



Original Article

Translation and psychometric evaluation of the Persian version of the Mini International Classification of Functionality, Disability and Health Rating for Activity and Participation Disorders in Psychological Illnesses (Mini-ICF-APP)

Fatemeh Ghaedi-Heidari¹, Samira Abbasi^{2*}, Alireza Irajpour³, Michael Linden⁴, Zahra Taheri⁵

¹Department of Psychiatric Nursing, Nursing and Midwifery Care Research Center, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

²Department of Psychiatric Nursing, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

³Department of Nursing and Midwifery, Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

⁴Department of Psychosomatic Medicine, Charité University Medicine Berlin, Berlin, Germany

⁵Department of Sociology, Faculty of Social Sciences, Imam Khomeini International University, Qazvin, Iran

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Corresponding Author:

Samira Abbasi, Department of
Psychiatric Nursing, Faculty of
Nursing and Midwifery, Isfahan
University of Medical Sciences,
Isfahan, Iran.
E-mail: s.abbasi@nm.mui.ac.ir

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ABSTRACT

Background & Aim: Patients with mental disorders frequently experience limitations in activity and social participation, potentially disrupting recovery and social reintegration. Accurate assessment of these limitations is essential for treatment planning and rehabilitation. This study aimed to determine the validity and reliability of the Persian version of the Mini International Classification of Functionality, Disability and Health Rating for Activity and Participation Disorders in Psychological Illnesses.

Methods & Materials: This methodological study was conducted in 2025 among patients discharged from the psychiatric wards. Following forward-backward translation, face and content validity were assessed by 11 experts. Construct validity was evaluated using Exploratory Factor Analysis, followed by Confirmatory Factor Analysis in 193 patients. Reliability was assessed using Cronbach's alpha and the Intraclass Correlation Coefficient.

Results: All items demonstrated satisfactory face and content validity, with no item removed. Content Validity Ratio values ranged from 0.63 to 1.00, while the overall Scale-level Content Validity Index was 0.88, indicating acceptable but slightly below-threshold content validity. Exploratory Factor Analysis identified a three-factor structure explaining 51.13% of the total variance. Confirmatory Factor Analysis showed acceptable model fit. Cronbach's alpha was 0.76 overall, and the Intraclass Correlation Coefficient for the total scale was 0.796, indicating satisfactory internal consistency and stability.

Conclusion: The Persian Mini International Classification of Functionality, Disability and Health Rating for Activity and Participation Disorders in Psychological Illnesses demonstrates acceptable face, content, and three-factor structural validity. However, the low internal consistency of the third factor and suboptimal Tucker-Lewis Index fit warrant caution in interpreting subscale scores.

Introduction

Mental disorders are among the leading causes of disability worldwide. According to the World Health Organization (WHO), approximately 5% of adults globally suffer from mental disorders, and one in every four individuals experiences a disturbance in mental health status during their lifetime. Recent studies indicate that the global prevalence of mental disorders ranges from 11% to 23.8%, with prevalence rates among adults estimated

between 12.6% and 48.6% (1). The prevalence of mental disorders in Iran is consistent with global trends, with depression and anxiety being the most commonly diagnosed conditions, and their burden on the population continuing to increase. Studies have shown that nearly seven million individuals in Iran are affected by some form of mental disorder (2).

Patients with mental disorders often struggle with persistent symptoms that interfere



with their daily functioning within the community. Furthermore, relapse symptoms and repeated hospitalizations adversely affect many patients' ability to adapt to everyday life in society (3). In fact, these patients are vulnerable in terms of maintaining interpersonal relationships, frequently lack the necessary skills for independent living, and in more severe cases, lose their employment due to inadequate social skills (4). Consequently, individuals with mental disorders can be considered among the socially marginalized groups in society. Despite advances in the treatment and rehabilitation of these patients, they continue to experience social isolation and face numerous challenges related to occupational participation, securing appropriate housing, engaging in leisure activities, and maintaining social relationships (5). In response to these challenges, social participation has become a fundamental objective and value within mental health services and policies (6).

Within the International Classification of Functioning, Disability and Health (ICF), the World Health Organization defines participation as "involvement in life situations" (7). Social participation, as a dimension of participation, refers to the extent of an individual's involvement in interpersonal interactions, fulfillment of social roles, engagement in group activities, and access to social relationships and community resources (8). Given the low levels of social participation among individuals with mental disorders (9), and considering the association between increased social participation and greater perceived recovery, reduced symptom severity, and enhanced social interaction in these patients (10), promoting social participation through rehabilitation and community-based interventions is considered one of the key objectives in the treatment and recovery of individuals with mental disorders (11).

