The Egyptian Journal of Hospital Medicine (July 2025) Vol. 100, Page 4433-4440

Arabic POMA Validity and Reliability for Elderly

Ebtihal Magdy Abd El Aziz Hasan*, Nagwa Hamed Badr, Rana Hesham Mohamed Elbanna
Department of Cardiovascular Respiratory. Disorder and Geriatric,
Faculty of Physical. Therapy, Cairo University, Egypt
***Corresponding author:** Ebtihal Magdy Abd El Aziz Hasan, **Mobile:** (+20) 01141708798, **E-mail:** ebtihal141@gmail.com

ABSTRACT

Background: An effective and reliable evaluation technique is required to estimate the risk of falls in seniors. The Performance-Oriented Mobility Assessment (POMA) is a frequently used test for assessing balance and gait qualities.

Objective: This study aimed to translate the POMA into Arabic and test the face validity, content validity, internal consistency reliability, and test-retest reliability of the Arabic-language version of the POMA questionnaire in the Egyptian older adult population.

Methods: This prospective observational study had two expert panels (each with ten experts) and 100 seniors aged 60 to 80 years old. In all, 200 sheets (test and retest) were completed. The methodology included forward translation, production of a preliminary translated version, backward translation, development of a pre-final version, expert testing of the pre-final version, and lastly testing the final version on patients. Statistical analysis was performed using the Index of Clarity (IC), Expert Proportion of Clearance, Scale Index of Content Validity (S-CVI), Expert Proportion of Relevance, descriptive statistics, Cronbach's alpha, and Intraclass Correlation Coefficient (ICC).

Results: The study revealed that the scale IC was 86.5%, and the Expert Proportion of Clearance was 86.5%. The S-CVI was 100%, and the Expert Proportion of Relevance was 100%. Cronbach's alpha for the Arabic version of POMA was 0.873. The test-retest (intra-rater reliability) for the total score was 0.998.

Conclusion: The Arabic-language version of the POMA showed acceptable face and content validity, internal consistency, and test-retest reliability for assessing balance and gait in the Egyptian elderly population.

Keywords: Validity, Reliability, POMA.

INTRODUCTION

The WHO defines aging as a biological and dynamic phenomenon beyond human control. Individuals over the age of 65 are called elderly. The elderly are at a vital period of life and will make up a significant portion of the world population. According to predictions, as life expectancy increases and mortality declines, the proportion of the world's old population is expected to reach 25% by 2030 [1].

Abnormal gait is particularly common in older adults, impacting over one-third of individuals over 60 in the neighborhood. Gait abnormalities in this population are linked to a lower quality of life (QOL) and increased risk of nursing home placement, and can signify progression to dementia [2].

Falling is a serious health concern that places a huge strain on individuals, healthcare systems, and society, with injuries ranging from mild to deadly [3]. More than 25% of older persons sent to comprehensive health treatment facilities had experienced at least one fall, and more than 10% have fallen numerous times [4]. As a result, identifying older people at risk of falling early is critical for adopting fall prevention interventions [5].

Several tests and techniques have been created to predict and assess functional balance, mobility, falling, and fear of falling in this population. The Timed Up and Go (TUG) test and Dynamic Gait Index are two examples of gait evaluation tests, whereas the Berg Balance Scale (BBS), Fullerton Advanced Balance Scale (FAB), and Step Test in the Elderly are balance assessment instruments. The POMA especially assesses gait and balance in the elderly [6]. The POMA test is used to assess fall risk in community-dwelling older people, distinguishing between fallers and non-fallers, and determining the underlying causes of falls [7].

POMA takes less than 5 minutes to administer and is seen to be more practicable than many other clinical studies, such as the BBS [8]. It consists of hard activities that test reactive control, dynamic stability, and sensory integration [9].

POMA offers advantages such as applicability, minimal implementation costs, high reliability, and validity, overcoming limitations of clinical scales like the BBS, which primarily assesses balance without evaluating gait [10]. An effective questionnaire can assess the prognosis of a problem and the impact of treatment, while also revealing the severity and nature of a patient's condition [11].

Given Egypt's growing senior population, a cheap assessment tool with acceptable psychometric properties is critical for detecting and predicting balance and gait problems in the elderly. The purpose of this study was to look into the psychometric properties of the Arabic version of the POMA among older adults residing in Egypt [12].

