

Factors affecting adherence to rehabilitation in Iranian stroke patients: A qualitative study



Maryam Khoshbakht Pishkhani, MSN, BSN, PhD Candidate, Asghar Dalvandi, LPN, ADN, BSN, MSN, PhD, Abbas Ebadi, BSN, MSN, PhD, and Mohammadali Hosseini, BSN, RN, MSN, PhD

Adherence to rehabilitation has significant effects on patient outcomes. This study aimed to explore factors affecting adherence to rehabilitation in Iranian stroke patients. This is a descriptive, qualitative study. This study was conducted in 2018. Participants were stroke patients, family members, and rehabilitation team members—20 in total. They were purposively recruited from Rofaideh inpatient rehabilitation center in Tehran, and the outpatient physiotherapy center of Poursina hospital in Rasht. Data collection was performed through semistructured interviews and was continued up to data saturation. Data were analyzed by content analysis technique. Factors affecting adherence to rehabilitation in stroke patients were categorized into four main categories, namely patients-related, rehabilitation team, rehabilitation systems, and insurance and social support systems factors. Health care providers can promote patients' adherence to rehabilitation, involvement in the process of treatment, and their quality of life through broadening patients' knowledge about rehabilitation effectiveness, strengthening communication with health care providers, and adequate insurance and social support. (J Vasc Nurs 2019;37:264-271)

From the Nursing Department, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; School of Nursing and Midwifery, Islamic Azad University of Tehran, Central Branch, Tehran, Iran; Behavioral Sciences Research Center, Life Style Institute, Nursing Department, Baqiyatallah University of Medical Sciences, Tehran, Iran; Department of Rehabilitation Management, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

Corresponding author: Asghar Dalvandi, LPN, ADN, BSN, MSN, PhD, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, School of Nursing and Midwifery, Islamic Azad University of Tehran, Central Branch, Tehran, Iran 1985713834 (E-mails: dalvandi@uswr.ac.ir; asghar.dalvandi@gmail.com).

Funding: This study was supported by University of Social Welfare and Rehabilitation Sciences, Tehran, Iran. The funding source had no involvement on the explanation of results.

This study was approved by the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences by code IR.USWR.REC.1396.203.

There is no conflict of interest.

1062-0303/\$36.00

© 2019 Society for Vascular Nursing. Published by Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.jvn.2019.07.001>

INTRODUCTION

Stroke is a vascular disorder associated with rapid or gradual deterioration of brain vessels.¹ Stroke prevalence is increasing worldwide.^{1,2} According to the World Health Organization, stroke afflicts 15 million people annually in the world, five million of them die and five million develop stroke-related disabilities. Moreover, one American develops a new or recurrent stroke each 4 seconds, resulting in the affliction of 795,000 Americans each year. The prevalence of stroke in Iran is as high as 31.5%,^{3,4} and the incidence is 113–149 cases per 1,000 people of all ages and 500 cases per 100,000 people older than 45 years.⁵

Stroke is associated with debilitating effects on health and life. Depending on its underlying mechanism, stroke may cause varying levels of sensorimotor loss, communication loss, perceptual disturbance, cognitive impairment, and psychological disorders.⁶ Estimates that around 50 million stroke patients have some physical, cognitive, and emotional disorders and 25%–75% of them are partially or totally dependent on others in doing their activities of daily living. Moreover, stroke is the leading cause of disability among the adults in Iran and the second leading cause of death worldwide.² In 2013, it was the fifth leading cause of death in the United States, causing one death per four minutes. Accordingly, one per 20 deaths in 2013 in the United States was due to stroke.¹

Despite enormous medical advances in patient management in the acute phase of stroke, patient management after the acute phase still faces many difficulties,⁶ and hence, patients need rehabilitation services to overcome stroke-related disabilities and problems.^{4,5,7} The highest rehabilitation priorities are improvement of patients' functional status, prevention of another stroke and stroke complications, and management of problems.⁷