Accordingly, considering the importance of social participation among patients with mental disorders, mental health professionals involved in the care, treatment, and rehabilitation of these patients should assess the functional limitations affecting activity and participation. When necessary, timely interventions should be implemented to

reduce these limitations during hospitalization or following discharge from psychiatric wards, thereby facilitating patients' reintegration into society as rapidly as possible.

According to a systematic review conducted by Amagai et al. (12), several instruments have been used to assess participation among patients with mental disorders. Among these, the Self-Efficacy for Social Participation Scale, developed in Japan, consists of 37 items and was designed to assist professionals in planning therapeutic programs aimed at enhancing social participation self-efficacy among individuals with mental disorders (12). Another instrument is the Comprehensive Inventory of Community Participation for Individuals with Psychiatric Disabilities, a relatively novel tool in psychiatric rehabilitation developed in the United States to assess community participation among individuals with mental disorders across multiple dimensions (13). However, evidence regarding its widespread application across different psychiatric populations remains limited. In this context, the ICF Checklist was developed by the World Health Organization to address the limitations of previous instruments, including the lack of a theoretical framework and insufficient specificity. The checklist comprises 125 categories covering five dimensions: body functions, body structures, activities, participation, and environmental factors. Among these, the activities and participation dimension includes 47 categories across nine domains (14).

Due to the complexity of the ICF Checklist in the domain of activities and participation, the Mini-ICF-APP was developed in Germany to enable rapid assessment and reliable documentation of impairments related to activity performance among patients with mental disorders and was introduced as a valid and reliable instrument (15). The validity and reliability of this instrument have subsequently been confirmed among psychiatric populations in several countries (16–19). Nevertheless, no standardized instrument is currently available in Iran to assess activity and participation among individuals with mental disorders.

Therefore, given the importance of addressing participation in patients with mental disorders, the potential impact of functional impairment and disability on patients' access to services (20), and the need for a reliable instrument that can be used by professionals to evaluate social participation, particularly during the post-discharge period and to facilitate patients' successful reintegration into society, the present study aimed to determine the validity and reliability of the Persian version of the Mini International Classification of Functionality, Disability and Health Rating for Activity and Participation Disorders in Psychological Illnesses (Mini-ICF-APP)

Methods

Study design, Participants & Setting

The present methodological study evaluated the validity and reliability of the Persian version of the Mini International Classification of Functionality, Disability and Health Rating for Activity and Participation Disorders in Psychological Illnesses (Mini-ICF-APP) among patients with mental disorders who had been discharged from psychiatric wards. The study was conducted between July and September 2025 in two educational-therapeutic hospitals, affiliated with Isfahan University of Medical Sciences, Iran, namely Khorshid and Farabi hospitals.

Two psychologists from the mentioned hospitals completed the demographic questionnaire and the Mini-ICF-APP questionnaire through interviews with patients and/or their family members. Convenience sampling was employed. Inclusion criteria for psychologists included willingness to participate in the study and holding at least a bachelor's degree. Inclusion criteria for patients included willingness to participate in the study, age above 18 years, and a recent history of hospitalization in psychiatric wards.

Scale

The Mini-ICF-APP was originally developed by Michael Linden and Stefan Baron in 2005 to assess the psychosocial functioning of patients with mental disorders, regardless of psychiatric diagnosis. The instrument also

describes and classifies impairments in activities and capacities that may lead to participation restrictions among patients (7). The questionnaire consists of 13 items, each evaluating a specific functional ability or domain, including:

adherence to rules and daily routines, planning and organization of tasks and duties, flexibility and ability to adapt to changes, competency and application of knowledge, decision-making and judgment ability, initiative and spontaneous activity, persistence and endurance, assertiveness, communication and brief interactions with others, group integration, close relationships with others, self-care, and mobility.

The questionnaire is scored using a 5-point Likert scale ranging from 0 (no disability) to 4 (complete disability). The total score ranges from 0 to 52. Scores of 3–7 indicate mild participation restriction; 8–15, moderate restriction; 16–24, marked restriction; 25–37, severe restriction; and 38 or higher, very severe participation restriction.

