Research Paper

The Persian Version of the "Participation Measure-3 Domains, 4 Dimensions": Translation, Cultural Adaptation, Face and Content Validity

Diba Sharifi[1] , Laleh Lajevardi[1] , Ghorban Taghizadeh[1] , Akram Azad[1]

1. Department of Occupational Therapy, Rehabilitation Research Center, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.

ABSTRACT

Background and Objectives: Investigating the impact of occupational therapy interventions on the participation levels of adults with stroke is crucial due to its significant influence on their satisfaction and quality of life (QOL). Therefore, it is essential to provide a more comprehensive understanding and an accurate assessment of individual participation, while ensuring the affordability of evaluation tools. This study aims to translate and evaluate the face and content validity of the Persian version of the participation measure–3 domains, 4 dimensions (PM-3D4D) questionnaire in adults with chronic stroke.

Methods: This methodological study was conducted following the international QOL assessment (IQOLA) protocol after obtaining permission from the test developer. The Persian version of PM-3D4D was created, and the face and content validity were evaluated with the participation of 20 adult patients with chronic stroke and 15 occupational and physiotherapists experienced in stroke rehabilitation. Both quantitative and qualitative approaches were utilized to assess face validity, while the content validity index (CVI) (to evaluate clarity, relevance, simplicity, and of items) and content validity ratio (CVR) (to establish the necessity of items) were applied to evaluate content validity.

Results: Participants' opinions regarding all items of the questionnaire were favorable; thus, the Persian version was entirely clear, appropriate, and satisfactory in terms of both structure and content. In terms of importance, quantitative assessments of face validity showed that all items had impact scores above 1.5 and were thus accepted. The CVR and CVI results confirmed that all items were necessary, simple, sufficiently clear, and relevant to the concept of participation.

Conclusion: The Persian version of the PM-3D4D questionnaire demonstrates good face and content validity and warrants further investigation in psychometrics as a tool to measure participation among adults with chronic stroke.

Keywords: Psychometrics, Face validity, Participation, Productivity, Efficiency

* Corresponding Author:
Laleh Lajevardi, Associate Professor.
Address: *Department of Occupational Therapy, Rehabilitation Research Center, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.*
Tel: *+98 (21) 22220946*
E-mail: *laleh23275@yahoo.com*

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

Stroke has a high incidence of mortality and disability among individuals worldwide. This condition has consequences that affect the social life and participation of individuals in society and community. A new tool designed to measure individuals' participation in social environments is the PM-3D4D, which has demonstrated suitable psychometric properties in Taiwanese stroke survivors. This 24-item questionnaire encompasses three domains: Social, community and productivity, across four dimensions: Diversity, frequency, difficulty and desire for change.

➤ *What this article adds:*

The results of this study indicate that the Persian version of this questionnaire is suitable in terms of face and content validity for patients with chronic stroke in Iran and it can be used in future research to examine other psychometric properties for these patients.

Introduction

Stroke ranks as the second leading cause of death and one of the primary causes of disability worldwide [1-3]. Many stroke survivors face limitations in their activities and participation [4, 5]. Common issues include diminished interpersonal relationships, daily immobility, an inability to resume previous social activities or engage in new ones, mood disturbances, and a subsequent decrease in quality of life (QOL) [6]. The ultimate goal of clinical rehabilitation for stroke patients is to mitigate these consequences, enhance independence, and improve social participation [7, 8]. Participation is a multidimensional concept that should be measured both objectively (observable and measurable aspects) and subjectively (personal experiences) [9-11]. Gathering information on participation from both perspectives provides a comprehensive overview of the quantity and quality of a patient's participation, assisting therapists in establishing clearer treatment goals and better evaluating the effectiveness of interventions [6]. Chang and Custer proposed a conceptual model of "participation" based on the ICF, defining participation as "active involvement in activities that are intrinsically social and occur within a societally defined context." [12]. The areas of participation were categorized into three domains, productivity, social, and community, with dimensions defined by subjective factors (such as perceived difficulty and desire for change) and objective factors (like frequency and variety) [12]. Based on this concept, the participation measure–3 domains, 4 dimensions (PM-3D4D) questionnaire was developed by Chang et al in Taiwan to assess adult participation in outpatient rehabilitation services [13]. This questionnaire consists of 24 items that evaluate individuals' participation over the past three months, encompassing productivity (6 items), social (6

items) and community (12 items) domains across four dimensions, diversity, frequency, perceived difficulty, and desire for change. The questionnaire scores reflect the activities individuals engaged in during the last three months, the frequency of participation in the past week, month, or quarter, the difficulties encountered while performing these activities, and their desire to modify their participation. Previous studies in Taiwan have reported strong psychometric properties for this questionnaire, including good content validity, high internal consistency (Cronbach's α=0.89~0.93 for each domain), and strong test re-test reliability exceeding 0.7 [13-16]. In the current research, the Persian translation, face, and content validity of the test were conducted and studied.