Although subjective, self-administered surveys are standardized and adaptable to clinical changes, which can reduce bias. Any new assessment instrument used in research must be valid and trustworthy to eliminate study bias [12]. POMA scores have been established in research on the elderly to be a gold standard for accurately identifying patients as high or low risk of falling [13]. The Tinetti POMA has been adapted and validated in various cultural and linguistic contexts, including Turkish [14], Korean [7], Persian [1], and Chinese [15] to ensure its applicability across diverse populations.

Received: 02/05/2025
Accepted: 04/07/2025

It is critical to recognize that a translated scale or questionnaire does not automatically retain the same validity and reliability as its original form, necessitating further validity and reliability testing for translated versions [16]. Valid, practical, and reliable instruments are essential in physical therapy to track patient condition improvement and gauge therapeutic benefits [17]. Connectivity, nice face, content, and criteria validity are all necessary for a valid tool. Good equivalence, stability, and internal consistency are fundamental for a reliable tool [18].

MATERIAL AND METHOD

This was a prospective observational study was conducted in outpatient clinics of 6 October health insurance and El-Yasmeen seniors' center, Egypt. The study aimed to test the face validity, content validity, internal consistency reliability, and test-retest reliability of the adapted Arabic-language version of the POMA in Egyptian elders. The study followed the recommendations of **Borsa *et al.*** [19] and **Sousa & Rojjanasrirat** [20] for testing these psychometric properties.

Subjects:

Expert panels: The study featured two panels of experts, each with ten specialists. All experts primarily worked with Arabic populations. All experts had at least ten years of experience or held a master's degree and were fluent in both Arabic and English.

Participants: One hundred seniors aged between 60-80 years old participated in this study, each providing informed consent. Every senior participant was cognizant and able to read and write in Arabic.

Exclusion criteria: Elderly people who use prostheses to replace lower limbs that have been amputated. Elderly people who had orthopedic surgery within the previous six months, those who were bedridden or in wheelchairs, those suffering from dementia or Alzheimer's disease, and those who were unable to follow directions because of sensory aphasia or deafness.

Method: The primary assessment tool used was the Tinetti POMA, by Tinetti [21].

A regular chair and a timer are the only expensive equipment needed for the simple POMA. A qualified expert administers it in around ten to fifteen minutes [22].

The POMA comprises two components: A balance subscale (POMA-B) with 9 items and a gait subscale (POMA-G) with 7 items [23]. A 3-point ordinal scale (0–2) is used to rate each item, with a maximum potential score of 28. A score of 2 indicates independence, while zero indicates the highest level of impairment. Scores of 25 to 28 suggest low fall risk, 19 to 24 indicate medium fall risk, and scores below 19 signify high fall risk [10]. It assesses many facets of balance that are not covered by other widely used tests, such the TUG and BBS tests. The POMA-B comprises nine position changes, including sitting balance, standing balance, arising, efforts to arise, and sitting down, that assess static balance ability. Step length and height, step symmetry, and gait commencement are among the seven gait exercises that are included in the POMA-G and are utilized in day-to-day activities [24].

The method described by **Sousa & Rojjanasrirat** [20] was followed in translating and adapting the integrated form of the POMA into Arabic, which included the following steps:

1. **Forward translation:** Two translators (Ar1 and Ar2) independently translated the English questionnaire into Arabic. One translation was skilled in health terminology and the subject area of the tool, while the other was acquainted with the cultural and linguistic peculiarities of the Arabic language.
2. **Development of preliminary initial translated Arabic version:** The researchers rectified grammatical flaws and inconsistencies by comparing and merging the two Arabic versions (Ar1 and Ar2).
3. **Blind back-translation:** The preliminary Arabic version was back-translated into English separately by two translators with different backgrounds (En1 and En2). One was conversant with the cultural and linguistic intricacies of the English language, while the other was well-versed in health terms and the subject matter.
4. **Comparison of back-translated versions:** For instructions, items, answer format, language, sentence structure, meaning, and relevance, the researchers compared En1 and En2—as well as with the original integrated English form—with one another. The preliminarily prepared Arabic version was regarded as the pre-final version, and no modifications were required.
5. **Pilot test for face and content Validity (Expert Review):**
   - **Face validity:** The initial panel of 10 experts assessed the clarity of each item in the pre-final Arabic translation using binary questions (clear/unclear) and offered recommendations for enhancement.
   - **Content validity:** Each item was assessed for content equivalency (content-related validity) by the second expert panel using a 4-point rating system: 1 for not relevant, 2 for unable to judge relevance, 3 for relevant but requires minor modification, and 4 for extremely relevant and succinct. Scores of 3 and 4 were considered relevant. Based on expert recommendations, modifications were made to enhance clarity and relevance of items.
6. **Pilot testing 2 on elders:** The final Arabic version of the questionnaire was administered to 100 elderly participants.