Translation

After obtaining permission from the developers of the instrument, the scale was translated based on the World Health Organization's WHODAS 2.0 (Disability Assessment Schedule) translation protocol (21) using the forward-backward translation method. In the first stage, the questionnaire was translated into Persian by two Persian-speaking translators, one of whom was familiar with medical concepts. Subsequently, another Persian-speaking translator synthesized the two initial translations into a single version. In the next step, the resulting Persian version was back-translated into English by two English-speaking translators. Finally, the research team, together with the translators, reviewed the Persian version and reached a preliminary consensus to ensure that the final Persian version was semantically, idiomatically, experientially, and conceptually equivalent to the original instrument.

Face validity

Face validity was assessed using both qualitative and quantitative approaches. In the

qualitative phase, the opinions of 11 experts in psychiatric nursing and clinical psychology regarding the difficulty, relevance, and clarity of the items were obtained. In the quantitative phase, the item impact score was calculated using a 5-point Likert scale ranging from “completely important” (score= 5) to “not important” (score= 1). In this method, the percentage of participants assigning scores of 4 or 5 to each item was multiplied by the mean importance score of that item to obtain the item impact score. Items with impact scores equal to or greater than 1.50 were considered appropriate and retained for subsequent analyses; otherwise, the item was removed (22).

Content validity

Content validity was assessed using both qualitative and quantitative methods. In the qualitative phase, 11 experts in psychiatric nursing and clinical psychology provided written feedback regarding content comprehensiveness, grammatical accuracy, appropriateness of wording, and item placement. In the quantitative phase, the Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated.

To calculate CVR, Lawshe’s table was used. Experts were asked to evaluate each item based on a three-point scale: “essential” (score = 3), “useful but not essential” (score = 2), and “not essential” (score = 1). Responses were then calculated using the following formula:

$$CVR = \frac{n_e - N/2}{N/2}$$

In this formula, n_e represents the number of experts who rated the item as essential, and N represents the total number of experts.

Items with calculated CVR values exceeding the critical values in Lawshe’s table were considered to have acceptable content validity. To calculate CVI, experts evaluated each item regarding relevance and specificity using a 4-point Likert scale ranging from “completely relevant” (score = 4) to “irrelevant” (score = 1). The item-level CVI (I-CVI) was calculated as the proportion of experts assigning scores of 3 or 4 to each item. Items with I-CVI values of 0.78 or higher were accepted. In addition, the scale-level CVI (S-CVI) was

calculated as the average of all I-CVI scores, with a value of 0.90 considered acceptable (23).

Preliminary item analysis

Prior to construct validity assessment, a preliminary item analysis was conducted, evaluating the instrument’s overall reliability through internal consistency analysis and examining inter-item correlations. For this purpose, the instrument was completed by 30 patients with mental disorders who had recently been discharged from psychiatric wards of Khorshid and Farabi hospitals, affiliated with Isfahan University of Medical Sciences, Iran. Items with corrected item–total correlation coefficients greater than 0.30 were retained (24) and entered into the exploratory factor analysis stage.

Construct validity

Exploratory Factor Analysis (EFA) was employed to evaluate construct validity. Sample size was determined based on the number of questionnaire items (5–20 participants per item) (25). Given that the instrument contained 13 items, the minimum required sample size was estimated at 130 participants. However, to improve factor structure stability, increase parameter estimation precision, and reduce potential error, a larger sample size than conventionally recommended, approximately 200 participants, was targeted. Ultimately, with a response rate of 96.5%, data from 193 participants were included in the final analysis.

The factor structure was extracted using Principal Axis Factoring (PAF) with Varimax rotation to identify the underlying latent dimensions of the Persian version of the Mini-ICF-APP. The Kaiser–Meyer–Olkin (KMO) index was used to assess sampling adequacy; values range from 0 to 1, with values above 0.70 indicating adequate suitability of the data for factor analysis. Bartlett’s test of sphericity was also used to examine the significance of the correlation matrix; a significant result ($p < 0.05$) is considered a prerequisite for factor analysis (26).

During the analysis process, factor loadings above 0.30 were considered acceptable (27), and items with lower factor loadings were removed. Furthermore, factor extraction was

performed based on eigenvalues greater than one, which is considered a necessary criterion in factor analysis (24). The scree plot was also examined to determine the optimal number of factors to be retained.