TABLE 1

PARTICIPANTS' DEMOGRAPHIC CHARACTERISTICS

<i>Number</i>	<i>Gender</i>	<i>Age (y)</i>	<i>Interview length (min)</i>	<i>Participant type</i>
1	Male	75	40	Patient
2	Female	56	45	Patient
3	Male	60	35	Patient
4	Male	68	45	Patient
5	Female	67	35	Patient
6	Male	73	48	Patient
7	Male	45	45	Family member
8	Female	32	40	Family member
9	Female	22	45	Family member
10	Male	45	35	Family member
11	Female	30	40	Physical therapist
12	Male	42	65	Physical therapist
13	Female	35	45	Physical therapist
14	Male	35	60	Occupational therapist
15	Female	35	40	Speech therapist
16	Female	34	45	Speech therapist
17	Female	37	45	Psychologist
18	Female	36	35	Nurse
19	Female	39	50	Nurse
20	Male	35	45	Neurologist

Adherence is one of the most important factors affecting treatment and rehabilitation success. It is the extent to which patients follow medical orders and recommended actions and interventions.⁸ Adherence to rehabilitation is a key component of stroke management programs and has significant effects on treatment outcomes in stroke patients.^{8,9} Studies reported that poor adherence results in treatment failure,^{8,9} reduces the effectiveness of stroke prevention strategies, raises the risk of stroke complications,^{8,10} prolongs hospital stay, and increases health care costs. Yet, only 50% of patients with chronic conditions such as stroke closely adhere to their treatments.⁵

There are a wide variety of factors affecting adherence. The World Health Organization developed a multidimensional model for adherence, which includes five categories of factors affecting adherence, namely socioeconomic, health care team and system, condition-related, therapy-related, and patient-related factors.¹¹ A former study reported that adherence to rehabilitation among patients with sports-related injuries was affected by different environmental, physical, and psychological factors.¹²

Identification and management of the factors that affect rehabilitation adherence can significantly improve the quality and the effectiveness of treatment and rehabilitation.¹³⁻¹⁷ Yet, there is a paucity of studies into these factors in Iran. In addition, studies in other countries mainly dealt with affecting adherence in patients with injuries and health conditions other than stroke.

Therefore, the present study was conducted to explore factors affecting adherence to rehabilitation in Iranian stroke patients.

Background in Iran

Despite the importance of rehabilitation to recovery from stroke, rehabilitation services in Iran are provided with some limitations. For instance, only physiotherapy services are covered by insurance provided that they are prescribed by neurologists, orthopedists, general surgeons, plastic surgeons, physical medicine specialists, or rehabilitation specialists. Moreover, insurance organizations only cover 15 physiotherapy sessions per month and do not cover home-based physiotherapy. Therefore, rehabilitation services in Iran are considered by patients as costly.

METHODS

This descriptive, qualitative study was conducted in 2018. Participants were six stroke patients, four family members, three physiotherapists, two speech therapists, two nurses, one psychologist, and one neurologist—20 in total. They were purposively recruited from X inpatient rehabilitation center in X, and the outpatient physiotherapy center of X hospital in X. Patients were included if they aged 30–80 years, were able to establish meaningful verbal communication, with any type of stroke, after the acute phase of stroke (first 15 days), were receiving rehabilitation services for at least two

TABLE 2

FACTORS AFFECTING ADHERENCE TO REHABILITATION IN STROKE PATIENTS

<i>Primary codes</i>	<i>Subcategory</i>	<i>Category</i>
Inability to go to rehabilitation centers due to age-related disabilities	Age-related disability	Patient-related factors
Inability to go to rehabilitation centers due to stroke-related physical dysfunction	Stroke-related functional disorders	
Mental and psychological dysfunction due to stroke-related reduced abilities		
Memory impairments and cognitive disorders due to stroke		
Satisfaction with rehabilitation services	Belief in the effectiveness of rehabilitation	
Regular attendance at rehabilitation sessions		
Performing recommended exercises at home		
Attendance at rehabilitation sessions without any financial concern	Financial status	
Unrelenting children and family members	Family support	
Appropriate interaction between therapist and patient	Interaction of rehabilitation team with patients	Factors related to rehabilitation team
Appropriate relationship between therapist and patient		
The application of techniques to encourage patients for activity		
Appropriate patient education about the correct performance of physical exercises at home		
Adequate number of multidisciplinary rehabilitation centers in all cities	Availability of public inpatient multidisciplinary rehabilitation centers	Factors related to rehabilitation systems
Public inpatient rehabilitation centers in all cities		
Reducing rehabilitation-related costs through insurance organizations and supportive associations	Inadequate insurance coverage of rehabilitation services	Factors related to insurance and social support systems
Social support provision to patients who have problems or do not have companions	Availability of support centers for patients with stroke	

months, were oriented to time, place, and person, and without any cognitive or psychological problems. Rehabilitation team members recruited to the study were neurologists, nurses, physical therapists, occupational therapists, speech therapists, and psychologists who were experienced in the rehabilitation of patients.