7. **Test-retest procedure:** The 100 elderly participants completed the questionnaire again after one week to assess test-retest reliability.

Ethical approval: The Faculty of Physical Therapy's Ethics Committee at Cairo University approved this work. After receiving all of the information, all participants signed their permissions. The Helsinki Declaration was followed throughout the course of the investigation.

Data collection: For each patient, the following information was recorded:

- Missing responses were left unfilled.
- If a patient marked two responses or an unclear mark, the answer was regarded as blank.
- Missing data (any data in the sheet except answers) were left blank if not obtainable by telephone.

Statistical analysis:

To analyze the data, SPSS version 26.0 for Windows was used. The following measures were used:

- **Ratio:** Calculated as a/b representing the frequency of some event occurrence.
- **Proportion:** Calculated as a/(a+b), where the numerator is a subset of the denominator, representing a relative frequency.
- **Clarity index (IC):** Defined as the ratio of raters who agreed that words were clear to the total number of raters. The item IC was the ratio of clear responses to the total raters for each item. This was used to measure the face validity of the Arabic POMA.
- **Expert proportion of clearance:** Defined as the ratio of agreement number to the total rates number for each rater, also used for face validity.
- **Index of content validity (CVI):** Defined as the ratio of raters who agreed that items were relevant to the total number of raters. This was employed to assess the Arabic POMA's content validity.
- **Expert proportion of relevance:** Defined as the ratio of agreement number to the total rates number for each rater, also used for content validity.
- **Descriptive statistics:** Used to summarize and compare patient data, including mean, median, SD, minimum & maximum values.
- **Cronbach's alpha:** This metric, which is determined by the number of items, average covariance between item pairings, and total score variance, measures the dependability of internal consistency. Using this, the Arabic POMA's internal consistency dependability was evaluated.
- **ICC:** Evaluated the test-retest stability (dependability over time) of the Arabic POMA and offered a statistical method of measuring reliability. Face validity was evaluated using the expert proportion of clearing and the clarity index. Relevance expert percentage and S-CVI were used to assess content validity. The ICC was used to assess intra-rater reliability, while Cronbach's alpha coefficient was used to assess internal consistency dependability.

RESULTS

The study involved ten expert physical therapists and 100 Egyptian elderly subjects. Statistical analysis of the POMA's validity was carried out using the IC and ICV, and Cronbach's alpha and the ICC were used to measure reliability.

I. **Experts results:** The mean proportion of clearance (clear responses) from experts was 86.5%. Among the experts, 40% showed a 100% proportion of clearance, 30% showed 80-90%, 20% showed 70-75%, and 10% showed 65% [Table 1].

Table. (1): Experts proportion of clearance of Arabic version of POMA

Expert No.	No. of agreement (clear responses)	Proportion of clearance
1	15	75%
2	20	100%
3	14	70%
4	20	100%
5	18	90%
6	20	100%
7	13	65%
8	20	100%
9	16	80%
10	17	85%
Mean	17.3	86.5%

Content validity: The second panel of ten expert physiotherapists, with a mean experience of 21 ± 6.57 years (ranging from 10-31years) assessed content validity [Table 2].

Table. (2): Mean and standard deviation of experts' experience years.

Experts	Experience (years)
N	10
Mean	21
±S. D.	6.57
Minimum	10
Maximum	31

This panel included three professors, three assistant professors, one lecturer, one consultant, and one assistant lecturer [Table 3]. Their specialties were orthopedics (1), basic science (1), cardiopulmonary and geriatrics (5), neurology (2), and woman health (1) [Table 4].

Table. (3): Experts' academic degree.