Following EFA, Confirmatory Factor Analysis (CFA) was performed using IBM SPSS Amos version 24 (IBM Corp., Armonk, NY, USA) to examine the factorial validity of the extracted model. Both the EFA and CFA were conducted using the same sample. Model fit was evaluated using multiple goodness-of-fit indices, including the chi-square to degrees of freedom ratio (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Tucker–Lewis Index (TLI), and Root Mean Square Residual (RMR). A χ^2/df ratio of less than 3.0, RMSEA < 0.08, RMR < 0.05, and GFI, CFI, IFI, and TLI values of 0.90 or higher were considered indicative of an acceptable model fit (28).

Reliability

The reliability of the questionnaire was evaluated using Cronbach's alpha coefficient to assess internal consistency. A Cronbach's alpha value above 0.70 was considered indicative of satisfactory internal consistency (28)(29). Test-retest reliability was assessed using a subsample of 30 patients. The questionnaire was administered on two separate occasions with a two-week interval (14 days). No attrition occurred during this phase, and all 30 participants completed both assessments. The Intraclass Correlation

Coefficient (ICC) was calculated using a two-way random effects model with absolute agreement.

Ethical considerations

This study was derived from a research project approved by Isfahan University of Medical Sciences with the ethical approval code IR.MUI.REC.1403.048. To ensure adherence to ethical considerations, the objectives and conditions of participation were explained to the patients and their family members. Written informed consent was obtained from the patients and their primary family caregivers. The questionnaires were completed anonymously, and participants were assured that their responses would remain confidential and would be used solely for research purposes. Participation in the study was entirely voluntary.

Data analysis

Data were analyzed using IBM SPSS Statistics. In all analyses, p-values less than 0.05 were considered statistically significant.

Results

Sociodemographic characteristics of the participants

The age range of the participants was 19 to 73 years, with a mean age of 39.93 ± 12.09 years. The majority of participants were female (54.2%), single (54.7%), had a diploma-level education (43.2%), and were diagnosed with bipolar disorder (45.3%) (Table 1).

Table 1. Demographic characteristics of participants (N = 192)

Variable	Category	n	%
Gender	Female	104	54.20
	Male	88	45.80
Marital Status	Married	30	15.60
	Single	105	54.70
	Divorced	47	24.50
	Widowed	10	5.20
Education Level	Below Diploma	54	28.10
	Diploma	83	43.20
	Associate Degree	37	19.30
	Bachelor's Degree and Higher	18	9.40
Diagnosis	Anxiety Disorders	25	13.00
	Schizophrenia	32	16.70
	Major Depressive Disorder	44	22.90
	Bipolar Disorder	87	45.30
	Other	4	0.50

Face and content validity

During the face validity assessment, items 5, 6, and 12 were revised to improve sentence clarity and simplicity. The range of item impact scores was 2.0–4.6, with the highest and lowest scores corresponding to items 8 and 6, respectively. Since no item had an impact score lower than 1.5, none of the items were removed at this stage.

During the qualitative content validity assessment, experts confirmed the appropriateness of the items in terms of relevance to the intended construct, content comprehensiveness, and grammatical accuracy. The CVR values for the items ranged from 0.63 to 1.00, all of which exceeded Lawshe's critical value of 0.59 for the given number of experts. Therefore, no items were considered unnecessary or removed at this stage. Additionally, the CVI values for individual items ranged from 0.72 to 1.00. The scale-level CVI (S-CVI), calculated as the mean of all I-CVI

scores, was 0.88, indicating acceptable, though slightly below the recommended threshold, content validity.

Item analysis

Item-level descriptive statistics were examined, including the mean, standard deviation, skewness, kurtosis, and corrected item–total correlation. The skewness coefficients ranged from –0.91 to 0.51, whereas the kurtosis coefficients ranged from –0.60 to 0.71, indicating no substantial departure from normality at the item level. Corrected item–total correlations ranged from 0.024 to 0.526, with most items demonstrating correlations above 0.30. The complete item-level results are presented in Table 2. Cronbach's alpha coefficient obtained from the item analysis was 0.82. All items demonstrated corrected item–total correlation coefficients greater than 0.30. Therefore, all items were considered suitable for entry into the exploratory factor analysis stage.

