



Validity and Reliability of Fall Efficacy Scale in Type 2 Diabetes Mellitus Individuals - English and Kannada Version

Nenmanikkara Geoviya George^{1*}, M. S. Moosabba², M. R. Sivakumar³, Manjula Suvarna⁴

^{1,2}Department of Surgery, ³Department of Physiotherapy, ⁴Department of Community Medicine,

^{1,2}Yenepoya Medical College, Mangalore, Karnataka, India

³Yenepoya Physiotherapy College, Mangalore, Karnataka, India

⁴A. J. Institute of Medical Sciences and Research Centre, Mangalore, Karnataka, India

***Corresponding Author:**

Nenmanikkara Geoviya George

Department of Surgery, Yenepoya Medical College, Mangalore, Karnataka, India

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Abstract

Introduction/Background: Fear of falling down has been noted among patients with type 2 diabetes mellitus and there is need for an extensive instrument for assessing the fear of fall for diabetic patients. This study determines the validity and reliability of English version and Kannada translated version of Tinetti Fall Efficacy Scale in Type 2 Diabetes Mellitus patients.

Materials and Methods: This study was conducted in three steps. In the first step, experts were consulted for content validation of the scale. In the second step, the translation process was carried out and in the third step, pre-test reliability of English and Kannada version of Tinetti fall efficacy scale was performed among 30 type 2 diabetes mellitus patients who were recruited from OPD, diabetic clinic and laboratory services from selected hospitals in Karnataka, India and those fulfilling the inclusion and exclusion criteria. The content validation index was calculated using the opinion of the experts and the reliability was analysed using the Cronbach's alpha coefficient in SPSS version 23 software.

Results: The age of the participants who answered the English and Kannada version of the scale ranged 30-74 years and 30-72 years respectively and most of the participants were males. The overall Cronbach's α for the English and Kannada version of the scale was 0.72 and 0.91 respectively.

Conclusions: The overall analysis of English and Kannada version of Tinetti fall efficacy scale has shown to have good measurement properties to investigate the fear of falling among type 2 diabetes mellitus patients.

Keywords: Diabetes mellitus, Fall, Fear, Reliability, Validity

INTRODUCTION

Fall is reported to be the second major cause of death worldwide. The low-middle income nations and individuals over 65 years are the major contributors for fall. A fall is defined as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level" [1]. Thirty to forty percent of falls are reported each year of which nearly 10-20% succumb to injury, hospitalisation and/or fatality [2]. Falls were common mainly among patients with uncontrolled diabetes, stroke and those

using a walking aid [3]. The percentage of diabetes reported by National Indian Council of Medical Research - India DIABetes study was 7.3 % [4], with a rise in these figures by 2035 [5,6]. The trend of fall was higher among patients with diabetes as compared to non-diabetes [7]. Diabetes related complications is a prime reason for increasing the susceptibility to falls, disability and loss of life in diabetic patients as compared to non diabetic population [8].

A pertinent psychological concern with falling includes fear of falling (FOF) [9]. Fear of falling is defined as “low perceived self-efficacy at avoiding falls during essential, non-hazardous activities of daily living” [10]. Fear of fall is an unexplored and a serious predictor associated with fall [11-13]. The fear of fall was predominantly seen among the aged, diabetic patients, increased gait difficulty, balance defects and past history of fall [14,15]. Fear of fall negatively affects the physical activity among active elders [16-18]. Fear of falling is seen to degrade one’s mobility, well-being and social participation, everyday activities and quality of life [19].

The fall efficacy scale (FES) developed by Tinetti *et al.*, is designed to measure the self-perceived fear of falling among individuals. The fall efficacy scale (FES) is a relatively quick and simple questionnaire that can be used as a self-reported or interview-based measure with no special training required [10]. There is a considerable amount of research in support of the use of this scale in clinical practice [20-27]. With the increasing prevalence of type 2 diabetes mellitus in India, there is a need for a comprehensive instrument both in English and regional language for assessing the fear of fall among type 2 diabetes populations. The intention of this study was to determine the validity and reliability of Tinetti fall efficacy scale in English and Kannada languages in type 2 diabetes mellitus.

MATERIALS AND METHODS

The scale: The Tinetti fall efficacy scale (FES) measures the fear of falling. FES consists of 10 items including cleaning the house, preparing simple meals etc. The scale score ranges from 1-10, where 1 indicates being very confident and 10 indicates being not confident at all while performing the activities without falling. A total score of more than 70 is considered to have fear of fall among the participants.

Step 1: Content Validation

For content validation [28-31], we met experts in the field of Diabetology, Physiotherapy and Medical Social Work having in-depth expertise in type 2 diabetes mellitus. For this process, a direction sheet, scale and checklist were directly given to the experts. A choice of “Agree” or “Disagree” provided, indicating an item in the scale as acceptable or unacceptable respectively. The acceptable implies

that an item in the scale is acceptable and valid for these populations. An opportunity to delete, keep or rectify each item in the scale was given to the evaluators. The investigator then collected the validated scale from the expert personally. On analysing the validated scale it was found that the experts have recommended keeping all the items in its original model for this study.

