Bulletin of Faculty of Physical Therapy

ORIGINAL RESEARCH ARTICLE

Open Access

Validation of an Arabic translation of the Functional Mobility Assessment (FMA) tool for assistive mobility device users

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Abstract

Background: Functional mobility assessment (FMA) tool is a self-report questionnaire developed to measure users' satisfaction with assistive mobility devices while performing activities of daily living.

Purpose: To validate an Arabic translation of the FMA tool for Arabic-speaking assistive mobility devices users.

Methods: A committee of 2 bilingual qualified occupational therapists translated the English version into Arabic which was verified by back translation. The final versions were administered to bilingual assistive mobility devices users. The participants were randomly assigned to answer either the English or Arabic version of the FMA first, followed by answering the FMA in the other language. The scores obtained were tested for agreement using the kappa statistic.

Results: Participants' (n=52), 28 were males and 24 were females, average participant age was 39.4 years old and had used an assistive mobility device for 6.4 years. We found a significant moderate agreement between the scores obtained from the two versions (p<0.000). The kappa measurement of agreement was 0.59 (95% confidence interval, 0.48–0.70).

Conclusion: The FMA is now available in Arabic, and it is an appropriate measure for use in research and clinical practice to quantify satisfaction with a functional mobility among assistive mobility device users. Further studies should test its psychometric properties.

Keywords: Activities of daily living, Assistive device, Functional mobility, Outcome measure, Satisfaction, Validity

Background

Functional mobility is a basic activity of daily living that is considered a fundamental human right and helps enhance social participation [1–3]. Assistive technology devices (ATD) that are concerned with mobility are known as wheeled mobility and seating devices (WMSD), such as walking aides, manual wheelchairs, power wheelchairs, or scooters. People with mobility impairments benefit from the use of these devices to allow them to engage in their occupations of daily living and are integral to enhance individual function, improve independence, and support participation in needed and desired occupations [4–8]. Properly fitted WMSD can improve satisfaction and quality of life of both the users and caregivers [9–11]. Valid and reliable functional outcome measures are integral parts of rehabilitation and help gather accurate information and identify appropriate devices that meet the needs and goals of the users [12]. Additionally, they help enhance user's involvement and satisfaction and prevent underuse or abandonment through creating a proper match between the user's functional needs, mobility limitations, personal preferences, the environment, and the device itself [13–16]. To facilitate active involvement of users in decision-making

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process about the most appropriate device, users' feedback, and self-reported outcome measures can be used to help clinicians better understand the personal, health, and functional needs to accurately match technology with users' needs, personal goals, and the surrounding environment [17].

The current self-reported outcome measures related to WMSD include the Psychological Impact of Assistive Device Scales (PIADS) [18], which measures the psychosocial impact of assistive technology, and the Quebec Users Evaluation of Satisfaction with Assistive Technology (QUEST), which assesses the consumer's satisfaction with the ATD and service delivery processes [19]. Items on these self-report tools are general and not specific to performance of functional activities for both wheeled and non-wheeled mobility devices in the user's natural environment. Hence, the self-report functioning everyday with a wheelchair (FEW) tool was developed to measure user functional performance of everyday tasks in terms of self-perceived satisfaction and independence while using their current wheelchair/scooter as their primary mean of mobility and proved to be a valid and reliable tool [20]. However, it does not address people who use non-WMSD such as canes, crutches, walkers, orthotics, or prostheses. Thus, the FEW was modified and revised to create the functional mobility assessment (FMA) to become applicable to assess the needs of both wheeled mobility and seating (WMS) users and non-WMS users and demonstrated strong content validity and test-retest reliability [21].

Our literature review revealed only one self-report outcome measure translated into Arabic for Arabic-speaking WMS users [22], and none was identified for non-WMS users. Also, in Arab countries, there is a lack of valid and reliable Arabic instruments that measure functional mobility. Hence, there is a critical need for an Arabic valid and reliable measure that can be used to measure functional performance of both WMS users and non-WMS users who currently use a wheelchair, scooter, cane, crutch, walker, or any mobility device. The aim of this study was to translate the FMA tool into Arabic to make it available for Arabic-speaking WMS and non-WMS users, test whether the translation is valid and accurate, and produce scores similar to the original English version.

