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Review Article

Adaptive Behavior in Stroke Survivors: A Concept Analysis

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SUMMARY

Purpose: This study aims to explore a clear and evidence-based definition of adaptive behavior in stroke survivors and establish the antecedents, attributes, consequences, and empirical referents of the concept.
Methods: The concept analysis was performed using the Walker and Avant method as a framework. Data from 90 publications were collected using various databases (PubMed, EMBASE, CINAHL, RISS, and KISS) and applied in the analysis.
Results: Adaptive behavior in stroke survivors was defined according to four attributes: realizing change, taking an optimistic view, restructuring daily activities to suit oneself, and carrying out one's own daily life. The conceptual structure of their adaptive behavior comprised stroke onset, functional changes, and emotional liability as antecedents and autonomy, family equilibrium, and quality of life as consequences.
Conclusions: Clarifying the concept of adaptive behavior in stroke survivors provides an understanding of the underlying attributes of this concept. Furthermore, it will facilitate the development of scales to measure the concept and the application of a theory-based intervention program that can improve adaptive behavior.

Introduction

In 2019, the World Health Organization declared stroke as the third leading cause of disability-adjusted life years [1], indicating that its disease burden is high. Stroke is a major cause of long-term disability and a leading diagnosis, accounting for approximately 70.0% of brain lesion disorder in Korea [2]. The prevalence of stroke in the population aged 30 or older remained at about 1.7% from 2014 to 2020 [3]; however, its mortality (per 100,000 people) has significantly decreased from 53.2 in 2010 to 42.6 in 2020 [4]. This means that as the number of stroke survivors increases, the population with acquired disabilities due to stroke is continuously increasing. This is a global trend, and the absolute number of stroke survivors is expected to continue to rise rapidly with the aging population [5]. Therefore, more attention should be paid to stroke survivors' health problems and adaptation.

Adaptation is a long and widely used term in nursing to capture the central concern of discipline, such as an individual's adaptation to a health problem, disease, or disability. Although adaptation was initially described in connection with evolutionary change, increasingly short-term and non-evolutionary changes have also been studied [6]. Even in the Roy adaptation model, adaptation is the process and outcome of making people think and feel, and conscious awareness and choice are used to create integration between human and the environment [7]. Behavior is described as a result of coping or response to coping [6]. Since stroke survivors experience sudden and shocking change, adaptive behavior should not appear as a result of adaptation, but should start from the process of realizing the change and re-establishing goals.

The term adaptive behavior has been used for a long time in the fields of psychology [8] and special education [9]. It has primarily been studied in children with congenital disabilities, such as autism spectrum disorder, intellectual disabilities, and developmental disabilities; it is a variable related to their quality of life [10].

Stroke causes sudden and profound changes in someone. They experience limited physical function due to hemiplegia [11]; limited roles at home and in the society [12]; economic difficulties due to job loss [13]; negative emotions, such as anxiety, anger, depression, and helplessness, due to a sudden onset of disease, an uncertain prognosis, and long-term rehabilitation [14]. Consequently, the quality of life of stroke survivors and their families

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declines [15]. Stroke survivors, regardless of its severity, refer to it as a turning point because it can make a profound difference in one's life. They must survive the uncertain consequences of the disease and their post-stroke future, as well as struggle to adapt to a new self; they find it challenging to manage the resultant changes [16,17]. Although the general clinical features of stroke survivors' recovery patterns have been described, there is not enough explanation for adaptive behavior, including the complexity of an individual's response to sudden and painful life events [18].

Clarifying the concept of adaptive behavior in stroke survivors can provide a basic understanding of the nature of adaptation in this demographic and ensure consistency in use and application. It can also enable theorists and researchers to construct statements or hypotheses that clearly reflect the relationships between related concepts and facilitate the development of scales for assessing the adaptive behaviors of stroke survivors. Additionally, healthcare professionals caring for stroke survivors may be able to apply interventions that can improve adaptive behavior. Therefore, this study aimed to explore a clear and evidence-based definition of adaptive behavior in people who have suffered a stroke and establish its antecedents, attributes, consequences, and empirical referents.