Data were collected through face-to-face semistructured interviews. During interviews, participants were asked to talk about their experiences of rehabilitation programs and factors affecting their adherence to rehabilitation. Examples of interview questions for patients were as follows: "May you please explain about your illness and your reason for referring to rehabilitation centers?" "To what extent do you participate in rehabilitation programs designed for you?" "Which barriers prevent you from participating in rehabilitation programs?" "In your opinion, what factors help you more actively participate in rehabilitation programs?" An example of interview questions for patients' family members was as follows: "What factors affect your patient's adherence to rehabilitation?" Examples of questions asked during interviews with rehabilitation team members were as follows: "What factors can affect adherence to rehabilitation in patients?" and "How can you promote adherence to rehabilitation in stroke patients?" In addition, probing questions were used to depth to the data. Interviews were conducted in quiet rooms in the study setting and lasted 30–60 minutes (44.15 minutes on average) according to participants' preferences and conditions. All interviews were recorded using a digital recorder and with participants' consent. Data collection continued until data saturation was achieved by 20 participants.

Conventional content analysis proposed by Graneheim and Lundman¹⁸ was used for data analysis. Each interview was transcribed and its transcript was read several times to obtain a general understanding. Initially, meaning units were extracted and coded, resulting in 237 primary codes. According to their similarities, primary codes were combined and categorized. None of the generated primary codes were allocated to more than one category. Subcategories and categories were constantly compared with each other and also with the raw data to make them as exhaustive and mutually exclusive as possible.

The credibility of the findings was ensured through both member and peer checking. During peer checking, two experienced qualitative researchers were asked to confirm the accuracy of coding and categorization. Moreover, sampling was done with maximum variation from patients, their family members, and rehabilitation team members to enhance confirmability and transferability.

This study was approved by the Ethics Committee of the University of Social Welfare and Rehabilitation Sciences (code: IR.-USWR.REC.1396.203). Participants were informed about the study aim and their informed consents were obtained.

FINDINGS

Study participants were six patients, four family members, three physical therapists, two nurses, two speech therapists, one occupational therapist, one psychologist, and one neurologist—20 in total. The mean age was 44.4 (Table 1).

Factors affecting adherence to rehabilitation in stroke patients were grouped into four main categories, namely patient-related, rehabilitation team, rehabilitation systems, and insurance and social support systems factors (Table 2).

Patient-related factors

According to participants, many different patient-related factors affect adherence to rehabilitation. These factors were

grouped into five subcategories of age-related disability, stroke-related functional disorders, personal belief in the effectiveness of rehabilitation, financial status, and family support.

Age-related disability. Rehabilitation team members in the present study noted that most patients with stroke age more than 45 years, and hence, they are unable to move and go to rehabilitation centers due to age- and stroke-related disabilities. Besides, they cannot effectively participate in rehabilitation programs due to pain, fatigue, and age-related disability and hence have limited adherence to medical orders, family members' recommendations, and rehabilitation.

Old age is a barrier for adherence to rehabilitation-related orders. Younger patients, willing to return to work, show more adherence to rehabilitation programs. However, in old ages, patients suffer from higher levels of pain and fatigue and therefore do not follow therapists' recommendations (P. 13: Physical therapist).

Stroke-related functional disorders. Depending on its type, severity, and complications, stroke affects different organs and hence reduces functional abilities, limits treatment and rehabilitation adherence, and prolongs rehabilitation course.

Patients with severe disability and limited ability to follow the recommended exercises and treatments need the help and support of their family members. On the other hand, some patients have limited disability, are more cooperative, and are more independent in performing exercises. Apparently, rehabilitation outcomes for these patients are better. Consequently, the severity of poststroke disability and limb paralysis plays a significant role in recovery (P. 20: Neurologist).

Personal belief in the effectiveness of rehabilitation. Patients' personal beliefs in the effectiveness of rehabilitation services have significant effects on their motivation for collaboration with rehabilitation team, adherence to rehabilitation, and continuation of treatment.