Table 2. Item analysis

Item	Mean	SD	Skewness	Kurtosis	Corrected item–total correlation
V1	1.93	0.81	0.247	0.714	0.384
V2	1.54	0.77	–0.339	–0.265	0.343
V3	1.52	0.83	0.255	0.511	0.386
V4	1.33	0.80	–0.080	–0.603	0.345
V5	1.51	0.76	–0.034	–0.299	0.400
V6	1.25	0.78	0.169	–0.358	0.526
V7	1.41	0.85	0.485	0.566	0.371
V8	1.60	0.78	–0.079	–0.344	0.494
V9	1.52	0.72	0.515	–0.272	0.414
V10	1.77	1.11	0.380	–0.435	0.424
V11	2.06	1.00	0.429	–0.256	0.525
V12	2.36	0.90	–0.197	0.202	0.316
V13	3.33	0.80	–0.911	–0.106	0.024

Construct validity

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.802, and Bartlett's test of sphericity was statistically significant ($\chi^2 = 541.674$, $df = 78$, $P < 0.001$), indicating that the correlation matrix was appropriate for factor analysis (Table 2). Exploratory factor analysis was conducted using Principal Axis Factoring (PAF).

Based on the Kaiser criterion (eigenvalues > 1), a three-factor solution was retained. The initial eigenvalues of the three extracted factors were 3.830, 1.503, and 1.314, explaining 29.47%, 11.56%, and 10.11% of the total variance, respectively. Collectively, the three factors accounted for 51.13% of the total variance (Table 3). The scree plot also supported the retention of three factors by showing a clear inflection point after the third factor (Figure 1).

Table 3. Summary of exploratory factor analysis

Factor	Eigenvalue	Variance (%)	Cumulative (%)	Cronbach α
1	3.830	29.47	29.47	0.786
2	1.503	11.56	41.03	0.697
3	1.314	10.11	51.13	0.546

Principal axis factoring; KMO = 0.802; Bartlett's $\chi^2(78)=541.674$, $p<.001$.

Table 4. Rotated factor loadings

Item	Factor 1	Factor 2	Factor 3
V1	0.417†		0.429†
V2	0.544†	0.337†	
V3	0.541		
V4	0.538		
V5	0.626		
V6	0.532		
V7	0.557		
V8	0.376†	0.327†	
V9	0.433		
V10		0.760	
V11		0.638	
V12			0.632
V13			0.541

† Cross-loading. Cross-loadings are retained and displayed to facilitate interpretation of the factor structure

Following Varimax rotation, the factor structure became more interpretable. The first factor consisted of nine items (V1 to V9), the second factor included two items (V10–V11), and the third factor comprised two items (V12–V13). Rotated factor loadings ranged from 0.433 to 0.626 for the first factor, 0.638 to 0.760 for the second factor, and 0.541 to 0.632 for the third factor (Table 4). Based on the conceptual

similarity of the retained items and the theoretical framework of the Mini-ICF-APP, Factor 1 was labeled "Cognitive-Social Functions", Factor 2 was labeled "Interpersonal Interactions", and Factor 3 was labeled "Functional Autonomy". These labels reflect the underlying constructs represented by the items loading on each factor.

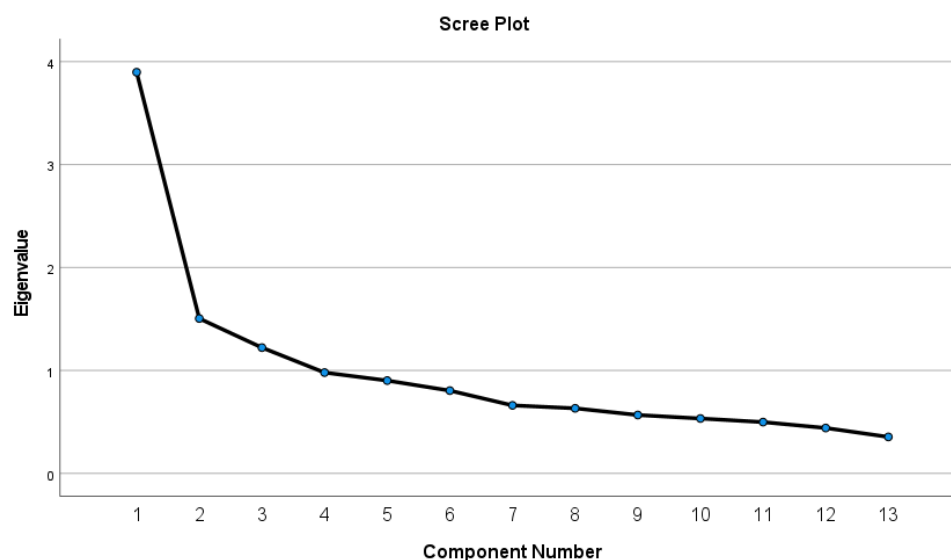


Figure 1. Scree plot of the exploratory factor analysis

Reliability

The overall Cronbach's alpha coefficient of the questionnaire was 0.76, indicating satisfactory internal consistency of the questionnaire items. In addition, the internal consistency of the extracted factors was then evaluated separately. Cronbach's alpha