	Academic degree						Total
	Professor	Assistant Professor	Lecturer	Consultant	Assistant lecturer	Specialist	
Frequency	3	3	1	1	1	1	10
Percentage	30%	30%	10%	10%	10%	10%	100%

Table. (4): Experts' specialty.

	Specialty					Total
	Orthopedic	Basic science	Cardio-pulmonary, Geriatrics	Neurology	Woman health	
Frequency	1	1	5	2	1	10
Percentage	10%	10%	50%	20%	10%	100%

The mean expert proportion of relevance was 100%, with all experts showing a 100% proportion of relevant responses [Table 5].

Table. (5): Experts proportion of relevance of the Arabic version of POMA

Expert No.	No. of agreement (relevant responses)	Proportion of relevance
1	20	100%
2	20	100%
3	20	100%
4	20	100%
5	20	100%
6	20	100%
7	20	100%
8	20	100%
9	20	100%
10	20	100%
Mean	20	100%

II. Patients results

1. **Descriptive statistics of patients:** The study group comprised 100 elderly patients (41 males, 59 females) suffering from various health issues, including diabetes mellitus and hypertension. The mean age was 65.88 ± 5.93 years, mean body weight was 76.75 ± 13.41 kg, mean height was 162.27 ± 8.54 cm, and mean BMI was 29.19 ± 4.76 kg/m^2 [Table 6].

Table. (6): Demographic data of the patients

Study group	Mean	SD	Minimum	Maximum
Age(years)	65.88	5.93	60	80.00
Body weight (Kg)	76.75	13.41	51	120.00
Height (cm)	162.27	8.54	140.00	185
BMI (kg/m^2)	29.19	4.76	20.76	44.17
Sex Males Females	Number 41 59	Percent 41% 59%		

2. **Internal consistency reliability:** Internal consistency, measured by Cronbach's alpha, was very high for the POMA observer scale, with an alpha coefficient of 0.873. For the balance section, Cronbach's alpha was 0.883, and for the gait section, it was 0.854. This confirms a very high level of internal consistency for the POMA [Table 7].

Table. (7): Internal consistency of POMA by Cronbach's Alpha

No	Item	Cronbach's Alpha if Item Deleted	Cronbach's Alpha of scale as total
Balance		0.939	0.883
1.	Question1	0.875	
2.	Question2	0.867	
3.	Question3	0.864	
4.	Question4	0.869	
5.	Question5	0.867	
6.	Question6	0.863	
7.	Question7	0.868	
8.	Question8	0.871	
9.	Question9	0.868	
10	Question10	0.865	
Gait		0.915	0.854
11.	Question11	0.873	
12.	Question12	0.866	
13.	Question13	0.866	
14.	Question14	0.867	
15.	Question15	0.873	
16.	Question16	0.864	
17.	Question17	0.862	
18.	Question18	0.867	
POMA as total			0.873

3. Test-retest reliability (Stability)

POMA total score: The total scores of the questionnaire recorded at the 1st and 2nd occasions by the same tester (intra-rater reliability) showed high reliability. The mean ± SD total score for the first reading was 20.08 ± 6.45 and for the second reading one week later, it was 20.11 ± 6.38. The Intra-class Correlation Coefficient (ICC) for the total score was 0.998 (P-value = 0.0001*), indicating very high reliability.

Balance section: The balance section also demonstrated high intra-rater reliability. The mean ± SD balance score for the first reading was 10.82 ± 3.76 and for the second reading one week later, it was 10.83 ± 3.73. The ICC for the balance section was 0.997 (P-value = 0.0001*).

Gait section: Similarly, the gait section exhibited high intra-rater reliability. The mean ± SD gait score for the first reading was 9.26 ± 2.96 and for the second reading one week later, it was 9.28 ± 2.92. The ICC for the gait section was 0.998 (P-value = 0.0001*) [Table 8].

Table. (8): ICC for test and retest Intra rater reliability of total score of POMA, balance section and gait section

	Total score of POMA		Balance		Gait section	
	1st reading	2nd reading	1st reading	2nd reading	1st reading	2nd reading
Mean	20.08	20.11	10.82	10.83	9.26	9.28
±SD	±6.45	±6.38	±3.76	±3.73	±2.96	±2.92
ICC	0.998		0.997		0.998	
P-value	0.0001		0.0001		0.0001	

All questionnaire items were filled out by 100% of the participants, with no missed items.

