patient adherence to PA.
Conclusions. These three factors were interrelated to change the individual perception towards exercise among stroke patients. This review enables the development of an intervention to improve participation in PA among stroke patients.

Key words: stroke, physical activity, rehabilitation, adherence, factors, barrier

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INTRODUCTION

Every year approximately 795,000 people experience a new or recurrent stroke and approximately 610,000 are first attacks while 185,000 are recurrent attacks [1]. Considering stroke separately with other cardiovascular

diseases, stroke ranks fifth among all causes of death after diseases of heart, cancer, chronic lower respiratory disease and unintentional injuries or accident [2]. Physical activity (PA) has various benefits along the lifespan and one of the most basic human functions. It is well established that has led to a low level of risk factor for a first stroke attack and low level of PA has the risk for recurrent stroke events as it can be reduced by 20% with the PA [3]. Physical inactivity among stroke is still high in the acute and chronic stage. Estimated that community-dwelling stroke survivors spent only one to two hours of standing or walking per day [4]. Physical inactivity lead to the reduction in aerobic fitness causing the cardiovascular capacity of the stroke survivor below the level needed to perform activities daily living (ADL) [5]. Stroke survivor with a mean age of 71.3 years old reported to have lower levels of moderate and high activity than expected and even patient with mild stroke only spent 11.3% of walking per day [6]. Lack of adherence to the treatment is a problem in a few healthcare profession including physiotherapy [7] and the adherence level among strokes survivor remains the major barrier to the effectiveness of the intervention [8-10]. The aim of this study is to review the literature on the factors that influence stroke patients' adherence to PA and to identify the intrapersonal, interpersonal and environmental factors that affect the adherence of stroke patients' to PA.

METHODS

Search strategies

Research was conducted using EBSCO: CINAHL Plus with Full text, Willey Online Library and Science Direct from UiTM PTAR online databases with additional database PUBMED and Google Scholar published from 2008 to 2019. Limit to "English language", "Full text" and "Academic Journal" was applied to all searches. Following were the keywords used with the Boolean operators: "Stroke, CVA, Hemiplegia, Hemiparesis, Cerebrovascular stroke, adherence, cohesion, compliance, Physical activity, exercise, and physical fitness".

Selection of criteria

This review includes if the participant had stroke and the study discussed factors to participate in PA. Quantitative studies with no limited range of age of the stroke patient were included. Only research with full text and English language from 2008 to 2019 were selected. Qualitative study and review article were excluded.

Quality assessment of the study

Study methodological quality was evaluated using McMaster critical appraisal tools (CAT) [11]. The McMaster CAT were chosen because of their generic nature that applies to all type of quantitative study. Total score for the quantitative study was 14 and obtained by the summation of all items with a higher score indicate good methodological quality.

Data extraction

Data were extracted from the online searching on the online databases. The studies were selected according to inclusion and exclusion criteria and were screened using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart. The data have been extracted according to study design, country of origin, and mean age of the participant in the study, sample size, result and conclusion of the studies.

RESULTS

Study characteristic

Figure 1 shows the database search yielded 8505 records of which the 7865 records were excluded on initial application of the inclusion criteria to the title and abstract. 57 articles obtained in full text and 48 articles were subsequently excluded as they did not meet the selection criteria. 10 quantitative studies were included in this review. Eight of the studies were cross-sectional study while two studies were randomized control trial (RCT). The 10 studies provided data on 815 stroke survivors ranging from 7 to 207 participant of each study. The average age of participant ranged from 52.87 years old to 72.4 years old. The origin of the selected studies was from Chicago, Canada, India, Nigeria, Ghana, England, United Kingdom, and Australia. Two studies focus on community-based PA [12,13], two studies on home-based exercise [14,15], three studies on clinical based exercise [9,16,17] and four studies focusing on general PA [9,16,18]. The mean score for McMaster was 9.20. The articles score range from 8/14 to the highest 11/14. The standard deviation was 0.92 while the variance was 0.84.

DISCUSSION

Intrapersonal factors

This review identified several physical health-related factors that influence stroke patients' adherence to PA as shown in Table I. Musculoskeletal (MS) issues prevent stroke survivor from participating in community-dwelling exercise and the pain during exercise may come from fatigue or overexertion due to spasticity. Pain