Materials and Methods

The inclusion criteria for participants included adults with a stroke diagnosis, at least six months post-onset, at least a middle school education, and proficiency in Farsi. The exclusion criteria included cognitive impairment (MoCA ≤23) [17], severe depression or anxiety (hospital anxiety and depression scale [HADS] ≥11) [18] and significant pain (visual analogue scale [VAS] ≥7) [19]. The inclusion criteria for experts included occupational therapists and physiotherapists with 5 or more years of experience in the rehabilitation of stroke patients. Non-random convenience sampling was conducted from the occupational therapy and physiotherapy departments in hospitals and rehabilitation clinics in Tehran and Alborz Province, Iran.

Questionnaire

The original PM-3D4D test was developed in Chinese to measure participation in adults using outpatient rehabilitation services in Taiwan, addressing neurological deficits

(such as stroke), musculoskeletal issues (such as chronic back pain) and other chronic conditions (such as cancer) [13]. The latest version includes 24 items assessing participation across three domains, productivity (6 items), social (6 items), and community (12 items), evaluated through the dimensions of variety, frequency, difficulty, and desire for change. Respondents answer "yes/no" for the diversity dimension, report activity frequency over the last week, month, or quarter, rate difficulty from 1 (very difficult) to 4 (no difficulty) and indicate their desire for change participation levels with "yes/no" answer options. It is essential to mention that the questionnaire was translated from Chinese to English by test developers.

Translation

Following permission from the test developer, the translation of the questionnaire was conducted about the international QOL assessment (IQOLA) protocol, ensuring cultural and linguistic equivalence for the Iranian context [20]. The process of translating was forward-backward. At first, permission was taken from the test developer. The original questionnaire was translated from English to Farsi by two translators fluent in native Farsi—one with a medical background and the other with a non-medical background. The translators focused on conceptual equivalence rather than a literal translation, ensuring that the choice of phrases, wording, and writing style was appropriate for a middle school education level. Subsequently, they assessed the difficulty and ease of each item in the translation using a linear analog scale assessment rating scale from 0 (not at all difficult) to 100 (very difficult) and provided comments when necessary. The preliminary translation was then given to two translators whose native language was either American or British English, depending on availability and who had extensive knowledge of Farsi. These translators translated the questionnaire back into English. The backward translations were reviewed by researchers for conceptual equivalence with the original version. Item-to-item and response option-to-response option translations were discussed in researchers' meetings, and corrections were made to some translations [21]:

In the forward translation of item 14 ("playing sports [e.g. playing badminton, basketball, table tennis, or baseball]"), "baseball" was replaced with "volleyball" since it is not a common sport in Iran.

For item 15 ("participating in non-physical group entertaining activities [e.g. playing cards, chess, mahjong, or online games]"), "mahjong" was omitted due to a lack of familiarity among Iranians and replaced with "mental games."

In item 16 (participating in religious or spiritual activities [e.g. go to a church, temple, or meditation group]"), "church" and "temple" were substituted with "mosque" and "shrine" because the former are not common spiritual activities in Iran.

For item 21 ("receiving school education or taking courses for personal skills development [e.g. taking courses, such as languages, computer, music, art, or finance in a community college]"), "community college" was replaced with "vocational school" because this term is more familiar in Iran.

In item 24 ("getting involved in investment activities [e.g. buy and sell stocks, buy lottery tickets, and collect rent from tenants]"), the mention of buying lottery tickets was updated to reflect current practices in Iran, and the phrase "participation in lotteries" was included in the examples.

The developer reviewed and approved these changes during the backward translation process. After addressing their comments, the revised version was emailed to the developer for final approval. The approved Persian version was used to assess face and content validity.

Face validity

The questionnaire was administered to 20 participants (10 men and 10 women) with chronic stroke, aged between 54 to 73 years, to assess qualitative face validity. This group included 5 individuals with under-diploma education, 6 with a diploma, and 9 with academic degrees. Additionally, 15 rehabilitation specialists (8 occupational therapists and 7 physiotherapists) with 5 to 30 years of experience in stroke rehabilitation were included. Face-to-face interviews were conducted with the participants to evaluate the meaning of the questions from their perspectives. During this process, any misunderstandings regarding the questions were noted and clarified. Subsequently, quantitative face validity was assessed. The same 20 chronic stroke patients rated the importance of each questionnaire item on a 5-point Likert scale (5=completely crucial; 4=crucial; 3=moderately crucial; 2=slightly crucial; and 1=not crucial at all). An impact score >1.5 for each item was required for it to be considered appropriate and retained (Equations 1, 2 and 3) [22, 23].