coefficients were 0.786 for Factor 1, 0.697 for Factor 2, and 0.546 for Factor 3 (Table 3). Corrected item–total correlations ranged from 0.402 to 0.541 for the first factor, whereas both items of the second and third factors showed corrected item–total correlations of 0.537 and 0.375, respectively.

The overall stability of the questionnaire was assessed using the Intraclass Correlation Coefficient (ICC), which was 0.796 (95% CI: 0.62–0.91, $p < 0.001$), indicating satisfactory

stability of the instrument. Furthermore, the F-test demonstrated that the ICC value of the questionnaire was significantly greater than zero ($p < 0.001$).

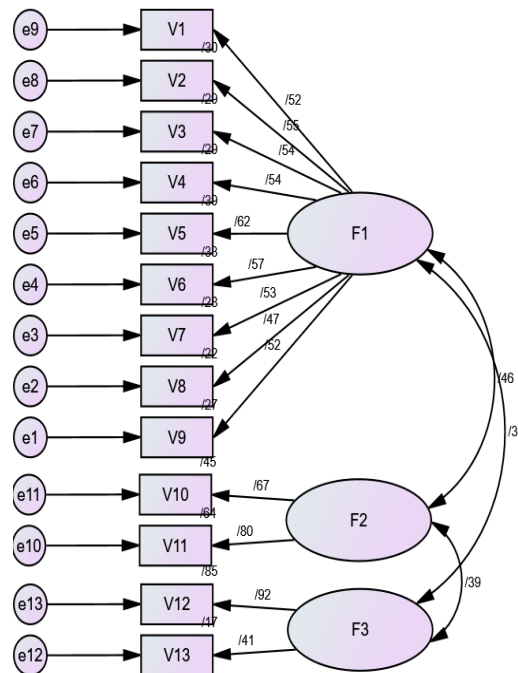


Figure 2. Standardized estimates of the correlated first-order three-factor confirmatory factor analysis model

Confirmatory factor analysis

The correlated first-order three-factor model demonstrated an acceptable fit to the data (Figure 2). The chi-square to degrees of freedom ratio was 1.775 ($\chi^2 = 110.058$, $df = 62$, $P < 0.001$).

Additional goodness-of-fit indices also supported the adequacy of the model, including RMSEA = 0.064 (90% CI = 0.044–0.083), RMR = 0.047, GFI = 0.919, AGFI = 0.882, CFI = 0.900, and IFI = 0.903 (Table 5). Although the

Tucker–Lewis Index (TLI = 0.874) was slightly below the conventional criterion of 0.90, the overall pattern of fit indices indicated that the three-factor model adequately represented the data. All factor loadings were statistically significant. Standardized regression coefficients ranged from 0.467 to 0.623 for Factor 1, 0.670 to 0.802 for Factor 2, and 0.407 to 0.923 for Factor 3, providing further support for the factorial validity of the Persian version of the Mini-ICF-APP.

Table 5. Confirmatory factor analysis model fit indices

Index	Recommended	Observed
χ^2/df	<3	1.775
RMSEA	<0.08	0.064
RMR	<0.05	0.047
GFI	>0.90	0.919
AGFI	>0.80	0.882
CFI	>0.90	0.900
IFI	>0.90	0.903
TLI	>0.90	0.874
PCLOSE	>0.05	0.121

Discussion

The present study aimed to determine the psychometric properties of the Persian

version of the Mini-ICF-APP for assessing activity and participation limitations among patients with mental disorders. The findings

demonstrated that the Persian version of the instrument possesses satisfactory face, content, and construct validity, as well as acceptable reliability, with evidence derived from both exploratory and confirmatory factor analyses. Accordingly, it can be used as an appropriate instrument for assessing functioning and social participation among patients with mental disorders following discharge from psychiatric wards in Iran.