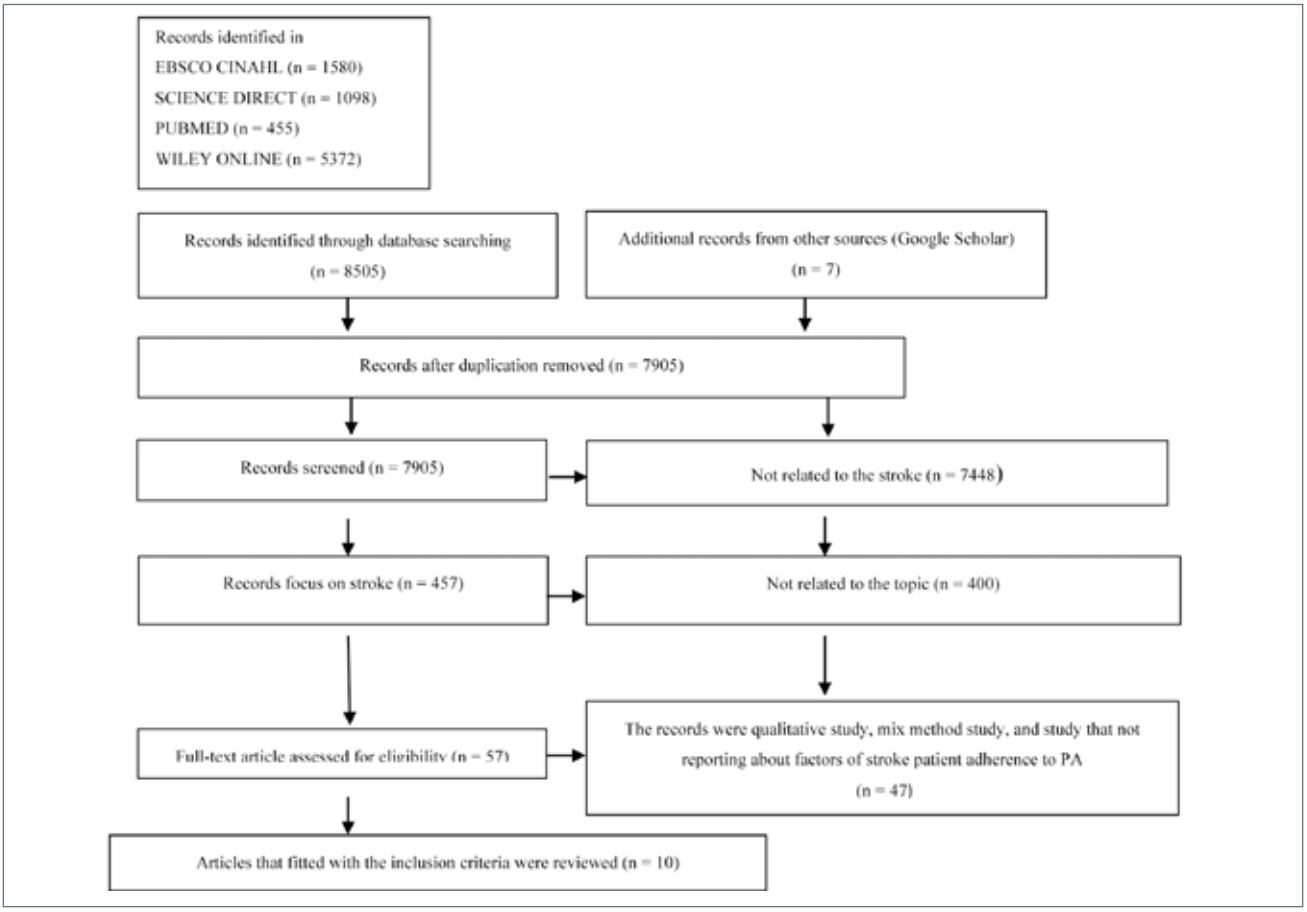

Figure 1. PRISMA flow-chart of search strategies.

as one of the factors that influence the home-based exercise [19] with contrast to a study that reported pain was not significantly affecting the home-based exercise adherence [20].

Fatigue is a complication after stroke. The frequency of fatigue among stroke patient is between 35 to 92% and can be a persistent symptom for at least 36 months post stroke [21]. Fatigue is an important clinical reason of a progressive way of reducing the PA or the physical fitness. These required them to put extra effort to perform any physical task. To prevent difficulty performing exercise due to physical health-related factors, the exercise prescription should be given in appropriate amount and beneficial to the patient.

Balance is an important factor for stroke survivors to participate in PA because walking was the most common identified exercise among them [22]. Three studies reported that the mobility impairment causing the reduction in PA participation among the stroke people [23] and older adult [24]. Self-efficacy can be the most common factors associated with the reduced level of PA. This finding is similar to the previous study that found reduce in self-efficacy as a factor for not exercise among post-stroke [25]. A meta-analysis study found that most of them have a lack of confidence to control their body ability [26].

