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# Research Paper:
# Psychological Factors Predicting Participation in Meaningful Activities of People With Chronic Stroke

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The authors reported no conflicts of interests.

## ABSTRACT

**Background and Objectives:** One of the most important areas in the rehabilitation of stroke patients is participation in meaningful activities. Participation of individuals with stroke in meaningful activities can increase their satisfaction and quality of life. The present study aimed to investigate the relationship between psychological factors and participation in meaningful activities as well as determining factors predicting participation in meaningful activities in patients with stroke.

**Methods:** In this cross-sectional study, 100 people with chronic stroke participated which were selected from four rehabilitation centers using a convenience non-probability sampling method. Participants were assessed using Meaningful Activity Participation Assessment (MAPA), Satisfaction with Life Scale (SWLS), Center for Epidemiological Studies of Depression Scale (CED-S), 36-Item Short-Form Health Survey (SF-36), Visual Analogue Scale for Fatigue (VAS - F), and Visual Analog Scale for Pain (VAS Pain).

**Results:** The severity of depression had the highest relationship with the level of participation in meaningful activities. Also, the severity of depression, cognitive status, pain intensity, and severity of fatigue were identified as significant factors predicting the rate of participation in meaningful activities of patients with stroke.

**Conclusion:** Participating in meaningful activities in people with stroke is an important issue and a major obstacle in the lives of people with stroke. As a result, identifying problems and making appropriate interventions to remove obstacles, such as fatigue, pain, cognitive problems, and most importantly depression should be a priority for professionals.

**Keywords:** Meaningful activities, Regression, Stroke, Participation, Psychological

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*What is "already known" in this topic:*

*High prevalence of psychological disorders (e.g., depression, cognitive impairment, etc.) has been reported in stroke survivors, indicating the possibility of a significant effect of psychological factors on participation in meaningful activities in these patients.*

*What this article adds:*

*The results of this study indicated that, among psychological factors, depression, fatigue, cognitive status and pain have the greatest effect on participation of chronic stroke survivors in meaningful activities.*

## 1. Introduction

Stroke, as a neurological disorder, affects various aspects of the mental, physical, emotional, and cognitive functions of a person and limits the patient's ability to participate in various activities [1-3]. This limitation, which is defined as the problems that a person experience in involvement in various activities, [4] includes various areas of occupation, such as work, activities of daily living, social participation, and leisure activities [5].

Factors, such as the ability to walk, cognitive problems, psychological problems, and age of individuals can be related to the level of participation restriction [6, 7]. Also, other factors affecting people's participation include psychological factors, such as acceptance of new circumstances, motivation, and self-esteem, and environmental factors, such as the amount of social support to the person, use of health-related services, the physical condition of the environment, the attitude of the community and relatives to the person, and acceptance of the current situation by the person [8]. Achieving participation and consequently increasing the quality of the life of patients with chronic stroke is one of the main goals of rehabilitation interventions [9].

In most cases, therapists list several activities to evaluate a person's participation and examine the number or duration of a person's participation in those activities [10, 11]. However, an important aspect of examining participation is having information about the importance of different activities for the person. If a person does not participate in an activity, is that activity meaningful or important to the person or not? The significance of the activities is related to their purposefulness, the person's past experiences, and the benefit that the person gains from performing the activity [12]. Meaningful activity participation involves several dimensions, such as creating a sense of pleasure, satisfaction, and belonging. Participating in meaningful activities satisfies basic psychosocial needs, improves health and wellbeing, and activates the reward neural pathway in the brain by creating positive emotions [13, 14]. Participation is the result of complex interactions between different environmental and individual factors [15]. Environmental factors, also called external factors, include various dimensions, such as social, economic, cultural, attitudinal, and supportive status. Individual or intrinsic factors also include various physical, physiological, behavioral, spiritual, and psychological dimensions [16]. In the comprehensive review of participation, a comprehensive look should be given to the cases mentioned. However, some psychological factors, such as depression, in addition to changing the level of participation, affect the individual's interpretation of participation and may change the type of interactions between the individual and environmental factors mentioned [15, 17].