Step 2: Translation process

The forward-backward translation was followed as per the guidelines set by the World Health Organisation. Before commencing the process, the translators were provided personally with documents of a consent form, work statement, and definitions which were important to complete the translation process. The forward translation was completed by 2 qualified Kannada translators who independently translated from English to Kannada version of the scale. After translating the scale, research team and the translators reviewed the forward translation and developed the first version of the Kannada version of the scale which was handed over to an independent translator for back translation. A second meeting was held between the translators and the research team to develop the final version of the Kannada scale. The pre-test reliability was performed on a random sample of 30 individuals recruited for the pilot study.

Step 3: Pre- test reliability

In the third step, pre-test reliability of English and Kannada version of Tinetti fall efficacy scale was performed among participants of 30 years and above of both genders having type 2 diabetes mellitus with good cognition and willingness to participate, while those who were unable to comprehend the instructions, with impaired hearing and vision and suffering from terminal illness were excluded from the study. The participants were recruited from OPD, diabetic clinic and laboratory services from a hospital in Karnataka, India. The participants answered the self-described scale and if required the questions were read out to the participants. The participant’s details of age and sex were recorded. The content validity of the scale was performed using content validation index. For the purpose of reliability analysis, Cronbach’s α statistics was used. The α coefficient equal to or greater than 0.70 was considered satisfactory [32]. The study was approved

by the institutional ethical committee and obtained informed consent from the participants.

RESULTS

All the experts exhibited 100% level of agreement with Item-CVI as 1 and Scale-CVI as 1 (Figure 1, Table 1).

The age of the participants who were recruited in the study noted for English and Kannada version of the questionnaire ranged between 30-74 years and 30-72 years respectively. (Table 2).

The majority of the respondents for English and Kannada version of the scale were in the range of 30-39 years (Table 3). The male participants were the majority participants in this study.

The internal consistency for English and Kannada version of the scale, was 0.72 and 0.91 respectively (Table 4).

DISCUSSION

Fear of falling down is a dominant problem among type 2 diabetes mellitus patients, however there was a lacuna in the literature about the use of English and Kannada version of the Tinetti Fall Efficacy Scale among type 2 diabetes mellitus patients. The present study evaluated the validity and reliability of the Tinetti fall efficacy scale in English and Kannada languages in type 2 diabetes mellitus. Overall, the study suggested that the English and Kannada version of the Tinetti Fall Efficacy Scale provides adequate validity and reliability for using among type 2 diabetes mellitus patient.

The experts included a team of 3 members having immense knowledge and experience in clinical and research area. The participants who answered the English and Kannada version of the scale ranged from 30-79 years with males outscoring in number.

The Cronbach's α value for some of the earlier studies were 0.90 [21], 0.89 [22], 0.88 [23], 0.99 [24], 0.97 [26]. The study done by Tinetti et al., found the Cronbach's α score to be 0.71 [10]. In our study the Cronbach's α for English and Kannada version of the scale, was 0.72 and 0.91 respectively.

The results of this study should be analysed considering the inherent limitations. Although the pre-test reliability was performed among type 2 diabetic patients, the participants were not uniform in

each of the age group and were recruited from a single hospital, hence the results from this study cannot be generalised to the entire population. In this present study the demographic data collected were focused only on age and gender and further study should be performed on larger participants equally spread in each age groups and having comprehensive demographic details

CONCLUSION

The present study developed a valuable scale for assessing the fear of fall among type 2 diabetes mellitus among Kannada populations. The Cronbach's α values were good to excellent with respect to all the domains in both English and Kannada version of the Tinetti fall efficacy scale in Type 2 diabetes mellitus. Our study results demonstrate that this questionnaire is valid and reliable for assessing the fear of fall among Kannada speaking type 2 diabetes mellitus patients.

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Table 1 Validation of the expert (N=3)

^a FES questionnaire items	Experts			Universal Agreement (UA)	Item- CVI (I-CVI)
	^b E1	^b E2	^b E3		
1) Take a bath or shower	A	A	A	3	1
2) Reach into cabinets or closets	A	A	A	3	1
3) Walk around the house	A	A	A	3	1

4) Prepare meals not requiring carrying heavy or hot objects	A	A	A	3	1
5) Get in and out of bed	A	A	A	3	1
6) Answer the door or telephone	A	A	A	3	1
7) Get in and out of a chair	A	A	A	3	1
8) Getting dressed and undressed	A	A	A	3	1
9) Personal grooming (i.e. washing your face)	A	A	A	3	1
10) Getting on and off of the toilet	A	A	A	3	1
Scale- CVI (S-CVI)					1