DISCUSSION

Clinicians require indicators that are user-friendly, valid, reliable, and sensitive to changes for monitoring disease progression and functional limitations in patients. A measuring tool's usefulness depends on its accuracy, repeatability, acceptance, usability, high reliability, validity, and adaptability to clinical changes, which are crucial criteria for determining its appropriateness in a given situation [25]. It is imperative to acknowledge that translating a scale or questionnaire into a new language does not inherently guarantee that the translated version retains the original's authenticity and dependability. Therefore, rigorous testing of the translation's validity and reliability is essential [16].

Tinetti's POMA is a fundamental and popular clinical technique for evaluating older people' gait and balance [26]. This tool has been translated into a number of languages and has proven to have reliable and valid psychometric qualities [27]. This study was especially developed to translate and evaluate the face validity, content validity, internal consistency reliability, and test-retest reliability of an Arabic language version of the POMA questionnaire. Our methodology involved 2 expert panels, each comprising 10 experts with at least ten years of experience or a master's degree, alongside 100 elderly participants aged between 60 and 80 years.

The translation and adaptation process began with forward translation into two Arabic versions, followed by the development of a preliminary translated version. This was then subjected to backward translation into 2 English versions. Prior to being tested on patients for internal consistency reliability and test-retest reliability, a pre-final version was created and approved by specialists for face and content validity. In contrast to other research that could evaluate the reliability and validity of each POMA subscale independently, our study focused on the psychometric properties of the entire questionnaire as a single unit.

Validity of the translated Arabic version of POMA

Face validity: The 100 seniors selected for the study were 41 males and 59 females aged 60 to 80 years old, with a variety of medical issues including diabetes mellitus and hypertension. This work effectively detailed the POMA's Arabic translation and adaption, while also offering rigorous evaluations of its psychometric qualities. The results indicated that the translated POMA has strong face validity, as seen by simple, straightforward, and intelligible terminology. The average IC across all twenty questions was 86.5%, as did the average expert proportion of clarity. These findings align with established guidelines, which often consider a face validity index of at least 0.83 (83%) as the minimum acceptable threshold for clarity and comprehension, as rated by experts or respondents [28]. This is further supported by **Dalawi *et al.*** [29] who noted that scores between 0.80 and 0.89 (80-90%) indicate good face validity, while scores below 0.80 may necessitate item revision to enhance clarity.

Content validity: The study also demonstrated excellent content validity, with a S-ICV of 100% and a mean expert proportion of relevance of 100%. These findings are in line with **Polit and Beck** [30], who claim that an item's Item Content Validity (I-CVI) must be 1.00 when evaluated by three to five experts, or at least 0.78 for six to ten experts, together with an S-CVI of 0.90 or above, in order for a scale to have outstanding content validity. They said that if preliminary evaluations show that significant item modifications are required, two rounds of expert review could be required. **Volker** [31] also supports this, promoting an S-CVI/Average of 0.90 or above as the minimal acceptable index, with items that fall below this level needing to be revised and reassessed.

Reliability of Arabic version of POMA:

Internal Consistency and Test-Retest Reliability of the Translated Arabic Version of POMA:

Cronbach's alpha was used to assess internal consistency. With a Cronbach's alpha of 0.873, the results demonstrated an extremely high degree of internal consistency for the POMA observer scale as a whole. In particular, the Cronbach's alpha for the balance and gait sections was 0.883 and 0.854 respectively. These values align with **George** [32] who defines excellent internal consistency as a value between 0.7 and 0.9. Furthermore, our findings are consistent with **Roh *et al.*** [33], which views adequate internal consistency as shown by a Cronbach's alpha of≥0.7.

The Arabic version of the POMA questionnaire also exhibited high test-retest reliability, as evaluated by the ICC. For the total score, administered by the same tester over a one-week interval, the ICC was 0.998 (P-value = 0.0001*). The mean total score was 20.08 ± 6.45 for the first reading and 20.11 ± 6.38 for the second. The balance section demonstrated an ICC of 0.997 (P-value = 0.0001*), with a mean scores of 10.82 ± 3.76 for the first reading and 10.83 ± 3.73 for the second. The gait section similarly showed high intra-rater reliability, with an ICC of 0.998 (P-value = 0.0001*), and mean scores of 9.26 ± 2.96 for the first reading and 9.28 ± 2.92 for the second. These high ICC values are in agreement with **Koo and Li** [34] who suggested that good dependability is indicated by values between 0.75 and 0.90, while exceptional reliability is shown by values more than 0.90. **Navarro *et al.*** [35] also state that an ICC value greater than 0.75 signifies a reliable instrument. Comparable outcomes have been shown for several translated POMA versions. Cronbach's alpha values for test-retest reliability in the Turkish version were 0.88, while ICCs were higher than 0.70 [14]. With an ICC of 0.97 and a Cronbach's alpha of 0.94, the Persian version demonstrated great dependability [1].