In a study, the inability to participate in meaningful activities was reported as the most prevalent limitation that people with stroke face [3]. The ability of people with stroke to re-engage in meaningful activities has a positive relationship with the quality of life and perception of health in this population [18, 19]. Given the importance of participating in meaningful activities, finding relevant and effective factors can facilitate the process of interventions to achieve a higher level of performance.

A study conducted on people with cancer introduced psychological factors, such as the individual's perception of his/her ability and the amount of support received from the environment as the most important factors predicting the level of participation in meaningful activities [20]. Regarding people with stroke, no study has been done to find factors related to participation in meaningful activities. According to the high prevalence

of psychological disorders, such as depression and cognitive problems after stroke and the subjectivity of the meaningfulness of various activities, there is a possibility of a relationship between the level of participation in meaningful activities and psychological status in people with stroke [21]. This study aimed to investigate the relationship between psychological factors and the level of participation in meaningful activities and also the ability of these psychological factors to predict the level of participation in meaningful activities. The results of this study can provide a better understanding of participation in meaningful activities and may facilitate multilateral interventions.

## 2. Methods

### Participants

In this cross-sectional study, 100 people with chronic stroke were selected from Tehran's Rehabilitation Centers and tested using a convenience non-probability sampling method. Having a chronic stroke diagnosed by a neurologist, more than 6 months after the onset of the disease, the ability to communicate verbally with the examiner, having an acceptable level of cognitive function (Mini-Mental State Examination (MMSE) ≥24) [22], and the absence of other neurological disorders (exclusive of stroke) were among the inclusion criteria. Individuals who did not complete the questionnaire were excluded from the study. The type of their collaboration in the study and the purpose of doing it was described to the participants, and they filled out the informed consent with full knowledge of the research. This study was approved by the Ethics Committee of the Iran University of Medical Sciences (Code: IR.IUMS.REC.1399.238).

The participants were evaluated using Meaningful Activity Participation Assessment (MAPA), Satisfaction with Life Scale (SWLS), Center for Epidemiological Studies of Depression Scale (CED-S), Health Survey (SF- 36) 36-Item Short Form, Visual Analogue Scale for Fatigue (VAS - F), and Visual Analog Scale for Pain (VAS Pain). An occupational therapist assessed the participants, and questionnaires were randomly assigned to participants. If it was difficult for the participant to read the questions or he/she could not mark it due to hand functions problems, the questions were read to the participant by the evaluator and marked for him/her. In order to prevent fatigue and its effect on the accuracy of the data, the participants were given time to rest (at least 2 minutes) between each assessment.

### Instruments

#### Meaningful Activity Participation Assessment (MAPA)

The Meaningful Activity Participation Assessment (MAPA) is a self-report instrument, in which participants complete 28 different and meaningful daily activities (meaningful subscale) and participation frequency (frequency subscale). These two types of answers determine the meaningful level of the activity [23]. To score a participant's participation frequency, a 7-point Likert scale (0=not at all to 6=every day) was used. To investigate the meaningful level of the participants' activities (MAPA-M), a 5-point Likert spectrum was used (0=not meaningful at all, 1=somewhat meaningful, 2=moderately meaningful, 3=very meaningful, and 4=extremely meaningful). The total score of this questionnaire was calculated by summing the scores of each item (participation×significance). The scores ranged from 0 to 672, and a higher score indicated more participation of participants in meaningful activities. This questionnaire was translated by Azad et al., and its validity and reliability were confirmed in the population of people with stroke in Iran [24].

#### Satisfaction with Life Scale (SWLS)

The participant's satisfaction with life was measured using a 5-item scale based on a 7-point Likert scale. In this scale, various fields, such as health-related or economic conditions of the person are not measured specifically, but the person examines his/her living conditions in general, and finally, it shows his/her agreement with the items of the questionnaire using the following scale: 1=strongly disagree to 7=strongly agree [25]. The SWLS is scored 5 to 35. Higher scores indicate greater satisfaction with life. This questionnaire has very good validity and reliability in the Persian version [26]; it also has high internal stability (Cronbach's α=0.87) and good temporal stability (ICC=0.82) [27].

