

Application of Capability-Opportunity-Motivation-Behavior Model in the study of influencing factors of social participation in stroke

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ABSTRACT

Stroke is a leading cause of death and disability worldwide. It causes a range of complex physical, communication, cognitive, and emotional impairments that limit patients' ability to participate in social activities, severely impacting the quality of life of stroke survivors. Many studies have identified factors that influence social participation after stroke, including social environment, mental health, and functional factors (motor, cognitive, and language). Combined with the literature review on the influencing factors of social participation of stroke patients, a theoretical framework was proposed to guide the study, namely the COM-B theoretical model. The content of each element of the COM-B model was defined through a panel discussion. Based on the COM-B model and the theoretical framework, a hypothesis model of influencing factors of stroke social participation was proposed to form a conceptual framework. Its goal is to help us better understand the important factors that influence the social participation of patients after stroke, and to establish a theoretical basis for the successful reintegration of stroke survivors into daily life. As a result, this will provide strong evidence-based support for recovery, facilitate patient reintegration and contribute to overall recovery and improved quality of life for stroke survivors.

Keywords: stroke; social participation; COM-B; influencing factors

Introduction

Stroke is a common neurological disease, the second leading cause of adult death and the third leading cause of disability worldwide, characterized by high morbidity, disability, and mortality, which seriously affects the physical health and quality of life of patients, and imposes

a heavy economic burden on families and the country (Yi et al., 2020). According to the Global Burden of Disease statistics in 2019, the incidence of stroke was 101 million, with 12.2 million incidence cases, and the incidence rate is increasing year by year (Ma et al., 2021).

In recent years, advances in the medical management of stroke have led to a global decline in stroke mortality. However, many survivors remain severely impaired. Stroke affects not only the individual patient, but also the patient's family and society as a whole. A study reported that 40% of patients who survive a stroke are left with moderate disabilities and 15 to 30% are left with severe disabilities such as motor dysfunction, cognitive dysfunction, aphasia, dysphagia, and affective disorders (Alaszewski et al., 2007). One of the most prominent post-stroke effects is social participation impairment (Bergström et al., 2017). The level of social participation is considered to be an important factor affecting patients' quality of life. Stroke rehabilitation has undergone a paradigm shift in recent years, with social engagement becoming the central focus and primary outcome measure (Della Vecchia et al., 2021).

The International Classification of Functioning, Disability and Health (ICF), officially published by the World Health Organization (WHO) in 2001 (Della Vecchia et al., 2023), provides a standard framework for describing a patient's health status and health-related issues. The International Classification of Functioning, Disability and Health is divided into two parts (Üstün et al., 2003). The first part deals with body structure and function, activity and participation, and the second part deals with contextual (environmental and personal) factors. These two components form the conceptual model of human functioning and disability in the International Classification of Functioning, Disability and Health, also known as the bio-psycho-social model. Body structure and function refer to anatomical parts and physiological functions respectively. Activity represents a personal perspective and refers to the ability to perform actions and daily tasks in different situations. The "participation" structure refers to real-life experiences and takes into account the individual's participation in society. Participation is therefore a functional social aspect (Levasseur et al., 2022). In fact, it is through participation that individuals develop the skills to meet social needs and find meaning in their lives, thereby positively impacting their physical and mental health. This reflects a growing recognition that successful rehabilitation includes not only functional recovery, but also meaningful reintegration into society (Morone & Pichiorri, 2023). Social participation is formally recognized as an important indicator of individual rehabilitation outcomes (Üstün et al., 2003). It has been widely recognized and applied in health and disability related fields around the world. ICF provides a new perspective and a new way to study the mechanisms that influence social participation in stroke patients.