Methods

Literature search and data collection were conducted using several databases (PubMed, EMBASE, CINAHL, RISS, and KISS) from November 28, 2020 to January 12, 2021 to confirm the basic elements of the concept. The keywords employed were “stroke”, “cerebrovascular accident”, “adaptive behavior”, “adaptive AND behavior”, and “adaptation”, and the search terms were used individually or in combination with each other. Each PubMed, CINAHL, and RISS database was searched from their inception to November 28, 2020, the KISS database from their inception to November 30, 2020, and the EMBASE database from their inception to January 12, 2021. The initial exploration identified 1,798 papers and the duplicate (n = 151) were excluded. After reviewing the titles and abstracts of the remaining articles, 1,340 literatures were removed, the full texts of 307 studies were evaluated, and 1 paper was added through manual search. The inclusion criteria were qualitative, quantitative, and mixed method research that can confirm the concept of adaptive behavior using stroke survivors as samples; additionally, only the literature written in English or Korean was selected. Of the 308 documents whose full texts were evaluated, 218 papers were removed for the following reasons; studies in which the subject is a caregiver (n = 35) or healthcare provider (n = 15), studies that do not deal of adaptive behavior (n = 49), biomedical measurement papers after stroke (n = 46), case studies (n = 38), studies of instrument evaluation (n = 23), literatures with conference article abstracts only (n = 9), studies that are not written in English or Korean (n = 3). Overall, 90 publications were included in this study (Figure 1). The search process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) search strategy guidelines [19].

Concept analysis was conducted according to the method suggested by Walker and Avant [20]. Concept analysis is that analyzes words or phrases and their meaning and usage and is the basis of theory development. Similarities or differentiations among the disciplines of a concept can be distinguished through the concept analysis process. The Walker and Avant's method provides a precise definition that reflects concept's theoretical base and, by its very nature, has construct validity. It can help clarify concepts that are used vaguely [20]. Through this, concepts can be clarified and theoretical definitions are derived, which are the basis for developing measurement tools [20]. The development of measurement tools can further enable practical application. The eight steps of this concept analysis are as follows: (i) select a concept, (ii) determine the aims or purposes of analysis, (iii) identify all the uses of the concept that you can discover, (iv) determine the defining attributes, (v) identify a model case, (vi) identify borderline, related, contrary, invented, and illegitimate cases, (vii) identify antecedents and consequences, and (viii) define empirical referents.

Results

Dictionary definition

There is no dictionary that defines adaptive behavior in one word. However, the dictionary well defines adaptation and behavior, respectively. To define the adaptive behavior, the existing literatures related to the adaptive behavior of stroke survivors were searched.

The American Psychological Association (APA) Dictionary describes adaptive behavior as the level of everyday performance of tasks that is required for a person to fulfill typical roles in a society; this includes maintaining independence and meeting cultural expectations regarding personal and social responsibilities. Categories that are usually assessed comprise self-help, mobility, health care, communication, domestic abilities, consumer skills, community use, practical academic skills, and vocational capabilities [21]. Adaptive behavior is an action that enables people to survive in their environment with the greatest success and least conflict with others. Similar to the term ‘life skills,’ it relates to the everyday skills or tasks that the average person is able to complete; moreover, it reflects an individual's social and practical competence to meet the demands of daily life [22]. Thus, adaptive behavior is a skill that enables individuals to maintain their independence from their environment and perform the tasks required in daily life and by society.

In a longitudinal qualitative study (A75) interviewed 6, 12, 24, and 36 months after stroke, the process of adaptation was described as an ongoing process of shock, confusion, and fear, understanding what happened, adapting to what was provided, finding what suits oneself and developing new standards, and managing life's ups and downs. In addition, in a phenomenological qualitative study of survivors who first suffered a stroke 5 years ago (A58), stroke survivors are in an unstabilized process of continuous change, dealing with disability, self-identity, and lifestyle changes, and they dealt with continuous processes, including resignation and personal growth. According to previous studies, the adaptive behavior in stroke survivors should be defined as a comprehensive concept that appears simultaneously.