#### Center for Epidemiologic Studies of Depression Scale (CED-S)

The CED-S is a widely used instrument for assessing and screening depression that evaluates the symptoms of depression and has 20 items to examine the main aspects of depression [28]. The participant scores each item 0 (rarely) to 3 (most often) based on the frequency. The scale is scored 0 to 60. A higher score indicates more symptoms of depression [28]. The CED-S questionnaire in people with stroke has acceptable internal stability (Cronbach's α=0.72) and good inter-rater reliabil-

ity (ICC=0.76) [29]. In the Persian version of CED-S, the test-retest reliability is reported to be appropriate (ICC=0.77) [30].

### 36-Item Short-Form Health Survey (SF-36)

SF-36 was used to assess the state of physical and mental health. This questionnaire has 36 terms in eight different fields of health including general health, physical function, role-play limitations due to physical and emotional reasons, physical pain, physical function, fatigue or vitality, and mental health, which measures health-related quality of life. The score of each section and the full score of this instrument range from 0 to 100; a higher score indicates the better health status of the participant [31]. In people with stroke, it has good validity and reliability [32]. Good reliability and validity were observed in the Persian version of this questionnaire, as well [33].

### Visual Analog Scale for Pain (VAS Pain)

VAS Pain is a questionnaire to assess a subjective pain of a person. In this instrument, there is a horizontal line with a length of 10 cm, at the two ends of which descriptions, such as no pain and maximum pain are inserted. Participants were asked to indicate their pain intensity along this line to the therapist [34]. It has been found that PVAS has good psychometric properties, such as good test-retest reliability (ICC=0.78) [35].

### Visual Analogue Scale-Fatigue (VAS-F)

It is an instrument with a line with a length of 10 cm, through which the person shows the amount of fatigue (the subjectivity of the fatigue perceived by the person). This questionnaire is scored 0 to 10. A higher score indicates more fatigue [36]. This instrument showed appropriate validity and good test-retest reliability (ICC=0.85) in people with stroke [37].

### Modified Rankin Scale

The questionnaire consists of a 6-point scale that assesses the level of disability in patients with stroke that can be used over time to assess the process of recovery or change in the patient's condition. It was scored by the therapist according to the individual's motor function and independence in activity of daily living. The scoring is as follows: "no disability=0", "no significant disability=1", "low disability=2", "moderate disability=3", "moderate to severe disability=4", "severe disability=5". As the score increases, the person's ability to perform daily activities, move and walk decreases [38, 39]. This questionnaire has good validity and reliability [39].

### Statistical analysis

Kolmogorov-Smirnov test was used to analyze the normality of data distribution. Descriptive statistics, including mean and standard deviation, were used to describe quantitative data, and frequency and percentage were used to describe qualitative data. Pearson and Spearman statistical tests for parametric and non-parametric variables were used to investigate the relationship between different psychological, cognitive, and demographic functions and the level of participation in meaningful activities. Psychological and cognitive variables with a statistically significant relationship with the level of participation were used in the regression model to evaluate the ability of the variables to predict the MAPA score. Stepwise regression models and linear regression models were used to examine the independent and dependent variables. The significance level was set at 0.05.

## 3. Results

One hundred patients with stroke with a Mean±SD age of 61.33±11.33 years and a mean duration of illness of 24.35±15.04 months participated in the study. Table 1 shows other demographic characteristics of the participants. Kolmogorov–Smirnov test revealed that all variables followed the normal distribution. The mean MAPA score was 152.07±62.26. Table 2 shows the mean, standard deviation, and range of scores obtained from other instruments. Among demographic variables, gender, dominant hand, affected side, and the duration of the disease had no significant relationship with participation in meaningful activities. The results showed that the severity of depression had the greatest relationship with the level of participation in meaningful activities. Table 3 shows the relationship between demographic characteristics and other evaluated parameters and participation in meaningful activities in people with stroke. In addition, the regression model explained 48.4% of the variance of participation in meaningful activities ($R=0.69$, $R^2=0.484$, Adjusted $R=0.451$, $F=14.54$, $P<001$).