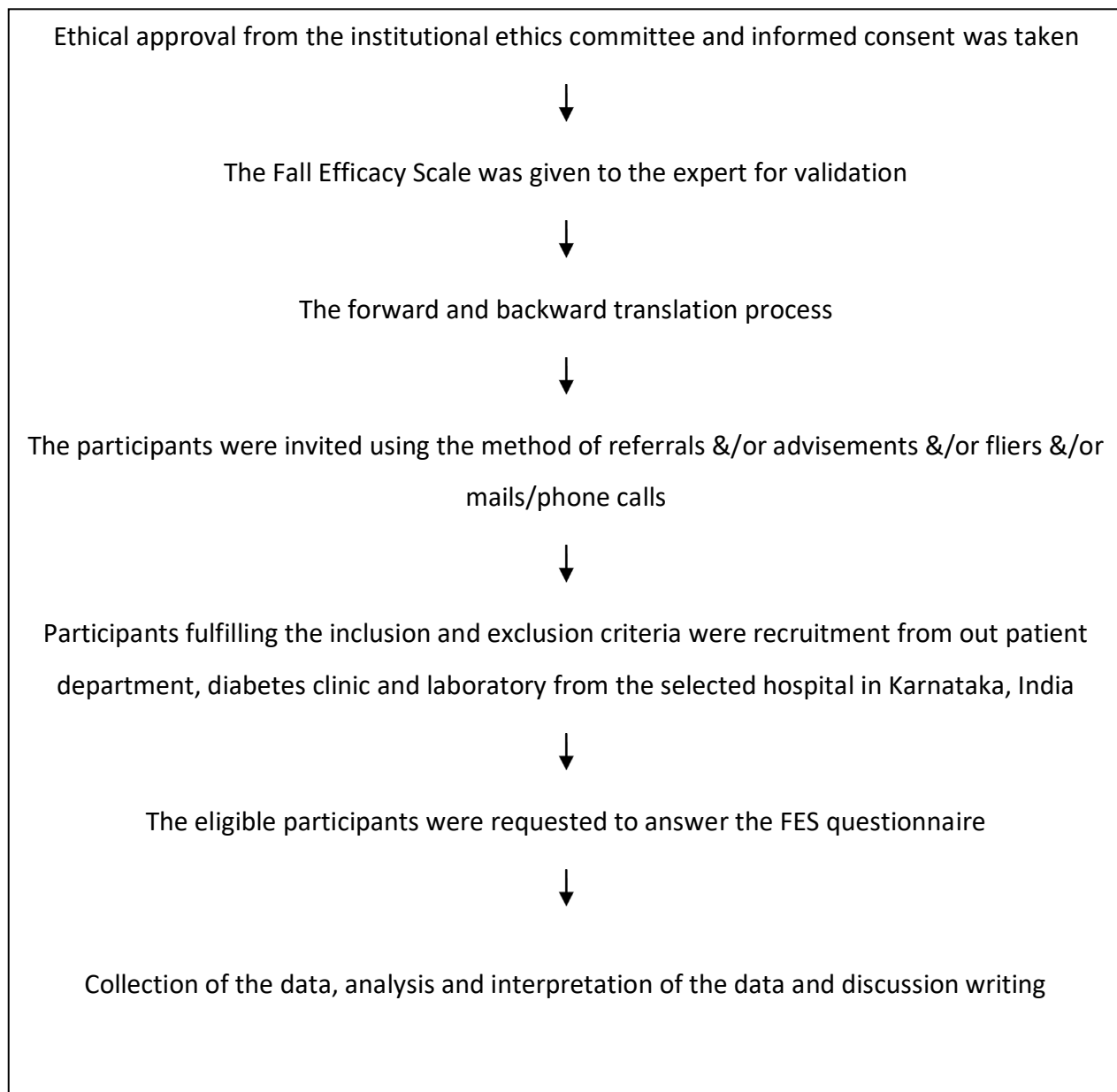


Figure 1: Flow chart showing research procedure in details

Table 2 Demographic details of the participants age for English and Kannada version of Fall Efficacy Scale respectively (N=30 participants each version)

^a FES Version	N	Range (age in years)	Minimum (age in years)	Maximum (age in years)
English	30	44	30	74
Kannada	30	42	30	72

aFES: Fall Efficacy Scale

Table 3: The group wise breakup of participants for English and Kannada version of Fall Efficacy Scale questionnaire (N=30 participants each version)

^a FES Version	Age group	Frequency	Percent	Valid Percent	Cumulative Percent
English	30-39	11	36.7	36.7	36.7
	40-49	4	13.3	13.3	50.0
	50-59	6	20.0	20.0	70.0
	60-69	6	20.0	20.0	90.0
	70-79	3	10.0	10.0	100.0
	Total	30	100.0	100.0	
Kannada	30-39	10	33.3	33.3	33.3
	40-49	7	23.3	23.3	56.7
	50-59	7	23.3	23.3	80.0
	60-69	4	13.3	13.3	93.3
	70-79	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Table 4 Reliability of the English and Kannada version of the Fall Efficacy Scale respectively (N=30 participants in each version)

^a FES Version	Number of items	Cronbach's Alpha (α)
English	10	0.72
Kannada	10	0.91

aFES: Fall Efficacy Scale