Use of the concept

In 1900, adaptive behavior was used as a criterion for the informal evaluation of intellectual disabilities. In 1936, the Vineland Social Maturity Scale was developed, which can be considered the first assessment of the adaptive behavior constructs. It measures individual's abilities and growth in relation to everyday situations; it consists of three categories: self-help, locomotion, and socialization [9]. In 1959, maturation, learning, and social adjustment were added to the diagnostic criteria for intellectual disabilities [8], and the American Association on Intellectual and Developmental Disabilities formally included adaptive behavior deficits as an integral part of the definition of intellectual disability [9]. Furthermore, the concept of adaptive behavior has been developed both

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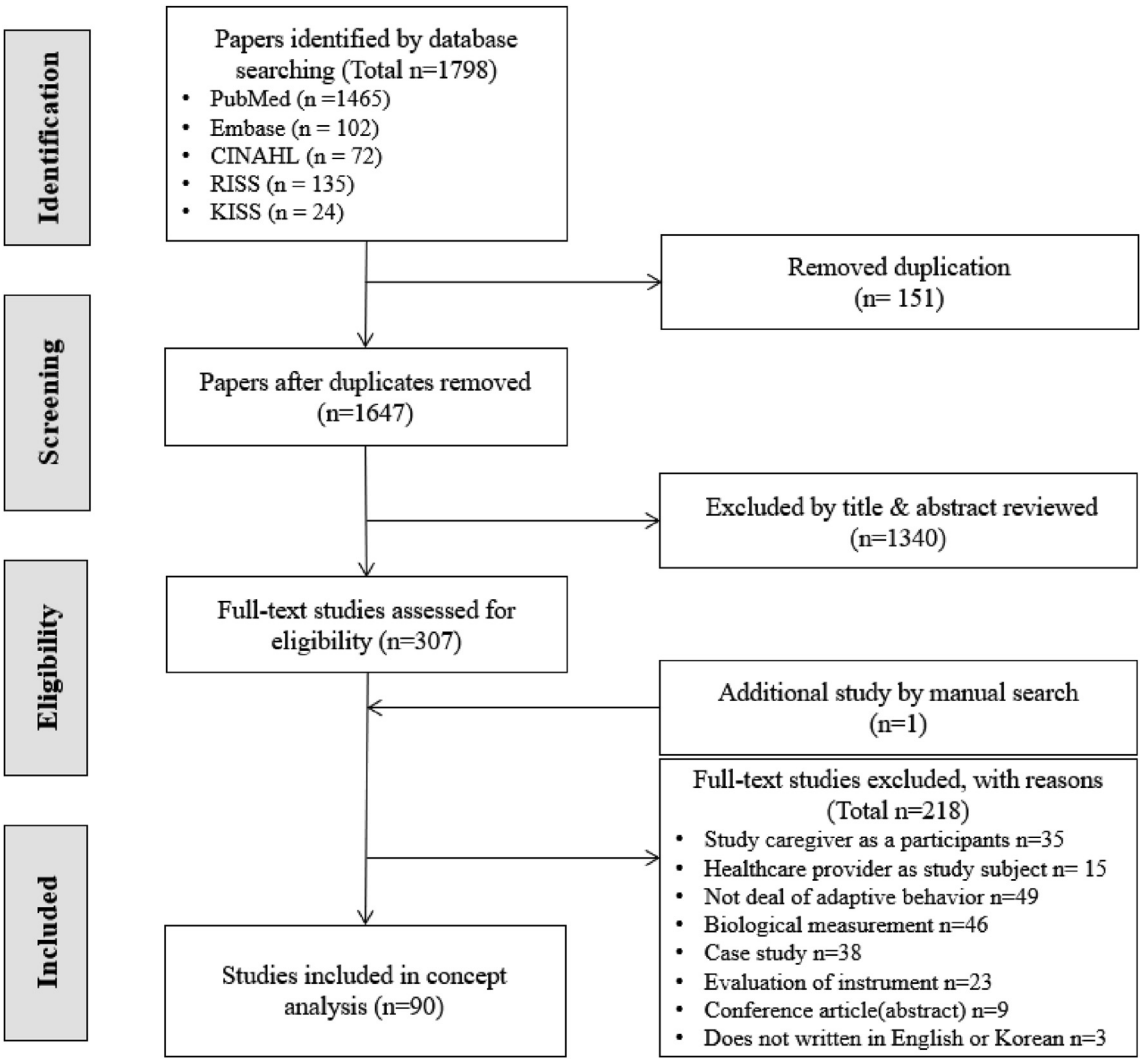