Among the selected factors, the severity of depression, cognitive status, pain intensity, and fatigue severity were identified as significant factors predicting the level of participation in meaningful activities of people with stroke (Table 4). In stepwise regression analysis, the severity of depression was the main predictor of participation in meaningful activities, followed by the amount of fatigue, cognitive status, and pain intensity (Table 5).

**Table 1.** Demographic characteristics of the participants (N=100)

| Characteristics | | No. (%)/Mean±SD |
|---|---|---|
| Age | | 61.33±11.33 |
| Gender | Female | 39(39) |
| | Male | 61(61) |
| Marital status | Married | 81(81) |
| | Single | 13(13) |
| | Widowed/Divorced | 6(6) |
| Affected side | Right | 44(44) |
| | Left | 56(56) |
| Month after onset | | 24.35±15.04 |
| Assistive Device for Gait | Yes | 27(27) |
| | No | 73(73) |
| Education level | Sub-Diploma | 42(42) |
| | Diploma | 40(40) |
| | Academic | 18(18) |
| Dominant hand | Right | 81(81) |
| | Left | 19(19) |
| Level of Disability (Modified Rankin Scale) | No significant disability | 25(25) |
| | Slight disability | 30(30) |
| | Moderate disability | 29(29) |
| | Moderately severe disability | 19(19) |

## 4. Discussion

Although several studies have been conducted on participation in people with stroke, this is the first study that examined participation in meaningful activities and its predicting factors. It was found that the most important factor in predicting participation was a depression in a person with stroke, and factors, such as fatigue, cognitive status, and pain were other related factors.

Regarding participation in this group of people, the importance of the meaningfulness of that activity is very important. Generally, depression affects various life-related aspects of a person with stroke [40] that should be identified quickly, and rehabilitation interventions should be done for these people to return them to their roles and participation in daily activities. The effect of depression on reducing participation can be attributed to decreased motivation, decreased social communication due to decreased perception of emotions, and increased

**Table 2.** Descriptive statistics for related variables (N=100)

| Variables | Mean±SD | Range |
|---|---|---|
| CES-D | 15.77±9.13 | 0-38 |
| SWLS | 19.54±7.61 | 5-35 |
| SF-36 | 51.13±20.80 | 16-83 |
| VAS-F | 4.62±1.50 | 0-8 |
| VAS Pain | 2.78±1.77 | 0-8 |
| MAPA | 152.07±62.26 | 46-284 |

CES-D: Center for Epidemiologic Studies of Depression Scale; SWLS: Satisfaction with Life Scale; SF-36: 36-Item Short-Form Health Survey; VAS-F: Visual Analogue Scale-Fatigue; VAS Pain: Visual Analog Scale for Pain; MAPA: Meaningful Activity Participation Assessment.

**Table 3.** Correlation of different variables with MAPA

| Criterion Variables | r | P |
|---|---|---|
| SWLS | 0.50 | 0.000 |
| CED-S | -0.61 | 0.000 |
| SF-36 | 0.49 | 0.000 |
| VAS Pain | -0.35 | 0.000 |
| VAS-F | -0.47 | 0.000 |
| MMSE | 0.26 | 0.004 |
| MRS | -0.53 | 0.000 |
| Age | -0.31 | 0.001 |
| Gender | 0.15 | 0.07 |
| Education level | 0.30 | .001 |
| Dominant hand | 0.08 | 0.16 |
| Affected side | 0.11 | 0.14 |
| Month after onset | 0.15 | 0.07 |
| Falling history | -0.27 | 0.003 |
| Assistive device | -0.42 | 0.000 |

MAPA: Meaningful Activity Participation Assessment; SWLS: Satisfaction with Life Scale; CED-S: Center for Epidemiologic Studies of Depression Scale; SF-36: 36-Item Short-Form Health Survey; VAS Pain: Visual Analog Scale for Pain; VAS-F: Visual Analogue Scale-Fatigue; MMSE: Mini-Mental State Examination; MRS: Modified Rankin Scale.

fatigue [41]. Other studies have evaluated participation [7, 42], but the importance and meaningfulness of each activity for the individual have not been examined, and only some activities based on questionnaires have been mentioned, which can reduce the individual's score because some activities were never important to the individual but affected his/her overall participation score [6].