Patients' belief in the effectiveness of rehabilitation is the key to their recovery. Motivation for continuing treatments also has significant role in performing rehabilitation exercises particularly at home. Patients who are more willing to achieve recovery and return to their prestroke life are more adherent to treatments (P. 18: Nurse).

Financial status. Financial status was the most important patient-related factor from the perspectives of the patients and families. Patients need to frequently attend rehabilitation centers and receive rehabilitation services to achieve satisfactory outcomes. Limited number of public rehabilitation centers exists in Iran, and hence, most patients go to private centers, where rehabilitation services are costly. Patients with low financial status may be unable to receive rehabilitation services, and thereby, financial status is a significant factor affecting adherence to rehabilitation.

After stroke, the doctor prescribed physical therapy for my father. We took him to a physical therapy center in

our city; however, its services were expensive. My father does not have fully comprehensive insurance. Thus, we had no option but to take him to a public center; but that center is too far from us (P. 7: Family member).

Family support. Most patients with stroke are old and unable to go to rehabilitation centers due to age- and stroke-related disabilities. Therefore, their families help and support them. Patients with more children and those who had private caregivers had fewer problems in referring to rehabilitation centers and adhering to rehabilitation.

Determined family members have significant roles in stroke treatment and recovery. Most patients with stroke are dependent on others in doing their activities; therefore, family support is essential to their recovery. A patient who has no companion or his/her companion is not cooperative may be unable to complete rehabilitation programs and may stop referring to rehabilitation center after several sessions (P. 14: Occupational therapist).

Factors related to rehabilitation team

Rehabilitation team consists of physicians, nurses, physical therapists, occupational therapists, speech therapists, social workers, and other health care providers. These professionals collaborate with each other and with patients to achieve desired outcomes. This category had just one subcategory, that is, the interaction of rehabilitation team with patients.

Interaction of rehabilitation team with patients. Rehabilitation is a participatory activity and interaction between rehabilitation team and patients can improve the rehabilitation outcome and fast the recovery. Rehabilitation team members' effective communication with patients, their quality education for patients, and encouragement for treatment can significantly promote patient adherence.

The communication and confidence between rehabilitation team and patients are of great importance to recovery from stroke. To enhance recovery, rehabilitation staff need to develop patients' confidence in rehabilitation services, hearten and motivate them, promote their interaction with rehabilitation team, and encourage them to correctly perform rehabilitation exercises at home (P. 16: Speech therapist).

Factors related to rehabilitation systems

The characteristics of rehabilitation systems can also significantly affect patient adherence to rehabilitation. Easy accessibility to rehabilitation centers and the provision of the multidisciplinary rehabilitation services in rehabilitation centers play a significant role in patient motivation to go to the centers and attend rehabilitation programs. This category had one subcategory.

Availability of public inpatient multidisciplinary rehabilitation centers. One of the chief concerns of the participants

was the lack of multidisciplinary inpatient rehabilitation centers with the necessary equipment to provide comprehensive rehabilitation services. Currently, most rehabilitation centers in Iran provide outpatient services in different settings, and hence, patients need to go to different centers in different locations to receive such services. On the other hand, public centers provide more extensive services at lower costs (ie, 10% of the cost of services in private centers), and hence, patients are more willing to go to these centers. However, these centers are not proportionate to the number and the needs of patients and are not easily accessible to them; hence, patients need to go long distances and wait long hours to receive rehabilitation services. These problems may finally require patients, particularly those with limited financial and family support, to discontinue rehabilitation.

In inpatient centers, patients can receive all necessary rehabilitation services according to their rehabilitation program and their degree of disability. Of course, they may need to wait varying periods of time. On the contrary, private outpatient centers immediately admit patients but provide only some types of rehabilitation services. The main problem in private outpatient centers is the high costs of services, whereas the main problem in public inpatient is crowdedness. Therefore, patient adherence in inpatient centers differ from patient adherence in outpatient centers (P. 12: Physical therapist).

Immediately after stroke, I started receiving rehabilitation services in a private outpatient center. There, they only provided physical therapy services at high cost. After that, I came here [a public center]. All progresses in my recovery happened in this center. Each day, they take me to occupational therapy, speech therapy, and physical therapy departments according to a predetermined schedule (P. 2: Patient).