Figure 1. Flow Diagram of the Study Selection.

socially and theoretically. The Diagnostic Adaptive Behavior Scale measures it by assessing the conceptual (literacy; self-direction; and concepts of number, money, and time), social (interpersonal skills, social responsibility, self-esteem, naïveté [i.e., wariness], social problem solving, following rules, obeying laws, and avoiding being victimized), and practical skills (activities of daily living [personal care], occupational skills, use of money, safety, health care, travel/transportation, schedules/routines, and use a the telephone) [23]. It evaluates the skills that average people naturally acquire through experiences in everyday life. The concept of adaptive behavior has been mainly used in people with congenital disabilities. It was initially used only as a tool for diagnosis, but it is moving toward a multidimensional approach by discussions that focus on individual functionality rather than fixed deficits.

Studies addressing concepts similar to adaptive behavior in stroke survivors have been found in the fields of nursing, medicine, psychology, clinical speech and language, physiology, occupational therapy, social sciences, and social work. Most of these are exploratory qualitative studies regarding life, experience, adaptation, and solution strategies after stroke (A75): communication difficulties (A88), pain (A44), dysphagia (A51), urinary incontinence (A30), visual impairment (A68), sexual problems (A54), and movement changes (A72). And several quantitative studies explored the association between adaptive behavior and psychosocial factors such as acceptance and social support (A10).

Attributes of adaptive behavior in stroke survivor

The adaptive behavior in stroke survivors were found to be realizing change, taking an optimistic view, restructuring daily activities to suit oneself, and carrying out one's own daily life. Details of each attribute are described below.

Realizing change: This means knowing and accepting the physical, psychological, and social changes caused by stroke. Knowing and accepting what has happened subsequent to a stroke reduces maladaptive behaviors and emotions, creates a balance between independence and receiving help from others, helps in the struggle with the belief that 'I must return to normal,' leading to the rebuilding of a routine and a new normal (A75).

Taking an optimistic view: This means that stroke survivors have a positive meaning in life by hoping for recovery, gaining self-efficacy, maintaining meaningful relationships, and securing self-worth in situations where they experience sudden changes in physical functioning and social relationships. Having an optimistic view of life after a stroke promotes goal-oriented action, which in turn promotes the restructuring of identity, learning about

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individual abilities and limitations, and continued acquisition of new adaptive skills (A58).

Restructuring daily activities to suit oneself: This refers to modifying and negotiating activities to suit oneself so that one can safely and smoothly carry out daily life in their new, stroke-altered physical, psychological, and social situations. They develop customized strategies to manage difficulties in communication (A2, A88), dysphagia (A51), fatigue (A76), pain (A44), urination problems (A30), and vision impairment (A68) that occur after stroke. In addition, they have to modify and redefine their roles in the home or society due to functional disturbances, such as physical or psychological problems (A39). Stroke survivors structure a new routine by tailoring their daily activities to suit them [17].

Carrying out one's own daily life: This means actually performing daily activities that are modified and negotiated to suit oneself. Stroke survivors have established their own new normal and living their daily lives. They perform functional activities to their fullest potential, perform healthy behaviors, including taking medications or rehabilitating exercises, and participate in family or community activities to reintegrate (A50, A73). They have clear expectations of themselves and are well aware of what others expect of them (A75).

Model case

A model case is an example that contains all the defining attributes of the concept [20].