1. *Impact Score=Frequency^1(%)×Importance^2*

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1. The percentage of individuals who rated the items with scores of 4 and 5.
2. The average scores of the respondents.

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Table 1. Quantitative face validity results of PM-3D4D questionnaire in patients with chronic stroke (n=20)

Item	Impact Score	Result
1	6.18	Acceptable
2	6.81	Acceptable
3	6.75	Acceptable
4	6.75	Acceptable
5	5.16	Acceptable
6	5.61	Acceptable
7	4.36	Acceptable
8	4.91	Acceptable
9	5.8	Acceptable
10	5.1	Acceptable
11	6.18	Acceptable
12	4.98	Acceptable
13	5.93	Acceptable
14	5.55	Acceptable
15	5.55	Acceptable
16	5.3	Acceptable
17	6.88	Acceptable
18	6.81	Acceptable
19	5.75	Acceptable
20	6.88	Acceptable
21	5.93	Acceptable
22	5.05	Acceptable
23	6.63	Acceptable
24	5.68	Acceptable

Content validity

The questionnaire was administered to 15 occupational and physical therapists who had 5 or more years of experience in the rehabilitation of stroke patients. Based on their feedback, two indicators were calculated, the content validity index (CVI) and content validity ratio (CVR). The CVR assessed the necessity of each item's inclusion in the questionnaire. The expert panel rated each item using a three-point scale: 1=the item is necessary, 2=the item is useful but not necessary, and 3=the item is not necessary. The CVR was then calculated to ensure that the items effectively measured the intended concepts. The expert panel evaluated each item using a four-point Likert scale based on three criteria, simplicity and fluency, relevance and clarity. For the simplicity criterion, the options were as follows: 1=not simple; 2=relatively simple; 3=simple; and 4=completely simple. Given that 15 experts existed, the minimum acceptable score for CVR, according to Lawshe's table [24], is 0.49. Furthermore, the acceptance criteria for each item based on CVI are as follows: A score above 0.79 is deemed ap-

Table 2. Information on the CVR of the PM-3D4D questionnaire in chronic stroke patients (n=15)

Item	CVR	Result
1	0.6	Acceptable
2	0.6	Acceptable
3	0.87	Acceptable
4	0.6	Acceptable
5	0.6	Acceptable
6	0.6	Acceptable
7	0.6	Acceptable
8	0.6	Acceptable
9	0.73	Acceptable
10	0.6	Acceptable
11	0.6	Acceptable
12	0.6	Acceptable
13	0.6	Acceptable
14	0.6	Acceptable
15	0.6	Acceptable
16	0.6	Acceptable
17	0.73	Acceptable
18	0.6	Acceptable
19	0.73	Acceptable
20	0.6	Acceptable
21	0.6	Acceptable
22	0.6	Acceptable
23	0.6	Acceptable
24	0.6	Acceptable

propriate, scores between 0.7 and 0.79 require revision, and scores below 0.7 are considered unacceptable [24].

2. $CVR = \frac{Ne - \frac{N}{2}}{\frac{N}{2}}$

3. $CVI = \frac{N_1}{N}$

Results

Face validity

In terms of qualitative face validity, the patients' opinions regarding the items and questions of the questionnaire were acceptable. Consequently, the PM-3D4D questionnaire was deemed clear, appropriate, and satisfactory in both structure and concept. The assessment of quantitative face validity revealed that the impact scores

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Table 3. Information on the CVI of the PM-3D4D Questionnaire in chronic stroke patients (n=15)

Item	R-CVI	S-CVI	C-CVI	Result
1	0.83	0.83	0.92	Acceptable
2	0.83	0.83	1	Acceptable
3	0.92	0.83	0.83	Acceptable
4	0.92	0.83	0.83	Acceptable
5	0.83	0.83	0.83	Acceptable
6	0.83	0.92	0.83	Acceptable
7	0.83	0.83	0.92	Acceptable
8	0.83	0.83	0.92	Acceptable
9	1	0.83	0.83	Acceptable
10	0.83	0.92	0.92	Acceptable
11	0.83	0.83	0.92	Acceptable
12	0.83	0.83	0.83	Acceptable
13	0.83	0.83	1	Acceptable
14	0.83	0.83	0.92	Acceptable
15	0.83	0.83	1	Acceptable
16	0.83	0.83	0.83	Acceptable
17	0.83	0.83	0.92	Acceptable
18	0.83	0.83	0.83	Acceptable
19	0.83	0.83	0.83	Acceptable
20	0.83	0.83	0.92	Acceptable
21	0.83	0.83	0.92	Acceptable
22	0.83	1	0.92	Acceptable
23	0.83	0.83	0.83	Acceptable
24	0.83	0.83	0.83	Acceptable

of the items ranged from 4.36 to 6.88 (>1.5), indicating that all items had acceptable importance and were retained (Table 1).