Furthermore, the ICC value of 0.945 and Cronbach's alpha of 0.924 were shown by the Chinese version of POMA [15].

An instrument's translation, adaptation, and validation for cross-cultural research is a multi-year procedure that frequently necessitates numerous investigations in order to follow suggested methodological guidelines. An initial study might focus on the translation, adaptation, and pilot testing with a monolingual sample, including cognitive debriefing. Subsequent studies would then establish preliminary and full psychometric properties with bilingual participants and a target population sample respectively [20].

CONCLUSION

The Arabic-language version of the POMA showed acceptable face and content validity, internal consistency, and test-retest reliability for assessing balance and gait in the Egyptian elderly population. The final version developed in this study serves as a basis for further research to explore the complete psychometric characteristics of the Arabic version of the POMA scale.

No funds.
No conflict of interest.

REFERENCES

1. **Moulodi B, Azad A, Taghizadeh G *et al.* (2020):** Reliability and validity of Persian version of performance-oriented mobility assessment (POMA) in community-dwelling Iranian older adults: Psychometric properties. Iran Rehabil J., 18: 39–48.
2. **Pirker W, Katzenschlager R (2017):** Gait disorders in adults and the elderly: A clinical guide. Wien Klin Wochenschr., 129: 81–95.
3. **Yamashita T, Noe D, Bailer A (2012):** Risk factors of falls in community-dwelling older adults: logistic regression tree analysis. Gerontologist, 52: 822–832.
4. **Salari N, Darvishi N, Ahmadipanah M *et al.* (2022):** Global prevalence of falls in the older adults: a comprehensive systematic review and meta-analysis. J Orthop Surg Res., 17: 334. doi: 10.1186/s13018-022-03222-1.
5. **Jazaeri S, Azad A, Mehdizadeh H *et al.* (2018):** The effects of anxiety and external attentional focus on postural control in patients with Parkinson's disease. PLoS One, 13: e0192168. doi: 10.1371/journal.pone.0192168.
6. **Raji P (2012):** Functional balance tests. Audiol., 21: 1–9.
7. **Park J, Koh S, Kim H *et al.* (2018):** Validity and reliability study of the Korean Tinetti Mobility Test for Parkinson's disease. J Mov Disord., 11: 24-29.
8. **Azad A, Sabet A, Taghizadeh G *et al.* (2020):** Clinical assessment of persian translation of fullerton advanced balance scale in community-dwelling older adults. Disabil Rehabil., 42: 567–573.
9. **Sibley K, Beauchamp M, Van Ooteghem K *et al.* (2015):** Using the systems framework for postural control to analyze the components of balance evaluated in standardized balance measures: a scoping review. Arch Phys Med Rehabil., 96: 122–132.
10. **Sterke C, Huisman S, van Beeck E *et al.* (2010):** Is the Tinetti Performance Oriented Mobility Assessment (POMA) a feasible and valid predictor of short-term fall risk in nursing home residents with dementia?. Int Psychogeriatrics, 22: 254–263.
11. **Maxwell J (2021):** Why qualitative methods are necessary for generalization. Qual Psychol., 8: 111-118.
12. **Kimberlin C, Winterstein A (2008):** Validity and reliability of measurement instruments used in research. Am J Heal Pharm., 65: 2276–2284.
13. **Rivolta M, Aktaruzzaman M, Rizzo G *et al.* (2019):** Evaluation of the Tinetti score and fall risk assessment via accelerometry-based movement analysis. Artif Intell Med., 95: 38–47.
14. **Yücel S, Şahin F, Doğu B *et al.* (2012):** Reliability and validity of the Turkish version of the Performance-Oriented Mobility Assessment I. Eur Rev Aging Phys Act., 9: 149–159.
15. **Yang C, Mo Y, Cao X *et al.* (2023):** Reliability and validity of the Tinetti performance oriented mobility assessment in Chinese community-dwelling older adults. Geriatr Nurs., 53: 85-89.
16. **Hambleton R, Merenda P, Spielberger C (2005):** Issues, designs, and technical guidelines for adapting tests into multiple languages and cultures," in Adapting educational and psychological tests for cross-cultural assessment. Psychology Press, Pp: 15–50. https://doi.org/10.4324/9781410611758
17. **Holden R (2010):** Face Validity. In I. B. Weiner, & W. E. Craighead (Eds.), The Corsini Encyclopedia of Psychology (4th ed.). Hoboken, NJ: Wiley. http://dx.doi.org/10.1002/9780470479216.corpsy0341
18. **Heale R, Twycross A (2015):** Validity and reliability in quantitative studies. Evid Based Nurs., 18: 66–67.
19. **Borsa J, Damásio B, Bandeira D (2012):** Cross-cultural adaptation and validation of psychological instruments: Some considerations. Paid (Ribeirão Preto), 22: 423–432.
20. **Sousa V, Rojjanasrirat W (2011):** Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. J Eval Clin Pract., 17: 268–274.
21. **Tinetti M (1986):** Performance-oriented assessment of mobility problems in elderly patients. J Am Geriatr Soc., 34: 119-26.
22. **Soubra R, Chkeir A, Novella J (2019):** A systematic review of thirty-one assessment tests to evaluate mobility in older adults. Biomed Res Int., 19: 1354362. doi: 10.1155/2019/1354362.
23. **Lin M, Hwang H, Hu M *et al.* (2004):** Psychometric comparisons of the timed up and go, one-leg stand, functional reach, and Tinetti balance measures in community-dwelling older people. J Am Geriatr Soc., 52: 1343–1348.
24. **Canbek J, Fulk G, Nof L *et al.* (2013):** Test-retest reliability and construct validity of the tinetti performance-oriented mobility assessment in people with stroke. J Neurol Phys Ther., 37: 14–19.
25. **Köse S, Özbaran B, Yazgan Y *et al.* (2017):** The Psychometric Properties of Turkish Version of Autism Spectrum Screening Questionnaire in Children aged 6-18 years. Turkish J Psychiatry, 28: 268-77.
26. **Ambrose A, Paul G, Hausdorff J (2013):** Risk factors