Mrs. A is 68 years old and was usually healthy. One day she suddenly had a stroke and was paralyzed on her right side. She was shocked, but did not want to spend her life lying in bed. She also believed that she would be able to withstand crises on her own. After being discharged from the hospital, she made plans to keep her routine under the changed situation. She woke up at 5 am, did the exercises she learned at the hospital, and walked around her house with the help of a cane and her husband. Their meals were mainly prepared by her husband; she sat down to do the laundry or mop with one hand. When she needed help, she turned to her daughters for help. She found solace in interacting with other people with stroke when she visited a physical therapy center near her home. Besides, she got information on how to manage shoulder pain, go to the bathroom, and change clothes. She also faced challenges and tried to be more active in her daily life. She felt her potential as she heard her family and neighbors say her movement and strength improved. She said she lives a meaningful life. She hopes to be able to travel alone someday.

Mrs. A's case contains all the previously discussed defining attributes of adaptive behavior in stroke survivors.

Borderline case

Borderline cases are those that contain most of the defining attributes, but differ significantly in time or intensity in one of them. These help to identify inconsistencies in the concept under study and to define their attributes clearly [20].

Mr. B is 76 years old and has left hemiplegia. After the death of his wife, he had a stroke while living alone. He knows that a stroke involves a slow recovery and that hemiplegia makes it difficult to live independently. Thus, when his son suggested that they live together, he agreed. However, he feels like a burden on his son and does not want to show his daughter-in-law or grandchildren his changed circumstance; hence, he says he would rather die. He believes that his grandchildren ignore him; therefore, he avoids talking to them and hates them. He attaches a great importance to exercising as he believes that if his illness becomes more severe or he is unable to move, he will become a greater burden on his son and the balance of his son's family will be disrupted. He learned how to wash and change clothes by himself. Furthermore, he took a taxi to the community or the public health center to see if there were any services that could help him. He walks around the house with his cane and talks and plays chess with the locals. He tries to perform his daily life activities by himself as much as possible. However, he has no hope that things will get better and [feels that] this situation that has no end in sight is hard to bear.

Mr. B's case contains the attributes of realizing change, restructuring daily activities to suit oneself, and carrying out one's own daily life, but he did not take an optimistic view. He does not have a meaningful relationship with his family and is unable to find hope and meaning in life.

Related case

Related cases are instances that are in some way related to the concept being examined but do not include all the defining attributes. These help us understand how the concept under study fits into the network of concepts surrounding it [20].

Mr. C is 47 years old and has left hemiplegia. He is embarrassed by the physical changes caused by [his] stroke. However, if he works hard on rehabilitation, he will be better than now and hopes to return to work as soon as possible. He spends too much time exercising. Excessive exercise can cause shoulder and leg pain, but [he] does not control the level of exercise. He also strives to carry out daily activities alone. However, he sometimes falls while walking alone without using a cane or a walker and bruises his face and body. He also had a car accident while driving his own car.

Mr. C's case contains the attributes of realizing change and taking an optimistic view. However, he does not understand the characteristics of a stroke with a long-term rehabilitation. In addition, he has not modified his activities to suit him and is unable to perform his daily activities safely.

Contrary case

Contrary cases are clear examples of not following the concept [20] as the one described below.

Mrs. D is 58 years old and has right hemiplegia. She is divorced and lives with her unmarried daughter. She is outraged about her stroke "… and now it is all over," she says. She makes no effort to carry out her daily life activities by herself and depends on her daughter for everything. One day, her daughter invited her mother's friends to the house. Mrs. D spilled food while eating and salivated when talking; thus, her friends wiped her with napkins. Subsequently, she decided that she did not want other people to look at her pitifully. [Now] She stays alone in her house and weeps.

The case of Mrs. D does not include any attributes of adaptive behavior. She is angry and frustrated without accepting the changes caused by the stroke. She does not make any effort to reconstruct and carry out her own new daily life.

Antecedents and Consequences

Antecedents

Antecedents are incidents or events that must exist or occur prior to the concept's occurrence [20]. It is not synonymous with causation, and may contribute to the occurrence of a concept, relate to its occurrence, or may have to exist in order for the concept to exist [24]. Those events that occur before the adaptive behavior in stroke survivors include stroke onset, functional changes, and emotional lability. A stroke occurs, and survivors experience changes in physical and social functions, such as movement limitations (A72), communication difficulties (A88), dysphagia (A51),

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urinary incontinence (A30), visual impairment (A68), and sexual problems (A54). They also experience grief and anger due to the destructive diagnosis, and the shock and confusion of relapses, disability, and worries about the future tend to be profound and long-lasting (A75). Approximately 20.0% of stroke survivors are at risk of clinically significant depression [14].