Factors related to insurance and social support systems

Patients with stroke need to receive rehabilitation services for long periods of time. These services are costly and hence, insurance coverage play significant role in patient adherence. This category had two subcategories.

Inadequate insurance coverage of rehabilitation services. Adequate insurance is a significant factor affecting long-term adherence to rehabilitation. However, most rehabilitation services in Iran are not fully covered by insurance. Therefore, patients with financial problems may show limited adherence to their rehabilitation.

Insurance organizations cover only 10 physical therapy sessions a month, while patients may need daily or twice daily physical therapy. This problem may negatively affect patient adherence to rehabilitation (P. 13: Physical therapist).

Availability of support centers for patients. Patients experience many disabilities due to stroke. Therefore, they are unable

to afford rehabilitation-related costs and cannot independently go to rehabilitation centers. Thus, support centers, charity organizations, and stroke associations can significantly promote patient adherence to rehabilitation through covering the costs of rehabilitation and providing patients with services such as transportation.

Suppose that some patients have no children to take them to rehabilitation centers or a couple may be both too old and disabled to take each other to such centers. These groups of patients may have limited adherence because they are unable to go to rehabilitation centers. In these situations, social work organizations can provide patients with support services and facilitate their attendance at rehabilitation centers. (P.18: Nurse).

DISCUSSION

This study explored factors affecting adherence to rehabilitation in stroke patients from the perspectives of patients, their family members, and rehabilitation team members. These factors were the patient-related, rehabilitation team, rehabilitation systems, and insurance and social support systems factors. The World Health Organization categorized factors affecting adherence into five main categories, namely socioeconomic, health care team and system, condition-related, therapy-related, and patient-related factors.¹¹ A study on patients with sports injuries also reported that adherence to rehabilitation was affected by situational and personal factors. Situational factors included environmental factors (such as time, support, weather, and rehabilitation program) and physical factors (including fatigue, pain, progress, return to normal conditions, fitness, and esthetics). Personal factors included psychological factors such as motivation, perceived effectiveness, enjoyment, and pleasing others.¹² Some of these factors are similar to those identified in this study.

Our findings indicated that patient-related factors affecting adherence to rehabilitation were age-related disability, stroke-related functional disorders, and personal belief in the effectiveness of rehabilitation, financial status, and family support. Age and age-related complications significantly affect adherence to rehabilitation so that younger patients are more adherent to the performance of rehabilitation exercises at home.¹⁹ Physical and mental health, functional disorders, and social support can also significantly determine adherence to treatments.²⁰ Estimates that 50 million stroke survivors in the world experience physical, cognitive, and emotional problems. These disorders cause difficulties in mobility and doing activities of daily living⁸ and necessitate receiving rehabilitation services to reduce stroke-related disabilities.⁹ Moreover, these disorders reduce patients' ability to seek rehabilitation services and perform rehabilitation and hence are considered as barriers to adherence to rehabilitation.^{8,21,22}

Personal belief in the effectiveness of rehabilitation services was another patient-related factor affecting rehabilitation adherence. Belief in treatments and motivation for receiving them are among the psychological factors affecting patients' treatment adherence.¹⁰ Belief and motivation can promote patient participation in rehabilitation programs²³ and enhance the chance of recovery among patients with chronic conditions.²³⁻²⁵ On the contrary, lack of confidence in treatments and their effectiveness negatively affect treatment adherence.^{12,22} The

other patient-related factor affecting rehabilitation adherence was family support. Similarly, several earlier studies reported inadequate family support as a significant factor contributing to treatment nonadherence.^{26-29,30,31}

Factor related to rehabilitation team was rehabilitation team members' interaction with patients. Similarly, an earlier study reported that dynamic interaction, health beliefs, and communication strategies of health care providers significantly affect treatment adherence among chronically ill patients.^{24,32} Rehabilitation team members can promote patient adherence to rehabilitation to encourage them for adherence through establishing effective communication, providing with quality education, and involving in decision making and planning for care and rehabilitation.^{6,21,33}