for falls among older adults: a review of the literature. Maturitas, 75: 51–61.

27. **Schülein S, Pflugrad L, Petersen H *et al.* (2017):** Deutsche Übersetzung des' Performance-Oriented Mobility Assessment'nach Tinetti. Z Gerontol Geriatr., 50: 498-505.
28. **Yusoff M (2019):** ABC of response process validation and face validity index calculation. Educ Med J., 11: 55-61.
29. **Dalawi I, Isa M, Chen X *et al.* (2023):** Development of the Malay Language of understanding, attitude, practice and health literacy questionnaire on COVID-19 (MUAPHQ C-19): content validity & face validity analysis. BMC Public Health, 23: 1131. doi: 10.1186/s12889-023-16044-5.
30. **Polit D, Beck C (2006):** The content validity index: are you sure you know what's being reported? Critique and recommendations. Res Nurs Health, 29: 489–497.
31. **Volker D (2005):** Measurement in nursing and Health Research. J Nurs Law, 10: 181-83.
32. **George D, Mallery P (2003)**: SPSS for Windows Step by Step: Answers to Selected Exercises. A Simple Guide and Reference. Allyn and Bacon, Boston. https://www.scirp.org/reference/referencespapers?referenceid=3123260
33. **Roh Y, Yang B, Noh J *et al.* (2011):** Cross-cultural adaptation and validation of the Korean version of the Michigan hand questionnaire. J Hand Surg Am., 36: 1497–1503.
34. **Koo T, Li M (2016):** A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med., 15: 155–163.
35. **Navarro C, Ponzer S, Törnkvist H *et al.* (2011):** Measuring outcome after wrist injury: translation and validation of the Swedish version of the patient-rated wrist evaluation (PRWE-Swe). BMC Musculoskelet Disord., 12: 171. doi: 10.1186/1471-2474-12-171.