Regarding face and content validity, the CVR was within desirable ranges, indicating the appropriateness, clarity, and necessity of the items from the experts' perspectives. Although the overall S-CVI (0.88) demonstrated a high level of agreement among the expert panel, it was marginally below the predefined criterion ($S-CVI \geq 0.90$) established in this study. Therefore, the content validity of the Persian version should be interpreted as acceptable rather than excellent. Nevertheless, the consistently favorable item-level content validity indices, together with satisfactory face validity, construct validity, and reliability findings, provide complementary evidence supporting the overall adequacy of the instrument while indicating that further refinement of specific items may further strengthen its content validity.

These findings are consistent with the original study by Michael Linden and Stefan Baron (2005), who designed and introduced the first German version of the Mini-ICF-APP (16). In the study conducted by Molodynski et al. (2013) on the English version of the instrument, mental health professionals similarly evaluated the items as appropriate in terms of clinical applicability and coverage of functional concepts, and no items were removed (18). Furthermore, Linden et al. (2018), in their study of the Mini-ICF-APP self-rating version (Mini-ICF-APP-S), reported that patients demonstrated a good understanding of the items and that the items possessed satisfactory clarity and comprehensibility (19). Likewise, in the psychometric evaluation of the Polish version of the Mini-ICF-APP, all items were approved by experts regarding conceptual relevance and consistency with the intended construct, and content validity indices were reported to be acceptable (30). However, Egger et al. (2021) noted that some items, particularly those related to decision-making and judgment, initiative and

spontaneous activities, and social interaction, required further clarification for patients with chronic mental disorders (7). In the present study, several items were also revised to improve linguistic clarity, which may be attributable to cultural and linguistic differences between the Iranian population and the original German version of the instrument.

Regarding construct validity, the results of the exploratory factor analysis demonstrated that the Persian version of the Mini-ICF-APP consists of three principal factors that collectively explained an acceptable proportion of the total variance. In addition to the exploratory factor analysis, the factorial structure was further evaluated using confirmatory factor analysis. The CFA results demonstrated an acceptable overall model fit, providing stronger evidence for the structural validity of the Persian version of the Mini-ICF-APP. The convergence of the EFA and CFA findings indicates that the extracted three-factor solution adequately represents the underlying construct of activity and participation limitations in Iranian patients with mental disorders. Notably, the Tucker-Lewis Index ($TLI = 0.874$) fell slightly below the typical threshold of 0.90. This may be attributable to TLI's known sensitivity to model simplicity and sample size, as it tends to penalize more concise models, such as our 13-item, three-factor structure, more than other fit indices. Additionally, TLI is affected by the average inter-item correlation. In diverse clinical populations where correlations are moderate rather than high, TLI values often decrease even when the model is correctly specified (26). Importantly, the other primary fit indices, $RMSEA = 0.064$, $CFI = 0.900$, and $GFI = 0.919$, were all within acceptable ranges, supporting the adequacy of the three-factor model. This pattern suggests that the instrument captures the intended constructs clearly, despite the slightly lower TLI.

These findings are consistent with those reported by Egger et al., who found that the German and Italian versions of the instrument had a multidimensional structure encompassing cognitive, social, and daily functioning domains (7). In their study, items related to planning, decision-making, and stress tolerance were clustered within a cognitive-executive domain, which is in line with the findings of the present

study. Similarly, Molodynski et al., in the validation study of the English version, reported that the instrument demonstrated an adequate ability to distinguish different dimensions of functional disability and showed satisfactory conceptual coherence (18). Moreover, in the Polish validation study, factor analysis indicated that the Mini-ICF-APP possessed a stable factor structure and satisfactory factor loadings, with items showing appropriate associations with the extracted factors (30). Notably, the three-factor structure identified in the Persian version differed from those reported in the German, English, and Polish validation studies, and several contextual factors may help explain these differences. Regarding Factor 1 ("Cognitive–Social Functions"), cognitive-executive abilities (e.g., planning, decision-making, and flexibility) clustered with communicative and assertiveness skills rather than forming separate cognitive and social domains. Based on our findings, this pattern may suggest that cognitive abilities are primarily expressed and evaluated through individuals' performance in everyday social and occupational roles, resulting in a closer association between cognitive and social functioning. The emergence of Factor 2 ("Interpersonal Interactions") as a distinct dimension may reflect the central role of family and extended social networks in Iranian society, where interpersonal functioning is closely embedded within family relationships and collective social life. Finally, the emergence of Factor 3 ("Functional Autonomy") may also reflect the relatively limited availability of community-based rehabilitation and psychosocial support services after discharge in Iran, placing greater emphasis on individuals' personal capacity to maintain independent functioning in daily life.