Consequences

Consequences are incidents that happen due to the occurrence of the concept. Specifically, they are the outcomes of a concept [20]. The results of the occurrence of adaptive behavior in stroke survivors include autonomy, family equilibrium, and quality of life. The adaptive behavior of stroke survivors helps them regain autonomy by acting according to norms and gaining a sense of competence in them (A30, A72). When individuals recover capacity for daily activities, the burden on spouse and children is minimized and family equilibrium can be maintained (A39). Furthermore, it reduces maladaptive behaviors and emotions and has a positive effect on quality of life (A80).

The conceptual structure of the adaptive behavior in stroke survivors, including the relationships between antecedents, attributes, and consequences is shown in Figure 2.

Empirical referents

Empirical referents are the categories of real phenomena that prove the occurrence of the concept itself. In the final step of concept analysis, the question arises: How can I measure this concept or verify its existence in the real world? Empirical referents are not tools for measuring concepts, they are means by which defining attributes can be recognized or measured, not the whole concept itself [20].

The attributes of adaptive behavior in stroke survivors are examined using the tools for evaluating post-stroke status. The Stroke Impact Scale 3.0 [25] is a 59-item scale that consists of the domains of strength, memory and thinking, emotion, communication, ADL, mobility, hand function, and social participation. The items in this tool are similar to taking an optimistic view and carrying out one's own daily life among the attributes of adaptive behavior in stroke survivors. The Preference-Based Stroke Index [26] consisted of 10 items to measure walking, climbing stairs, physical activities, recreational activities, work/activity, driving, memory, speech, coping, and self-esteem. Its items are similar to taking an optimistic view and carrying out one's own daily life attributes among the findings of this study. The Post-Stroke Checklist [27] consists of 14 items to evaluate secondary prevention, ADL, mobility, pain, stiffness, incontinence, communication, mood, cognition, relationships with family, fatigue, intimate relationships, work, and social activities. Its items are similar to carrying out one's own daily life attribute of adaptive behavior in stroke survivors. In addition, some studies have suggested that realizing change is an important factor for the rehabilitation of stroke survivors. Failure to acceptance stroke and its changes have been reported to be associated with anxiety and depression after stroke and behaviors that lowered the risk of complications and accelerated recovery (A10).

Discussion

As a result of concept analysis through rigorous literature review, four attributes were derived: realizing change, taking an optimistic view, restructuring daily activities to suit oneself, and carrying out one's own daily life. We discuss the meaning and characteristics of each attribute.

Stroke onset might be a turning point in the lives of individuals who experience it. This is because, for them, the stroke and its effects were not present from the beginning (birth) but rather come as a sudden change. They have to know and accept their new physical, psychological, and social statuses (classified as 'realizing change' in this analysis). An interview described in a qualitative study by Wottrich et al. (A87): "*I have to walk with a crutch and my balance is poor; further, my hand does not quite follow when I pick something up.*" supports this attribute. People who have suffered a stroke are often unable to accept these changes, resulting in physical and psychosocial dissonance or unrealistic expectations regarding recovery (A87), which negatively affects their adaptation and rehabilitation processes (A10). Understanding and accepting illness is related to physical, emotional, and social adaptation and plays a pivotal role in determining life satisfaction (A10, A80). In this situation, healthcare professionals should support patients adjust to real life by balancing realistic views and expectations about the prognosis (A87).