There are several theories and models of behavior change that are commonly used in research on health promotion. Transtheoretical Model (TTM) divides the behavior change process into multiple stages (Hashemzadeh et al., 2019). Each stage has its specific psychological and behavioral characteristics, and interventions can be tailored to which stage the patient is at. This model can be used in long-term rehabilitation programs to support the progressive improvement of social participation in stroke patients. The Health Belief Model (HBM) is mainly used to predict individual health behaviors, which is based on an individual's perception of health problems and attitudes toward behaviors (Yenew et al., 2023). The model is suitable

for designing targeted education and incentives to motivate patients to take action. However, compared with the COM-B model, the above two models have the disadvantage of ignoring external factors, such as less consideration of the influence of external environment, social support, social opportunities and other factors on behavior. Capability, opportunity, motivation-behavior (COM-B) model is a widely used behavioral psychology model in foreign countries, which was proposed by Michie et al in 2011 (Michie et al., 2011). The model aims to explain the basic conditions under which behavior occurs and the factors that promote behavior change. According to COM-B model, the occurrence of Behavior depends on three core elements: Capability, Opportunity and Motivation. These three elements work together to influence whether a person's behavior can be successfully changed (Gingrich et al., 2023).

Previous studies often focuses on these factors, and often looked at one factor at a time individually as predictors of post-stroke participation, but these factors are intertwined and influence on each other and also directly affect participation (Hewetson et al., 2018, Silva et al., 2019). Ezekiel et al. (2019) found that depressive symptoms, cognitive function, and mobility were strongly associated with social participation after stroke; However, the extent to which these factors were associated with participation was unclear, the authors noted, in part because of which factors were considered in the different studies and how many measures of each factor were considered across studies. Through literature search, no one has studied the complex relationship between different influencing factors and determined the decisive factors affecting social participation.

Therefore, this study aims to base on COM-B model to study the interaction among cognitive ability, personal internal factors, environmental factors and social participation of stroke survivors. And identify the decisive factors affecting social participation., so as to provide new diagnosis and treatment ideas and directions for stroke rehabilitation, and provide strong clinical evidence-based medical evidence for promoting patients' return to society.

1. Influencing factors of social participation in stroke

Many studies have identified factors that influence social participation after stroke, including social environment, mental health, and functional factors (motor, cognitive, and language). The results show that there is a strong correlation between social support and social participation (Morone & Pichiorri, 2023). A study showed that up to 33% of stroke patients would have anxiety, depression and other negative emotions after the occurrence of the disease, resulting in patients' lower confidence and enthusiasm for social participation. Post-stroke physical disorders and speech disorders change patients' self-image, and a positive mental state can improve the quality and frequency of patients' social interactions, thereby effectively avoiding self-isolation and social alienation (Della Vecchia et al., 2021). Environment refers to the sum of all kinds of physical, social and people's attitude environment perceived by patients at different stages of life after receiving treatment in medical institutions and returning to their communities (including family, work, leisure and religious places, etc.), which can be divided into tangible physical environment and intangible human environment (Babulal & Tabor Connor, 2016). Physical environment includes: air temperature and humidity, light, road conditions, equipment of barrier-free facilities, access to information and technology, etc., such as: employment security services, government budget, rehabilitation and treatment insurance,

etc. Matching these facilities with patients' needs will be conducive to patients' outdoor activities, thereby promoting participation (Zhang et al., 2017).

2.COM-B model

2.1 COM-B model content framework

COM-B model is the core and behavioral source of the behavior change Wheel (BCW) theory (Wilson & Marselle, 2016), which states that a certain behavior (B) change can only be achieved if an individual has the ability (C), opportunity (O), and motivation (M). In this "behavioral system," abilities, opportunities, and motivations interact to produce behaviors that affect these components, as shown in Figure 1. The single-headed and double-headed arrows in Figure 1 represent potential impacts between components in the system. For example, opportunity can influence motivation, and so can ability; Implementing a behavior can change abilities, motivations, and opportunities (Michie et al., 2011).