Although the present study provides evidence for construct validity through both exploratory and confirmatory factor analyses, additional sources of validity evidence were not evaluated. Specifically, convergent validity, discriminant validity, and criterion validity could not be examined because no validated Persian-language instrument assessing the same construct of activity and participation limitations in psychiatric populations was available. Consequently, the construct validity of the Persian Mini-ICF-APP should be interpreted

within the scope of the analyses performed in this study.

The total scale demonstrated acceptable reliability ($\alpha = 0.76$). However, subscale consistency varied across Factor 1 (9 items, $\alpha = 0.786$), Factor 2 (2 items, $\alpha = 0.697$), and Factor 3 (2 items, $\alpha = 0.546$). Factors 1 and 2 provided acceptable to good reliability, while Factor 3 had the lowest alpha. This can be explained by two considerations. First, from a psychometric perspective, Cronbach's alpha is influenced by the number of items, a phenomenon known as the 'item-count effect.' With only two items, reaching the conventional threshold of 0.70 is statistically difficult (31). Second, from a clinical standpoint, the construct of "functional autonomy" is inherently complex in psychiatric patients. Self-care and mobility may not be equally affected across various diagnoses or individuals. Although the Mini-ICF-APP was originally developed as a transdiagnostic instrument for assessing activity and participation limitations across mental disorders, previous studies have demonstrated that patterns of functional impairment differ across psychiatric diagnoses. For example, individuals with personality disorders exhibit more pronounced limitations in social functioning (e.g., contact with others, group integration, and intimate relationships), whereas patients with mood and anxiety disorders tend to show different profiles of functional impairment (32). Furthermore, Egger et al. investigated the factorial structure of the Mini-ICF-APP across nine ICD-10 diagnostic groups and reported that, although a one-factor model provided the best overall fit, two- and three-factor solutions emerged in some diagnostic categories, indicating that the latent structure of the instrument may vary according to the clinical characteristics of the study population (7). Therefore, although the overall reliability of the Persian Mini-ICF-APP was acceptable, the third factor should be considered preliminary and interpreted with caution until its psychometric stability is confirmed in larger and diagnostically homogeneous populations.

These findings are to some extent consistent with the original study conducted by Linden and Stefan Baron, who also reported favorable reliability of the instrument among patients with mental disorders (16). Molodynski

et al. similarly reported satisfactory internal consistency and inter-rater agreement for the English version and stated that the Mini-ICF-APP is a reliable instrument for assessing functioning among psychiatric patients (18). In addition, Linden et al. reported appropriate reliability coefficients for the Mini-ICF-APP-S self-rating version (19). In the Polish validation study, Cronbach's alpha and reliability indices were also reported within acceptable ranges, and the instrument was introduced as a reliable measure for assessing activity and participation limitations (30). Furthermore, findings from another study indicated that the instrument demonstrated high inter-rater reliability and was capable of consistently capturing changes in patients' functional capacities over time (33).

However, several limitations should be acknowledged. The relatively low TLI and the low internal consistency of the third factor suggest that further psychometric validation of the Persian Mini-ICF-APP is warranted. The small number of items per factor may have contributed to these issues, and larger samples in future studies are needed to confirm the factor structure and improve subscale reliability. Another limitation of the present study was that both the exploratory factor analysis (EFA and CFA were performed using the same sample. Therefore, the identified factor structure was not cross-validated in an independent sample. Future studies with independent samples are recommended to further evaluate the stability and generalizability of the proposed factor structure.

Conclusion

In conclusion, the Persian version of the Mini-ICF-APP demonstrates promising psychometric properties, including satisfactory face, content, and construct validity. The three-factor structure, encompassing "Cognitive-Social Functions", "Interpersonal Interactions", and "Functional Autonomy", was empirically supported by both EFA and CFA. However, the low internal consistency of the third factor (Functional Autonomy, $\alpha = 0.546$) warrants caution in its interpretation and suggests that its items may need further refinement or that the factor may be better conceptualized as a standalone screener rather than a reliable subscale. Despite this limitation, the overall scale

shows acceptable stability (ICC = 0.796) and offers a potentially valuable, brief instrument for assessing activity and participation limitations in Iranian patients with mental disorders. Future studies should focus on convergent and divergent validity and evaluate the instrument's responsiveness to clinical changes before recommending it for routine use in clinical and rehabilitation settings.

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Conflict of interest

There are no conflicts of interest.

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