The second attribute, 'taking an optimistic view,' can appear based on the 'realizing change' attribute. Stroke onset leads to disturbing life changes but taking an optimistic perspective has shown to be an indicator of reinforcing limitations and a force that drives survivors to do their best to gain new normalcy (A3, A86). The interviews described in the study by Kitzmüller et al. (A38) and Price et al. (A63): *"We are closer to each other. Nowadays, we talk more about our problems, we are more open with each other.", "I can be innovative when challenged."* support this attribute. People who take an optimistic view are characterized by having hope for recovery, gaining self-efficacy, maintaining meaningful relationships, and securing self-worth. Consciously seeking and positively experiencing the benefits of their changes can enhance survivors' self-care confidence and hope for rehabilitation, and can reduce negative emotions such as anger, depression, and sadness (A63). Studies have reported that these characteristics play an important role in adaptive behavior that requires various learning through rehabilitation. For example, psychological constructs such as self-efficacy have been shown to predict disability, quality of life, and functional independence after stroke [18,28,29]. All processes of

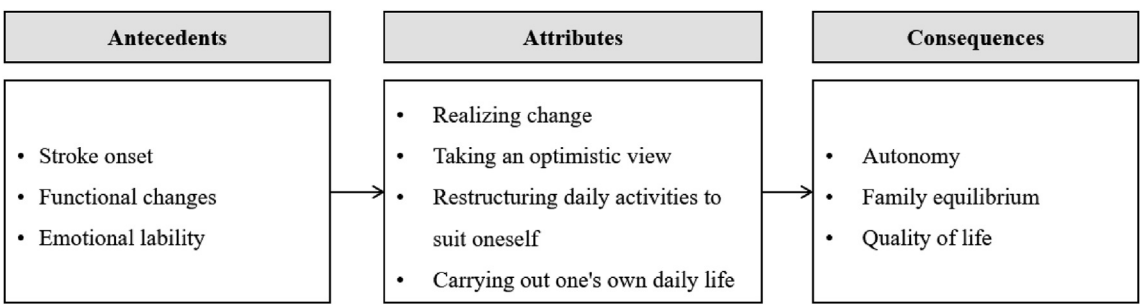

Figure 2. Conceptual Structure of the Adaptive Behavior in Stroke Survivors.

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learning survival skills such as eating (A51), voiding (A30), communicating (A88), connecting with society, and maintaining identity and role (A2, A21), require an optimistic view.

They also develop strategies to modify their activities and negotiate with themselves to accommodate their stroke-induced functional changes. This appeared as the third attribute, 'restructuring daily activities to suit oneself.' Stroke survivors may restructure their daily life activities to ensure a smoother way of living. In an interview described in a study by Williams and Murray (A86), *"When I was discharged from the hospital I had to rethink how to do things. They told me how to shower, they taught me how to dress; thus, I was not extremely bad [at] them."* supports this attribute. Such restructuring has been reported not only in the physical but also in the psychosocial aspect in several studies. For example, communication restructuring strategies include slowing speech or breaking long words into syllables (A88). Other strategies include modifying food and drinks to avoid aspiration (A51), adopting time voiding decisions to manage incontinence (A30), distracting attention to manage fatigue and pain (A44, A76), managing sexual problems (A54), and re-establishing one's role in the home or society (A38, A39). These strategies are quantitatively and qualitatively diverse and creative depending on the individual. The timeframe for re-establishment may also vary. Healthcare providers should support survivors by advocating these various strategies and assisting them with the strategies they have failed or missed.

The last attribute of adaptive behavior in stroke survivors was 'carrying out one's own daily life.' They carry out their own routines, individually coordinated and negotiated with themselves. They can perform daily activities to their full potential and utilize human, social, and physical resources according to negotiations. Many stroke survivors look forward to participating in social activities again; they do not hesitate to walk, use public transportation, or drive and utilize appropriate means of transportation to travel (A6). The interviews described in studies by Williams and Murray (A86) and Taule et al. (A73): *"Initially, I was similar to a trapped animal, and then I thought 'slow down, do not panic.' Thus, I bought a scooter … it gets me around the area", "To have something to do and someone to mingle with, I have many nice co-workers who I like to talk to and socialize with. Just to get out of bed, catch the bus, get to work, and be where you were previously"* support this attribute. Studies have reported that carrying out everyday activities and participating in social activities help to secure independence, minimize burden on family members, and affect depression and quality of life (A39, A50, A73).

The significance, limitation, and implication of this concept should be discussed as to how it relates to existing adaptation-related theories and whether it can be applied to adaptive behavior in other situations such as chronic or congenital condition.