Aging followed by the reduction of the outcome become the barrier to exercise. In the West European country, half of the citizen perform minimum two hours and 30 minutes per week of moderate PA [27]. The number reduces with 10% after the age of 75 years old. Similarly, the trend of participation in PA in other European [28] and non-European countries [29]. The trend continues with decline in PA after the age of 80 years old.

Forgetfulness of patient to perform the exercise or joining PA may due to the effect of medications taken by patient that leads to confusion [30]. Remind their family members or relative about the appointment date and exercise through any possible medium could help to overcome this factor. Exercise benefits motivate the participant to continually engage with treadmill exercise after stroke [31]. Knowing exercise is good for health and to become fitter act as the reasons for stroke survivors to start exercise [32].

Table I. Factors influencing stroke patient adherence to PA and McMaster CAT score.

13	Don't know how to exercise Lack of energy Lack of motivation Exercise won't improve condition Health concerns prevent from exercising Exercise too difficult Exercise is boring Lack of interest Lack of time	Don't feel trainer in the facility is able to help	Cost of program Lack of transportation Not aware of the fitness center in the area Don't know where to exercise Not comfortable in exercising in a facility	10/14
14	Improve functional Desire to improve the overall health Enhance confidence Lack of motivation Exercise reduces MS issues Fatigue MS issue prevent from exercise	Family support Family obligation		10/14
9	Mobility Balance Fear of fall			9/14
12	Don't know how to exercise Health concerns prevents me from exercising Pain that prevents me from exercise Lack of energy I am too old to exercise	Lack of attendant	Lack of transportation Lack of accessible facility Don't know where to exercise	8/14
15	Tiredness Exercise is difficult Pain Exercise is not part of daily routine Forgetfulness	Need physical assistance Exercise is important with therapist		9/14
8	Forgetfulness Fatigue Pain	Lacked of accompany to hospital	Financial constraint	11/14
16	Being embarrassed to exercise		Access to facilities Economic cost demand of exercise	8/14
17			Financial Transport	10/14
33	Exercise good for health To become fitter To feel in good shape mentally and physically Poor health Too Tired Might get injured or damage health Self-efficacy			9/14
18	Mobility level Pain Fatigue Fear of fall self-efficacy	Social support	Transport	9/14

Interpersonal factors

Lack of social support was perceived barrier to PA among stroke patient. Social support come from families, spouse and healthcare provider [31]. Family support shown to motivate stroke patient to participate in PA. Female more depending on male family members for the support in their life especially on health concern and suffer if their supporter does not cooperate to support them [34]. Common effect of stroke was hemiplegia, thus stroke survivors need to be physically dependent to perform any ADL including exercise [15]. Thus, lack of attendant was identified as a factor stroke survivors to refuse

from joining the community-based exercise [12]. Family support is an important factor which the stroke survivor not being to emphasize. Getting too much support from the family member cause the strokes survivors to have difficulty in performing ADL [35]. The family members may undergoes stress to provide enough support for stroke survivors [16]. Verbal and positive encouragement from the staff able to motivate the older adult with ischemic stroke to believe the benefits of exercise and encourage participants to exercise [31]. It is by providing information about the exercises to be done, safety and comfort and also provide external motivation to facilitate the participation to exercise [36]. A consistence result was found among the post-stroke population with a community exercise program after discharge from rehabilitation [37]. An instructor who able to monitor and supervise them during the exercise session and must be knowledgeable about prescribing the exercise for post-stroke is also needed [37]. Good interaction between both parties is another potential motivating factor [36].

Environmental factors

Living status of an individual affects their health care and hospital services [38]. In these cases, a self-employed person or come from lucrative family may be able to pay for physiotherapy and join community exercise for a longer duration. The stroke results in physical disable and they have to rely on their family and friends for financial support [39]. Transportation barrier reduce the engagement of physical activities outside the house. Most of the stroke survivors took cab to hospital although it was expensive [39]. More public transport with easily access by disable people such as buses should be done to improve their participation to PA. As the transportation burden to the person, emphasise on home-based exercise is the best way to improve their participation in PA.

Exercise facilities barrier hinder the individual with neurological condition to participate in PA [40]. The difficulty in accessing the facilities as some equipment not always be perceived as safe or suitable for them and may limits their mobility [40]. An action in order to improve the exercise facilities among the disable people need to be done to increase the PA level among them. It takes time to build an environment that aligns with social attitude in any country.

CONCLUSIONS

Intrapersonal factors have found to be the most common factors that determined stroke patient to engage in physical activity followed by the interpersonal factors. There was less research available regarding the environmental factors among the stroke survivors. The barriers to physical activity can arise from more than one factors such as the intrapersonal factors combined with interpersonal factors it changes the individual perception towards exercise. These factors can be linked together to explained the rate of adherence to physical activity among stroke patient.

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