Methods

This study was approved by the research and ethical committee (No.17/02/2021/2022). Prior to study enrollment, all potential participants were screened to determine if they met inclusion criteria and were asked by our researchers during their face-to-face interviews if they were interested in participating in this study. Informed consent was then obtained from all study participants. The inclusion criteria for participants recruited for this study were (a) existing WMS and non-WMS users, (b) 18 years of age or older, and (c) adequate cognitive and language status. Illiterate individuals with no elementary education and individuals with severe cognitive and language disorders were excluded. Participants were patients recruited from four different rehabilitation centers. All participants were seen and interviewed at the four sites.

Instrument

The functional mobility assessment (FMA) was used in this study. The FMA was adapted from the FEW tool, and items were relevant to users who use canes, crutches, walkers, wheelchairs, or scooters as their primary mobility and seating device. The FMA consists of 10 items/questions and takes approximately 5 min to be completed (see Table 1).

All FMA items address the features of mobility and seating devices, including wheelchairs, scooters, canes, crutches, or walkers that assist persons with disabilities in functional mobility and help perform functional tasks as independently, safely, and adequately as possible. All items are scored on a 7-point Likert scale in which 6 = completely agree, 5 = mostly agree, 4 = slightly agree, slightly disagree, 2 = mostly disagree, 1 = completely disagree, and 0 = does not apply. The FMA total score is a number out of 60, which pertains to the person's current assistive equipment and helps monitor the person's satisfaction and progress using current mobility device [21].

Procedures

Permission to use and translate the FMA in this study was obtained from the developers. The forward-back translation methodology following the World Health Organization guidelines and standardized procedures was used in this study [23, 24]. A committee of occupational therapists (OTs) who are native Arabic-speaking and with experience in translation performed the translation process. The committee consisted of two

Table 1 Items of the functional mobility assessment (FMA)

Items
(1) Carrying out my daily routine
(2) Comfort needs
(3) Health needs
(4) Operate with independence and safety
(5) Reaching and carrying out tasks at different surface heights
(6) Transfers from one surface to another
(7) Personal care tasks
(8) Indoor mobility
(9) Outdoor mobility
(10) Personal and public transportation

independent bilingual qualified occupational therapists (OTs) performed forward translation and translated the English version into Arabic first. Reconciliation into one single-translated document was carried out, and the document was then back translated into English by two different bilingual-qualified OTs who were not familiar with the FMA tool's original English version. This new English translation was compared with the original FMA by the study investigator to test the quality of the translation, ensure that the meanings of all the items were maintained, and check its suitability and adaptability with Arab culture. Cognitive debriefing was implemented to pilot test the level of comprehension or understanding of the final-translated document translation by 10 of the study participants. A final revision of the Arabic version was then made and approved by the study committee.

The final version was tested in 52 bilingual English-Arabic WMS and non-WMS users, and it took 10–15 min only to compete both versions by each participant. The participants were randomly assigned to answer either the English or Arabic version of the FMA first. Once they had completed the FMA, it was collected and the FMA in the other language was given to the participant to be completed.

Data analyses

Data analyses were conducted with no floor-ceiling effects detected. The content validity was assessed using kappa coefficient for agreement between the two versions, and a 95% confidence interval was constructed for kappa. The kappa coefficient was interpreted conventionally as <0 poor agreement, 0–0.20 slight agreement, 0.21–0.40 fair agreement, 0.41–0.60 moderate agreement, 0.61–0.80 substantial agreement, and 0.81–1 almost perfect agreement [25].

Results

Demographics of subjects (*n*=52)

This study sample consisted of 52 WMS and non-WMS users. Twenty-eight were males, and 24 were females. The average participant age was 39.4 years old, mostly Saudi, and had used an assistive mobility device for 6.4 years (see Table 2).

FMA item translation

The backward translation review conducted by the study investigator showed minor issues only in the translation which were modified to keep the original intended meaning for all questions and items (see Table 3).

Kappa measurement of agreement

The results were statistically significant (p<0.000) with moderate agreement between the scores obtained when comparing the English and Arabic versions of the FMA. The kappa measurement of agreement was 0.59 (95% confidence interval, 0.48–0.70) (see Fig. 1).