The primary goal of occupational therapy is to enable people to participate in activities they find important or meaningful [15, 24]. To achieve this goal, occupational therapists have a holistic view. Based on this view, making changes in the level of participation is not possible without considering various individual and environmental factors. Using the person, environment, and occupation models such as the Person-Environment-Occupation-Performance (PEOP) model can help to understand this holistic view and explain it in interventions to improve participation [16]. The PEOP model introduces participation as the result of an interaction between personal factors (including psychological, motor, sensory/perceptual, cognitive, and spiritual), environmental factors (including cultural, social support, social determinants, physical and natural environments, and public

**Table 4.** Linear regression analysis of participation in meaningful activities

| Variable | Beta | t | P |
|---|---|---|---|
| CED-S | -0.383 | -2.655 | 0.009 |
| SWLS | 0.024 | 0.170 | 0.865 |
| MMSE | 0.189 | 2.476 | 0.015 |
| VAS Pain | -0.165 | -2.106 | 0.038 |
| VAS-F | -0.254 | -3.026 | 0.003 |
| SF-36 | 0.073 | 0.549 | 0.585 |

CED-S: Center for Epidemiologic Studies of Depression Scale; SWLS: Satisfaction with Life Scale; MMSE: Mini-Mental State Examination; VAS Pain: Visual Analog Scale for Pain; VAS-F: Visual Analogue Scale-Fatigue; SF-36: 36-Item Short-Form Health Survey.

**Table 5.** Stepwise regression analysis of participation in meaningful activities

| Models | Beta | t | P |
|---|---|---|---|
| CED-S | -0.607 | -7.56 | 0.000 |
| CESD | -0.496 | -5.79 | 0.000 |
| VAS-F | -0.257 | -2.99 | 0.003 |
| CESD | -0.466 | -5.54 | 0.000 |
| VAS-F | -0.263 | -3.15 | 0.002 |
| MMSE | -0.192 | 2.51 | 0.013 |
| CESD | -0.421 | -4.92 | 0.000 |
| VAS-F | -0.255 | -3.10 | 0.003 |
| MMSE | -0.187 | 2.50 | 0.014 |
| VAS Pain | -0.164 | -2.11 | 0.038 |

policy) and characteristics of the occupation [16]. The results of this study, i.e., the relationship between psychological factors and participation should be properly interpreted and used. This means that therapists should consider other aspects of the individual and the environment in addition to the factors listed, such as fatigue, depression, pain, and cognition.

In rehabilitation interventions for people with stroke, the main goal is to increase participation and improve the quality of life of these people. To achieve this goal, a comprehensive and accurate assessment and knowledge of the relationship between different problems can facilitate the intervention process [43]. One way to increase participation in this population is to find activities that are valuable and meaningful to the individual and identify barriers to participation in those activities. Participation in activities after a long period of illness and even with existing injuries is possible and also depends on environmental and individual conditions [44]. The results of this study, in addition to depression, emphasized fatigue, pain, and cognitive factors.

However, the relationship between depression and participation in meaningful activities was very high and significant and considering the so-called problems and the solution to their rehabilitation intervention can increase participation [17, 45] .

The results of the study showed that fatigue was a predictor of participation in meaningful activities of people with stroke. Fatigue is very common in this population. Previous studies have shown that fatigue, in addition to reducing the level of individual participation, reduces the rate of involvement in rehabilitation interventions and also interferes with returning to work [46]. The pain was also mentioned as a predictor of participation in meaningful activities. Pain, especially musculoskeletal pain due to spasticity and shoulder dislocation, is common in people with stroke [47]. In a study by Muller on people with spinal cord injury, pain intensity was significantly associated with participation and satisfaction with participation [48]. The severity of cognitive impairment was another parameter predicting participation in meaningful activities. Cognitive functions, especially executive functions, have been introduced as effective parameters in people's relationship with the environment, especially the social environment, and the responsibility of people with stroke [49].