Rehabilitation systems factors affect patient adherence. Rehabilitation services in Iran are provided in public and private centers. Public centers' rehabilitation service costs are less than those of private centers. Comprehensive rehabilitation services that are provided in inpatient public centers through multidisciplinary approaches can significantly improve patients' abilities^{34,35} and reduce their disabilities and impairments.³⁶ However, there are only a few public inpatient rehabilitation centers in Iran to provide comprehensive rehabilitation services. These centers are exclusively located in large cities. Therefore, a large portion of stroke patients need to receive rehabilitation services in private outpatient centers. Rehabilitation services in these centers are not completely covered by insurance. Each private center covers only some aspects of rehabilitation. Thus, patients in these centers need to pay costs for rehabilitation services and it may show limited adherence to attending their rehabilitation programs.²⁶⁻²⁸

The final main category of the study was factors related to insurance and social support systems with two subcategories, namely inadequate insurance coverage of rehabilitation services and availability of support centers for patients. In line with these findings, earlier studies reported insurance coverage²⁶⁻²⁸ and financial and social support as factors affecting treatment adherence among patients with chronic conditions.^{24,26-28}

CONCLUSION

This study concluded that adherence to rehabilitation in stroke patient is affected by numerous personal, environmental, organizational, and social factors such as age- and stroke-related disabilities, personal belief in the effectiveness of rehabilitation, financial status, family support, interaction between rehabilitation team members and patients, availability of public inpatient rehabilitation centers, insurance coverage, and availability of support centers. Health care providers can promote patient adherence to rehabilitation, outcomes, involvement in the process of treatment, and their quality of life through broadening patients' knowledge about rehabilitation effectiveness, strengthening communication, and adequate insurance and social support.

ACKNOWLEDGMENT

The authors would like to thank the Research Administration of the University for funding the study and participants of the study for sharing their experiences.

This article was derived from a thesis research project.