Discussion

This study translated the FMA tool into Arabic and validated it for Arabic-speaking wheeled mobility and seating devices users. The FMA is a self-report tool that

Table 2 Study participants' demographics (*n*=52)

Demographics	All ($n = 52$)	WMS users ($n = 21$)	Non-WMS users (n=31)
Age (mean, SD)	39.4 (± 18.32)	34.2 (± 16.42)	29.7 (± 14.65)
Gender			
Male (*n*)	28	11	18
Female (*n*)	24	10	13
Race			
Saudi (*n*)	34	15	19
Non-Saudi (*n*)	18	6	12
Years using AMD (mean, SD)	6.4 (± 5.64)	7.3 (± 4.53)	5.6 (± 3.94)
Type of current AMD			
Manual wheelchair (*n*)	11	11	-
Power wheelchair (*n*)	5	5	-
Scooter (*n*)	5	5	-
Cane (*n*)	9	-	9
Crutch (*n*)	8	-	8
Walker (*n*)	14	-	14

WMS wheeled mobility and seating, *AMD* assistive mobility device

Table 3 Modifications to some questions and items in the functional mobility assessment (FMA) following the backward translation of the tool

Question/item backward translation	Response from study investigator	Modified question/item
What is your current mobility device? (e.g., walking, cane, crutch, walker, manual wheelchair, power wheelchair or scooter)	The words (cane, crutch, walker) might be confusing for the mobility device user. Hence, we suggest adding a brief description with visual representations "pictures" to show the difference between them.	A brief description has been added with pictures as follows. "Crutches are used for keeping all your weight off a foot or leg and a cane is used for balance and mobility assistance. Canes can be described according to the design of the handle, shaft, and bottom. Crutches are available in four types: underarm, triceps, forearm, and platform. Walkers are frames that provide bilateral support without the need to control two canes or crutches."  
My current means of mobility allows me to operate as independently, safely and efficiently as possible.	It is recommended to change the word "operate" to "use" as the word "use" is more commonly used in Arabic spoken language when referring to using devices for activities of daily living. This minor edit will not change the original meaning.	My current means of mobility allows me to use them as independently, safely and efficiently as possible.
My current means of mobility allows me to get around indoors: *(e.g., home, work, mall, restaurants, ramps, obstacles)*	We suggest adding more places that are important to the Arab community and are considered religious cultural activities that are performed on regular basis, such as mosques and churches.	My current means of mobility allows me to get around indoors: *(e.g., home, work, mall, restaurants, ramps, obstacles, mosques/churches)*

effectively measures a person's ability to function while using assistive equipment like walkers, wheelchairs, or prosthetic/orthotic mobility devices. The FMA is a very helpful and useful outcome measure and applying it with a person helps clinicians quickly and accurately measure patient satisfaction and ability to perform mobility-related activities of daily living (MRADLs) [26]. The FMA has been used for research and clinical applications and applied with children, adults, and older adults' populations with established psychometric properties [27–29]. It has been also used in rehabilitation and telerehabilitation services and proved to be valid and reliable tool [30]. The FMA was translated and culturally adapted to the Latin American Spanish for use throughout Latin America, North America, and the Caribbean. It has been very helpful in quantifying the impact of mobility devices in the functional performance of the individuals during performing different