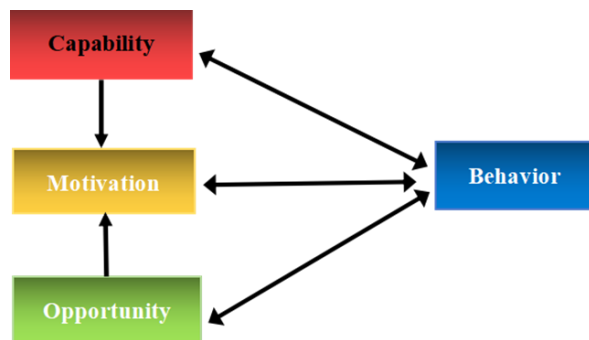


Figure 1 Theoretical Framework of the Capability-Opportunity-Motivation Behavior Model(Michie et al., 2011)

2. Composition of COM-B model

COM-B model conceptualizes behavior as a part of the interactive factor system and explains the influencing factors of behavior change from three aspects: ability, opportunity and motivation.

2.1 Ability factor

Ability includes the physical ability and mental ability of an individual to engage in relevant behaviors (Michie et al., 2011). Physical ability refers to whether an individual possesses the knowledge and skills necessary to perform the target behavior. Mental ability refers to the individual's ability to think, understand and reason in order to accomplish the target behavior. Competence is related to motivation and behavior in various situations (Bettiga et al., 2018). In the COM-B model, competence is directly or indirectly related to behavior through the mediating role of motivation (Howlett et al., 2021).

2.2 Opportunity Factors

Opportunity refers to the external factors that exist outside the individual, make the behavior possible or promote the behavior, including the physical opportunities provided by the

environment (such as time, resources, geographical location, etc.) and the social opportunities provided by the cultural environment (such as ideas, interpersonal influences, social and cultural customs, etc.). With the support of physical and social opportunities, individuals are highly likely to engage in relevant health activities (Willmott & Parkinson, 2017). Some studies suggest that opportunity is related to behavior, while other studies hold that there is no correlation between the two. In the COM-B model, ability is directly or indirectly related to behavior through the mediating role of motivation (Howlett et al., 2021).

2.3 Motivation Factors

Motivation includes all brain processes that inspire and guide behavior, not just a goal and/or conscious decision making, but also habit processes, emotional responses, and analytical decision making (Michie et al., 2011). Motivation is divided into reflexive motivation processes (assessment and planning) and spontaneous motivation processes (emotions and impulses), and there is a distinction between the former, which is achieved by increasing knowledge and understanding and triggering feelings and impulses related to behavioral goals, and the latter, which is triggered by associative learning. Previous studies have proved (Bettiga et al., 2018) that motivation is related to an individual engaging in a certain behavior. Howlett et al. (2019) pointed out that motivation is directly related to adults' physical activity behavior, and plays a partial mediating role among ability, opportunity and behavior. However, Howlett showed that there was no direct relationship between motivation and sitting behavior in his research (Howlett et al., 2021). In COM-B model, motivation is related to behavior and plays an intermediary role among ability, opportunity and behavior.

2.4 Behavioral factors

Behavior is any response an individual makes to internal or external events. Actions can be overt and directly measurable, or covert and indirectly measurable (Michie et al., 2011).

3. Connotation definition of COM-B theory on the influencing factors of stroke social participation model elements

3.1 The definition of influencing factors of social participation in stroke

Based on the research background and influencing factors of social participation of stroke patients, this study defined the ability factor as the ability of stroke survivors to participate in society through a panel discussion, including the physical function and independence of daily life of stroke patients. The body function mainly includes cognitive function, language function, executive function and upper and lower limb function. The physical function was evaluated using the Chinese stroke patients Clinical Neurological Deficit Scale (CSS) (Wang et al., 2022). The improved Barthel index was used to measure the independence of daily living (dos Santos Barros et al., 2022). Opportunity factors are defined as all factors other than individuals that make social participation in stroke possible or promote social participation in stroke, which can be specifically divided into two aspects: social support and social environment. Among them, social support comes from a wide range of sources, such as family, friends, significant others, social networks, religious organizations or community groups, and is assessed using the Social Support Rating Scale (SSS). Social environment refers to any situation or environment that impedes or promotes social participation in stroke. Such as the