Although the current study is very valuable in terms of being novel regarding participation in meaningful activities, it was accompanied by some limitations. The first was the small size of the population (100 people). Second, the effectiveness of using assistive devices in the study of any participation in life was not carefully examined, and only the issue of using assistive devices in walking and moving people was put into inquiry. Third, people were not divided into different groups in terms of the degree of physical injury and examining participation in meaningful activities of each group and comparing the groups with each other. Fourth, the role of the caregiver was not examined and considered with regard to the person's sense of satisfaction and participation in life as well as his/her economic status in participating in meaningful activities. Fifth, the type of treatments the person

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received in the past or is currently undergoing was not examined. As the number of participants increases, other variables can be examined as well. It is suggested that in future studies, in addition to examining the relationship and predictive power of other individual factors, such as physical performance in predicting participation in meaningful activities, various environmental factors should also be considered and evaluated.

## 5. Conclusion

The results demonstrated that demographic factors, such as age and level of education as well as factors related to the severity of the disease, such as the level of disability, cognitive problems, and psychological problems are related to the participation of people with stroke in meaningful activities. Regarding predicting factors of participation in meaningful activities, depression, fatigue, cognitive status, and pain showed the greatest effect, respectively, emphasizing the need to pay more attention to psychological factors in specialized interventions in the field of health and rehabilitation in people with stroke.

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of the Iran University of Medical Sciences (Code: IR.IUMS.REC.1399.238).

### Funding

The paper was extracted from the MSc. thesis of the first author, Department of Occupational Therapy, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.

### Authors' contributions

Conceptualization, Supervision: Akram Azad, Ghorban Taghizadeh; Methodology: Ghorban Taghizadeh; Investigation: Arian Dehmyani; Writing – review & editing and Writing – original draft: All authors.

### Conflict of interest

The authors reported no conflicts of interests.

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## مقاله پژوهشی

# فاکتورهای سایکولوژیک پیش‌بینی کننده مشارکت در فعالیت‌های معنادار افراد مبتلا به سکته مغزی مزمن

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## چکیده

**مقدمه** یکی از مهم‌ترین حیطه‌های توانبخشی بیماران سکته مغزی، مشارکت در فعالیت‌های معنادار است. مشارکت افراد مبتلا به سکته مغزی در فعالیت‌های معنادار می‌تواند کیفیت زندگی و رضایت از زندگی را در این بیماران افزایش دهد. هدف از این مطالعه، بررسی ارتباط میان فاکتورهای سایکولوژیک و مشارکت در فعایت‌های معنادار و همچنین مشخص کردن فاکتورهای پیش‌بینی‌کننده مشارکت در فعالیت‌های معنادار افراد مبتلا به سکته مغزی مزمن است.

**مواد و روش‌ها** این مطالعه از نوع بررسی مقطعی است. صد نفر از افراد مبتلا به سکته مغزی مزمن از چهار مرکز توانبخشی به روش نمونه‌گیری غیر احتمالی ساده انتخاب شدند. از پرسش‌نامه‌های مشارکت در فعالیت‌های معنادار (MAPA)، پرسش‌نامه افسردگی (CED-S)، پرسش‌نامه رضایت از زندگی (SWLS)، پرسش‌نامه کیفیت زندگی(SF-36)، مقیاس شدت خستگی (VAS-F) و مقیاس شدت درد (VAS-P) برای ارزیابی بیماران استفاده شد.

**یافته‌ها** شدت افسردگی بیشترین ارتباط معنادار با مشارکت در فعالیت‌های معنادار نشان داد. با توجه به یافته‌ها، فاکتورهای پیش‌بینی‌کننده میزان مشارکت در فعالیت‌های معنادار در افراد سکته مغزی به ترتیب شدت افسردگی، وضعیت شناختی، شدت درد و شدت خستگی می‌باشد.

**نتیجه‌گیری** مشارکت در فعالیت‌های معنادار در افراد مبتلا به سکته مغزی یک مشکل مهم و مانعی در زندگی این افراد است. در نتیجه، شناسایی موانع و انتخاب مداخله مناسب برای رفع مشکلاتی مانند خستگی، درد، مشکلات شناختی و از همه مهم‌تر افسردگی باید از اولویت‌های متخصصین باشد.

**کلیدواژه‌ها:**
فعالیت‌های معنادار، افسردگی، سکته مغزی، مشارکت، روانی

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