Content validity

The CVR for the items ranged from 0.6 to 0.87. Additionally, the CVI for all items across the three sections was >0.83. Based on these results, all items demonstrat-

ed necessity, simplicity, relevance to the concept, and sufficient clarity (Tables 2 and 3).

Discussion

Participation is the ultimate goal of rehabilitation programs and a key determinant of an individual's health and well-being. Given the multidimensional nature of participation, encompassing both subjective and objective aspects, and its various domains, including social,

community, and productivity, it is essential to employ a comprehensive test that addresses these areas. This study was conducted to translate and evaluate the face and content validity of the PM-3D4D questionnaire. Recognizing the importance of accurately conveying the concepts and examples in the questionnaire, cultural adaptation was performed during the translation process to account for the differences between Chinese and Iranian cultures. For instance, due to the unfamiliarity of Iranians with "Mahjong," this example was removed and substituted with "mental games." Face validity was assessed qualitatively through feedback from rehabilitation specialists and chronic stroke patients, and quantitatively based solely on the opinions of stroke patients. The results indicated that all items were clear and understandable, with acceptable importance, resulting in no deletions. The CVR and CVI were evaluated through ratings by rehabilitation experts, demonstrating that all items met acceptable levels of necessity, relevance, clarity, and simplicity. Consistent with the results of Chang et al. who reported good model fit and item fit through confirmatory factor analysis, the PM-3D4D questionnaire exhibits strong construct validity [13]. Therefore, the Persian version of the PM-3D4D questionnaire is poised to be a valuable test for future research in the field of instrument psychometrics, specifically to measure participation among adults with chronic stroke.

Conclusion

The Persian adaptation of the PM-3D4D questionnaire shows strong face and content validity, indicating that it deserves more research in the field of psychometrics as a means to assess participation in adults who have experienced chronic stroke.

Limitations and suggestions

The Persian version of the PM-3D4D questionnaire has been designed exclusively for Persian speakers in Iran, while various ethnic groups, including Azari and Arabic speakers, also reside in the country. Literacy programs in Iran are conducted in Persian. It is recommended that future studies focus on the psychometrics of the Persian version of PM-3D4D and the cultural adaptation of this questionnaire for the languages of other ethnic groups present in Iran.

Ethical Considerations

References

[1] Bonita R, Mendis S, Truelsen T, Bogousslavsky J, Toole J, Yatsu F. The global stroke initiative. Lancet Neurol. 2004; 3(7):391-3. [DOI:10.1016/S1474-4422(04)00800-2] [PMID]

[2] Bots ML, Van Dis SJ. Factsheet Beroerte. Uitgave Nederlandse Hartstichting. 2006. [Link]

[3] WHO. The top 10 causes of death. Geneva:WHO; 2020. [Link]

[4] Feigin VL, Barker-Collo S, Parag V, Senior H, Lawes CM, Ratnasabapathy Y, et al. Auckland Stroke Outcomes Study: Part 1: Gender, stroke types, ethnicity, and functional outcomes 5 years poststroke. Neurology. 2010; 75(18):1597-607. [DOI:10.1212/WNL.0b013e3181fb44b3] [PMID]

Sharifi L, et al. Persian Version of Participation Measure: Translation and Validation. Func Disabil J. 2025; 8:E316.1.

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[5] Mayo NE, Wood-Dauphinee S, Côté R, Durcan L, Carlton J. Activity, participation, and quality of life 6 months poststroke. Arch Phys Med Rehabil. 2002; 83(8):1035-42. [DOI:10.1053/apmr.2002.33984] [PMID]

[6] van der Zee CH, Visser-Meily JM, Lindeman E, Jaap Kappelle L, Post MW. Participation in the chronic phase of stroke. Top Stroke Rehabil. 2013; 20(1):52-61. [DOI:10.1310/tsr2001-52] [PMID]

[7] Cohen ME, Marino RJ. The tools of disability outcomes research functional status measures. Arch Phys Med Rehabil. 2000; 81(12 Suppl 2):S21-9. [DOI:10.1053/apmr.2000.20620] [PMID]