First, similar to various theories explaining adaptation to chronic diseases, it was confirmed through concept analysis that the adaptive behavior of stroke survivors is a complex, multidimensional, and dynamic process. There are already several theories that have contributed to the concept of adaptation. For example, in Roy's adaptation model, the 'adaptation level' defines the state of the multidimensional life process [7] and individual coping process, situational background, and personal resources affect the characteristics of adaptation process in theory of stress, coping, and adaptation by Lazarus and Folkman [30]. Stroke survivors experience disability, identity, and life changes amidst shock and grief, developing new standards for themselves and managing their lives. This is not a linear process, it is an unstable process that is constantly changing and renegotiation continues in the process (A58, A75).

Second, there is a question as to whether a phenomenon similar to the results of this study also exists in other chronic diseases such as diabetes or hypertension. Since the derivation of these attributes are for stroke survivors (somewhat limitation), it is necessary to study whether there is similarity or differentiation in other situations. However, existing theories explain that disease should be considered when understanding or interpreting the adaptation process due to have disease-specific task such as symptom management. Situational attributes from the disease experience shape the individual characteristics of adaptive process in theories [31]. Considering this point, many researchers are studying how the adaptations of subjects with various situational contexts are different and similar. In the same context, it is necessary to research whether similarity or differentiation is seen in various chronic disease situations through future tool development.

Nevertheless, a third implication is that the attributes of adaptive behavior in stroke survival can be distinguished from congenital disorders. Adaptive behaviors in people with a congenitally disabilities, such as developmental disability, include conceptual (concepts of number, money, and time, etc.), social (obeying laws, avoiding being victimized, etc.), and practical (use of money, use of the telephone, etc.) skills [32]. It is the intentional education and training of skills that average people, from birth, learn and perform naturally through experience in their daily lives. However, the adaptive behaviors in stroke survivors are self-directed behaviors including acceptance, perspective, and negotiation. Self-directed behavior leads to adaptive behaviors in stroke survivors, such as realizing change, taking an optimistic view, and restructuring daily activities to suit oneself.

This concept analysis is useful to provide a fundamental understanding of adaptive behavior in stroke survivors. Furthermore, it will contribute to constructing scale items or clinically validating by reflecting the attributes defined according to the researcher's aims. However, there are some considerations. Specifically, we only referenced published papers focusing on "stroke," "cerebrovascular accident," "adaptive behavior," "adaptive AND behavior," and "adaptation" and analyzed limited the languages to English and Korean. In addition, since there are methodological limitations, further study that sufficiently reflects the actual field is needed, and a study of the evolutionary method to confirm whether the conceptual structure presented in this result is consistent with other disciplines will also be meaningful.

Conclusion

This study explored the evidence-based definition of adaptive behavior in stroke survivors and its antecedents, attributes, consequences, and empirical referents. In conclusion, adaptive behavior in stroke survivors was defined as realizing the physical, psychological, and social changes caused by stroke, taking an optimistic view, restructuring daily activities to suit oneself, and carrying out one's own daily life. These results provide a basic understanding of the nature of adaptive behavior in stroke survivors. It can facilitate the development of scales for assessing the adaptive behaviors in stroke survivors and the application of theory-based intervention programs that can improve adaptive behavior.

Author contributions

Study design: Choi H, Lim A, Song Y, Data collection: Choi H, Lim A, Data analysis: Choi H, Lim A, Song Y, Manuscript writing: Choi H, Lim A, Song Y.

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Conflict of interest

No conflict of interest has been declared by the authors.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anr.2022.07.002.

Appendix. List of literatures included in the concept analysis

No.	Literature included in the concept analysis
A1	Anderson S, Whitfield K. Social identity and stroke: 'they don't make me feel like, there's something wrong with me'. Scand J Caring Sci. 2013; 27(4):820-30. http://doi.org/10.1111/j.1471-6712.2012.01086.x
*A2	Armstrong E, Hersh D, Hayward C, Fraser J. Communication disorders after stroke in Aboriginal Australians. Disabil Rehabil. 2015; 37(16):1462-9. http://doi.org/10.3109/09638288.2014.972581
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