natural environment, design and home adjustments, the characteristics of the surrounding environment, community design, social health and social services, transportation and information, etc., were assessed using the Craig Hospital Inventory of Environmental Factors (CHIEF) (Whiteneck et al., 2004). Motivational elements are beliefs that guide and motivate individual behavior change, that is, a brain process that motivates and guides behavior. In this study, motivation is defined as the orientation of patients' continuous efforts for rehabilitation, and it can also refer to patients' self-participation in the rehabilitation environment, which is indirectly quantified through the assessment of the hospital Anxiety and Depression Scale (HAD) (Williams & Demeyere, 2021). This study defines participation as a kind of social behavior in which individuals can participate in family and social activities independently, play corresponding social and family roles, and realize their own values and social functions under the background of social environment. Self-directed Participation Questionnaire (IPA) was used to evaluate the level of social participation of patients (Cardol et al., 1999).

The above three factors interact to produce behavior change, that is, ability and opportunity can affect behavior directly or indirectly through motivation. This theoretical model reflects that people must be physically and mentally capable of performing a particular action (B) and have the opportunity (O) to perform it, and that the motivation (M) for this action will outweigh any other motivation for a certain period of time. Capability, opportunity, and motivation and behavior are components in COMB model, and the four components interact and react, so that if one or more components are changed by a particular intervention, the others change as well (McArthur et al., 2018). For example, opportunity can influence motivation and behavior, and behavior can change ability, motivation and opportunity.

3.2 The hypothesis of the relationship between influencing factors of social participation

Based on COM-B model and the correlation between the model and the theoretical domain framework, this study proposed a hypothesis model of influencing factors of stroke social participation. The hypothesis of the relationship between variables is as follows.

3.2.1 Ability factors (body function, independent ability of daily life) have a direct impact on social participation in stroke, and indirectly affect medication compliance through motivational factors (belief, depression).

3.2.2 Opportunity factors (social support, physical environment) have direct influence on social participation in stroke, and motivation factors (belief, depression) indirectly affect medication compliance.

3.2.3 Motivational factors (belief, depression) have a direct impact on social participation in stroke.

3.2.4 Ability factors and opportunity factors influence each other.

Based on COM-B model and the study on influencing factors of social participation of stroke patients in literature review, the theoretical analysis framework to guide this study is presented in Figure 2. In this study, ability corresponds to the body function and independence of daily life of stroke survivors, and motivation corresponds to the psychological state of stroke

patients. Opportunities are environmental factors, including social support and physical environment.

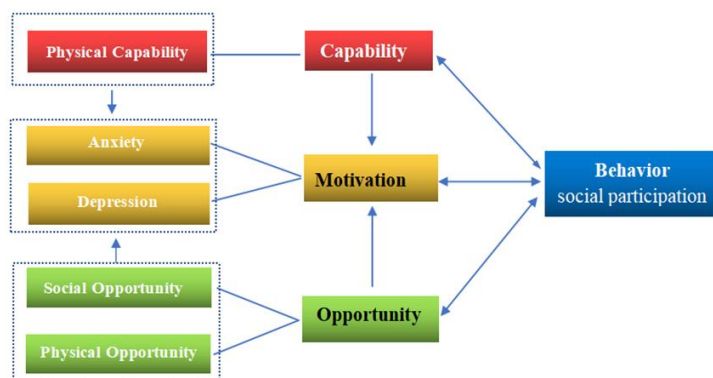


Figure 2 Conceptual Framework

4. Conclusion

In COM-B model, ability, opportunity, and motivation and behavior are the components of the model, and the four components interact with each other and counteract each other, so that if one or more components are changed by a specific intervention, the other components will be changed as well. COM-B model has been applied to a variety of aspects of self-management of various illnesses, disease prevention, and health promotion, and it has played an important role in improving the self-management behaviors of patients with chronic illnesses. Based on the theoretical framework of COM-B model, in the process of clinical intervention, patients can be encouraged to adhere to healthy behaviors through interventions that enhance patients' ability, enhance opportunities, and increase motivation. For stroke patients, rehabilitation training can improve physical capacity, provide appropriate assistive devices in the community to increase physical opportunities, and motivate patients to complete rehabilitation through goal-setting and feedback systems. COM-B model provides a theoretical basis for the intervention measures to promote social participation in stroke.

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