[8] Wade DT, de Jong BA. Recent advances in rehabilitation. BMJ. 2000; 320(7246):1385-8. [DOI:10.1136/bmj.320.7246.1385] [PMID]

[9] Dijkers MP. Issues in the conceptualization and measurement of participation: An overview. Arch Phys Med Rehabil. 2010; 91(9 Suppl):S5-16. [DOI:10.1016/j.apmr.2009.10.036] [PMID]

[10] WHO. International classification of functioning, disability, and health: Children & youth version: ICF-CY. Geneva:World Health Organization; 2007. [Link]

[11] Post M. Measuring the subjective appraisal of participation with life satisfaction measures: Bridging the gap between participation and quality of life measurement. Top Spinal Cord Inj Rehabil. 2010; 15(4):1-5. [DOI:10.1310/sci1504-1]

[12] Chang FH, Coster WJ. Conceptualizing the construct of participation in adults with disabilities. Arch Phys Med Rehabil. 2014; 95(9):1791-8. [DOI:10.1016/j.apmr.2014.05.008] [PMID]

[13] Chang FH, Liou TH, Ni P, Chang KH, Lai CH. Development of the participation measure-3 Domains, 4 Dimensions (PM-3D4D): A new outcome measure for rehabilitation. Arch Phys Med Rehabil. 2017; 98(2):286-94. [DOI:10.1016/j.apmr.2016.08.462] [PMID]

[14] Chang FH, Chang KH, Liou TH, Whiteneck GG. Validation of the participation measure-3 domains, 4 dimensions (PM-3D4D). Arch Phys Med Rehabil. 2017; 98(12):2498-506. [DOI:10.1016/j.apmr.2017.05.027] [PMID]

[15] Chang FH, Ni P. Responsiveness and predictive validity of the participation Measure-3 domains, 4 dimensions in survivors of stroke. Arch Phys Med Rehabil. 2019; 100(12):2283-92. [DOI:10.1016/j.apmr.2019.06.018] [PMID]

[16] Chang FH. Measuring participation of rehabilitation patients: test-retest reliability and mode of administration concordance of the Participation Measure-3 Domains, 4 Dimensions (PM-3D4D). Arch Phys Med Rehabil. 2017; 98(8):1622-7. [DOI:10.1016/j.apmr.2017.02.022] [PMID]

[17] Goldstein FC, Ashley AV, Miller E, Alexeeva O, Zanders L, King V. Validity of the montreal cognitive assessment as a screen for mild cognitive impairment and dementia in African Americans. J Geriatr Psychiatry Neurol. 2014; 27(3):199-203. [DOI:10.1177/0891988714524630] [PMID]

[18] Aben I, Verhey F, Lousberg R, Lodder J, Honig A.Validity of the beck depression inventory, hospital anxiety and depression scale, SCL-90, and hamilton depression rating scale as screening instruments for depression in stroke patients. Psychosomatics. 2002; 43(5):386-93. [DOI:10.1176/appi.psy.43.5.386] [PMID]

[19] Boonstra AM, Schiphorst Preuper HR, Balk GA, Stewart RE. Cut-off points for mild, moderate, and severe pain on the visual analogue scale for pain in patients with chronic musculoskeletal pain. Pain. 2014; 155(12):2545-50. [DOI:10.1016/j.pain.2014.09.014] [PMID]

[20] Bullinger M, Alonso J, Apolone G, Leplège A, Sullivan M, Wood-Dauphinee S, et al. Translating health status questionnaires and evaluating their quality: The IQOLA project approach. J Clin Epidemiol. 1998; 51(11):913-23. [DOI:10.1016/S0895-4356(98)00082-1] [PMID]

[21] Wagner AK, Gandek B, Aaronson NK, Acquadro C, Alonso J, Apolone G, et al. Cross-cultural comparisons of the content of SF-36 translations across 10 countries: Results from the IQOLA project. J Clin Epidemiol. 1998; 51(11):925-32. [DOI:10.1016/S0895-4356(98)00083-3] [PMID]

[22] Mohammadbeigi A, Mohammadsalehi N, Aligol M. [Validity and reliability of the instruments and types of measurments in health applied researches (Persian)]. J Rafsanjan Univ Med Sci. 2015; 13(12):1153-70. [Link]

[23] Yaghmaie FJ. Content validity and its estimation. J Med Edu. 2003; 3(1):e105015. [Link]

[24] Lawshe CH. A quantitative approach to content validity. Per Psychol 1975; 28(4):563-75. [DOI:10.1111/j.1744-6570.1975.tb01393.x]

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