REFERENCES

1. Mozaffarian D, Benjamin E, Go A, et al. Heart Disease and Stroke Statistics-2016 Update: a report from the American Heart Association. *Circulation* 2016;133(4):e38.
2. Feigin VL, Krishnamurthi RV, Parmar P, et al. Update on the global burden of ischemic and hemorrhagic stroke in 1990-2013: the GBD 2013 study. *Neuroepidemiology* 2015; 28(3):161-76.
3. Daneshfard B, Izadi S, Shariat A, et al. Epidemiology of stroke in Shiraz, Iran. *Iran J Neurol* 2015;14(3):158-63.
4. O'Donnell MJ, Xavier D, Liu L, et al. Risk factors for ischaemic and intracerebral hemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet* 2010; 376:112-23.
5. SalmanRoghani R, Delbari A, Tabatabae S. Stroke rehabilitation: principles, advances, early experiences, and realities in Iran. *J Sabzevar Univ Med Sci* 2012;19(2):96-108.
6. Hinkle JL, Cheever KH. Brunner & Suddarth's textbook of medical-surgical nursing. 13th ed. Philadelphia: Lippincott Williams & Wilkins; 2015.
7. Bates B, Choi JY, Duncan PW, et al. Veterans Affairs/Department of Defense clinical practice guideline for the management of adult stroke rehabilitation care executive summary. *Stroke* 2005;36(9):2049-56.
8. Bissonnette JM. Adherence: a concept analysis. *J Adv Nurs* 2008;63(6):634-43.
9. Duncan PW, Horner RD, Reker DM, et al. Adherence to postacute rehabilitation guidelines is associated with functional recovery in stroke. *Stroke* 2002;33(1):167-78.
10. Wade DT. Describing rehabilitation interventions. *Clin Rehabil* 2005;19(8):811-8.
11. Smith-Forbes EV. Exploration of Factors Associated with Patient Adherence in Upper Extremity Rehabilitation: A Mixed-methods Embedded Design [dissertation], 27. Lexington: University of Kentucky College of Health Sciences; 2015:142; https://uknowledge.uky.edu/rehabsci_etds/27. Accessed April 13, 2015.
12. Pizzari T, McBurney H, Taylor NF, et al. Adherence to anterior cruciate ligament rehabilitation: a qualitative analysis. *J Sport Rehabil* 2002;11(2):90-102.
13. Duncan PW, Zorowitz R, Bates B, et al. Management of adult stroke rehabilitation care a clinical practice guideline. *Stroke* 2005;36(9):e100-43.
14. Dehghan Nayeri N, Mohammadi S, Pedram Razi S, et al. Investigating the effects of a family-centered care program on stroke patients' adherence to their therapeutic regimens. *Contemp Nurse* 2014;47(1-2):88-96.
15. Couppe C, Comins J, Beyer N, et al. Health-related quality of life in patients with chronic rheumatic disease after a multidisciplinary rehabilitation regimen. *Qual Life Res* 2016;26: 381-91.
16. Lequerica AH, Rapport LJ, Whitman RD, et al. Psychometric properties of the rehabilitation therapy engagement scale when used among individuals with acquired brain injury. *Rehabil Psychol* 2006;51(4):331.
17. Chervinsky AB, Ommaya AK, deJonge M, et al. Motivation for traumatic brain injury rehabilitation questionnaire (MOT-Q): reliability, factor analysis, and relationship to MMPI-2 variables. *Arch Clin Neuropsychol* 1998;13(5):433-46.
18. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24(2):105-12.
19. Brewer BW, Cornelius AE, Van Raalte JL, et al. Age-related differences in predictors of adherence to rehabilitation after anterior cruciate ligament reconstruction. *J Athl Train* 2003;38(2):158.
20. Evangelista LS, Berg J, Dracup K. Relationship between psychosocial variables and compliance in patients with heart failure. *Heart Lung* 2001;30(4):294-301.
21. O'Carroll RE, Chambers JA, Dennis M, et al. Improving adherence to medication in stroke survivors: a pilot randomised controlled trial. *Ann Behav Med* 2013;46(3):358-68.
22. DiMatteo MR, Giordani PJ, Lepper HS, et al. Patient adherence and medical treatment outcomes: a meta-analysis. *Med Care* 2002;40(9):794-811.
23. Bassett SF, Prapavessis H. Home-based physical therapy intervention with adherence-enhancing strategies versus clinic-based management for patients with ankle sprains. *Phys Ther* 2007;87(9):1132-43.
24. Haynes R, Yao X, Degani A, et al. Interventions for enhancing medication adherence. *Cochrane Database Syst Rev* 2005;(4):CD000011.
25. Langhorne P, Bernhardt J, Kwakke G. Stroke rehabilitation. *Lancet* 2011;377(9778):1693-702.
26. Dehghan Nayeri N, Mohammadi S, Pedram Razi S, et al. Adherence of family caregivers of patients with stroke to rehabilitation regimen. *J Hayat* 2012;18(1):30-41.
27. Mitchell K. Assessment of stroke survivors: assisting families of stroke survivors on acute rehabilitation units. *Top Stroke Rehabil* 2009;16:420-4.
28. Vermeire E, Hearnshaw H, Van Royen P, et al. Patient adherence to treatment: three decades of research. A comprehensive review. *J Clin Pharm Ther* 2001;26(5):331-42.
29. Bauler S, Jacquin-Courtois S, Haesebaert J, et al. Barriers and facilitators for medication adherence in stroke patients: a qualitative study conducted in French neurological rehabilitation units. *Eur Neurol* 2014;72(5-6):262-70.
30. Zhang H, Qian HZ, Meng SQ, et al. Psychological distress, social support and medication adherence in patients with ischemic stroke in the mainland of China. *J Huazhong Univ Sci Technol* 2015;35:405-10.
31. Cheiloudaki E, Alexopoulos EC. Adherence to treatment in stroke patients. *Int J Environ Res Public Health* 2019; 16(2):196.
32. Evans NM. The process of exercise participation in the community for functional recovery post formal rehabilitation among survivors of stroke: a grounded theory study. *Electronic Thesis and Dissertation Repository*; 2019;:6034.
33. Bollen JC, Dean SG, Siegert RJ, et al. A systematic review of measures of self-reported adherence to unsupervised home-based rehabilitation exercise programmes, and their psychometric properties. *BMJ open* 2014;4(6):e005044.
34. Miller EL, Murray L, Richards L, et al. Comprehensive overview of nursing and interdisciplinary rehabilitation care of

- the stroke patient a scientific statement from the American Heart Association. *Stroke* 2010;41(10):2402-48.
35. Collaboration SUT. Organised inpatient (stroke unit) care for stroke. *Cochrane Database Syst Rev* 2013;(9):1-104.
36. Baune BT, Aljeesh Y, Bender R. Factors of non-compliance with the therapeutic regimen among hypertensive men and women: a case-control study to investigate risk factors of stroke. *Eur J Epidemiol* 2005;20(5):411-9.