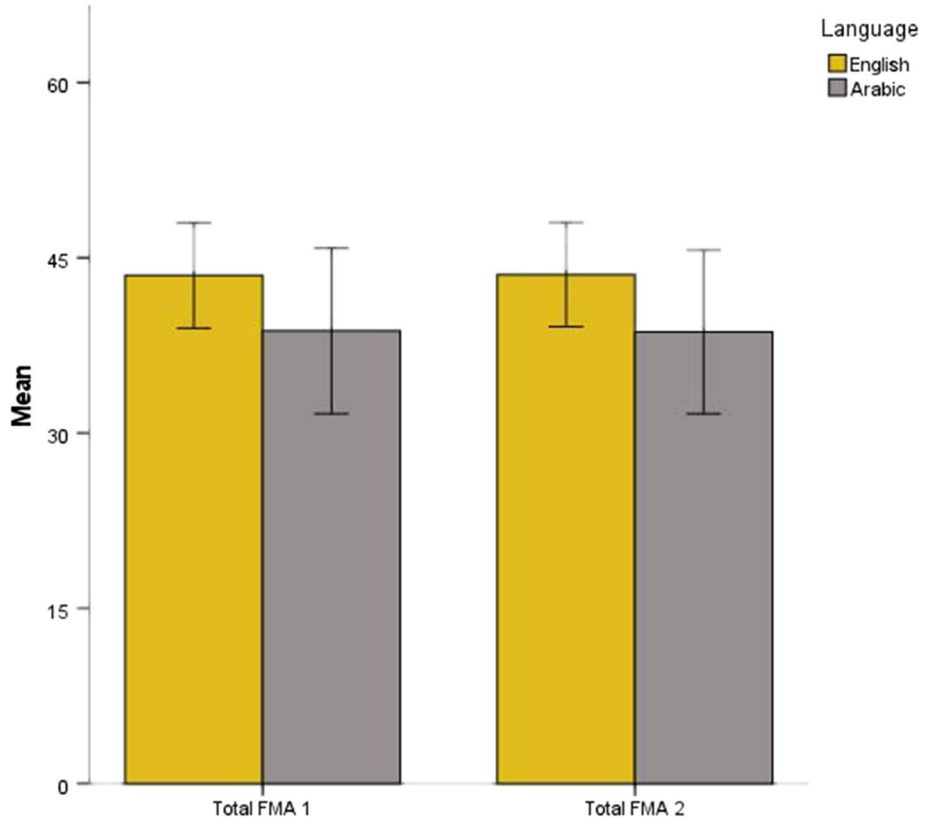

Fig. 1 FMA 1 (complete the first FMA) and FMA 2 (complete the second FMA in other language)

activities of daily living (ADLs) and instrumental activities of daily living (IADL) [31]. The FMA was also translated into Brazilian Portuguese language and demonstrated helpful valid and reliable data [32, 33]. Additionally, the FMA was adapted for use with school-aged pediatric population of wheelchair users in Africa and provided a reliable information that helped better understand children needs and their caregivers while using their wheelchairs [34].

Up to author's knowledge, this study was the first to translate the FMA tool to Arabic language. In our study, qualified rehabilitation professionals in the field of wheeled mobility and seating interventions with over 15 years of experience performed a thorough translation and back translation to ensure accuracy. Compared to previous studies that translated the FMA into other languages, the current study applied randomization as to which the FMA version (English or Arabic) was answered first. Because of the randomization and the fact that there are 10 questions with 7 possible answers in the FMA, we believe that the recall of the answer would not influence the results. Furthermore, our study used a relatively larger sample size compared to the previous studies that translated the FMA into other languages [31–33]. The results were statistically significant with moderate agreement between the scores obtained in English and Arabic FMA tools. Therefore, the translation of the FMA tool is valid and accurate and could be useful to clinicians who would like to use this tool for Arabic-speaking WMS users and non-WMS users in both evaluations and interventions.

Implications for rehabilitation

- The FMA is applicable to both wheeled mobility and seating (WMS) and non-WMS users.
- The Arabic translation of the FMA tool fills the gap in assistive mobility device assessment for Arabic-speaking clinicians and mobility devices users.
- The new translated tool could help better understand current functional status and meet needs of mobility devices users, hence enhance their functional performance and overall satisfaction using their current devices.

Limitations of the study

The current study had some limitations. It had a small sample size of WMS users and non-WMS users from only four rehabilitation centers with intact cognitive and language skills. For future studies, it is crucial to recruit a larger sample from multiple centers to better represent the targeted population. Also, in comparison to some previous studies that translated the FMA into other languages, this study applied different statistical methods and examined content validity of the translated version. While this limitation has not impacted the outcome of the study, for future work, we seek to investigate other psychometric properties of the FMA Arabic version, such as face validity, test-retest, and inter-rater reliability.

Conclusion

The Arabic translation of the FMA self-report tool has been generated for application in research and clinical practice. It is a promising tool that could bring valid and useful information to clinicians and Arabic-speaking users of assistive mobility devices. Further validation of the developed Arabic version is imperative.

Acknowledgements

It is such a great honor and a privilege for us to translate and validate such a very helpful and useful tool. We would like to thank the FMA developers at the University of Pittsburgh for their kind permission to use and translate the FMA tool in this study.

Author's contributions

This is a sole-authored work. The author(s) read and approved the final manuscript.

Funding

The author confirms that there is no financial support for this research.

Availability of data and materials

All data generated during this study is available on request.

Declarations

Ethics approval and consent to participate

The ethical approval was received from the research and ethical committee (No. 17/02/2021/2022). All participants were given a prior explanation regarding the purpose and methodology of the study. Informed consent was obtained from all study participants.

Consent for publication

N/A.

Competing interests

The author declares no competing interests.

Received: 16 May 2022 Accepted: 22 July 2022
Published online: 12 October 2022

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