ORIGINAL RESEARCH

Cross-Cultural Adaptation, Validity, and Reliability Testing of the Tilburg Frailty Indicator (TFI) Amharic Version for Screening Frailty in Community-Dwelling Ethiopian Older People

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Background: Frailty is a global health problem, including in African countries. Despite this, no reliable or valid frailty instruments incorporate any African language, and no research exists to cross-culturally adapt and test the validity and reliability of instruments commonly used in other countries for use within African countries. The Tilburg Frailty Indicator (TFI) is a reliable and validated instrument with the potential to be relevant for older populations living in Africa. This study aimed to develop the TFI Amharic (TFI-AM) version for use within Ethiopia.

Methods: This study employed psychometric testing and the evaluation of a translated and adapted instrument. The original English language version of the TFI was translated and culturally adapted into Amharic using the World Health Organization process of translation and adaptation of an instrument. A convenience sample of ninety-six community-dwelling older people 60 years and over was recruited. Cronbach's alpha was used for the analysis of the internal consistency of the TFI Amharic (TFI-AM) version using IBM SPSS 26.0 (IBM Corp., Armonk, NY, USA). Face and content validities of the TFI-AM were determined.

Results: The TFI-AM total mean score was 5.76 (±2.89). The internal consistency of the TFI-AM was very good with an overall Cronbach alpha value of 0.82. The physical domain showed the highest reliability with a 0.75 Cronbach's alpha value while the social domain was the lowest with a 0.68 Cronbach's alpha value. The Cronbach's alpha reliability coefficients of the instrument ranged from 0.68 to 0.75. The item content validity index value ranged from 0.83 to 1.0 and the total content validity index average for the instrument was 0.91.

Conclusion: The TFI-AM is reliable, valid, and reproducible for the assessment of frailty among community-dwelling older populations in Ethiopia. TFI-AM proved an easy-to-administer, applicable and fast instrument for assessing frailty in community-dwelling older populations.

Keywords: Tilburg frailty indicator, Amharic version, validity, reliability, older persons, frailty, Ethiopia

Background

Global ageing trends are resulting in increased challenges of providing healthcare for older populations, particularly frail older people.[1] As the population ages worldwide, the number of people classified as frail also increases, with a disproportionate rise in the burden across low-income regions such as sub-Saharan Africa (SSA).[2] Over the next three decades, the second fastest rise in the number of older people is foreseen in SSA with an expected growth from 32 million in 2019 to 101 million by 2050.[3] A recent review and meta-analysis on the prevalence of frailty in older people living in Africa showed the rate of frailty is rising with an overall prevalence of 38.64% [citation by authors to remain anonymised]. The average life expectancy in SSA is higher than it was two decades ago which leads to a greater proportion of frail older people in the region.[4,5]

Frailty is a strong predictor of adverse health outcomes, including disability, falls, mortality, hospitalisation, and institutionalisation.[6–10] Consequently, the development of a valid screening instrument to identify frailty is crucial for improving the health of frail older people at risk of adverse health outcomes. There are a range of frailty instruments that can distinguish frail and non-frail older people.[11–15] These screening instruments reflect different operational definitions of frailty: (1) focusing on physical functioning;[16] and (2) application of multidimensional approach encompassing biological, psychological, and social domains.[17,18] However, the validity of these instruments is subject to significant debate, and not one instrument is considered the gold standard.[19,20] The multidimensional concept of frailty has been studied more recently.[21–23] One of the multidimensional screening instruments, the Tilburg Frailty Indicator (TFI), is a frailty assessment instrument with good psychometric properties,[14,21] and easy to administer, and a user-friendly for assessing frailty in community-dwelling older people.[21] Moreover, of the 38 multicomponent frailty assessment instruments, the TFI has the most strong evidence for the reliability and validity of its psychometric properties.[24,25]

The TFI was developed by Gobben et al[22] based on the Integral Conceptual Model of Frailty (ICMF).[26] The TFI instrument contains 15 items that takes less than 15 minutes to complete. The TFI has been used in clinical trials to identify frail participants, monitor changes in frailty status over time, and evaluate the effectiveness of interventions.[27–29] The usefulness of the TFI in intervention studies also attributed to its ease of administration, validity and reliability, multidimensional nature, and risk stratification.[21,30]

The FRAIL Scale,[31] Edmonton Frail Scale (EFS),[32,33] Clinical Frailty Scale (CFS),[34,35] Groningen Frailty Indicator (GFI),[36,37] PRISMA-7,[38] and Tilburg Frailty Indicator (TFI),[39–41] instruments were cross culturally adapted to measure frailty. The TFI was one of the multidimensional frailty measurement instruments translated and adapted for use in many non-English speaking European countries,[23,39,41–44] including Asia[25,45] and South America.[46] To date, the TFI has not been tested in any developing countries and has never been used in studies of SSA older people. This study will be the first test of the TFI in a developing country, specifically the sub-Saharan country of Ethiopia.

This study aimed to translate the TFI into Amharic, the national language of Ethiopia, to undertake a cross-cultural adaptation and determine the validity and reliability of the TFI for use in Ethiopia. The research team are undertaking this study to enable them to use the TFI-AM version to measure the outcome of their nurse-led frailty intervention study in Ethiopia [citation by authors remains anonymised].

Methods
Study Setting, Design, and Period
The methodological research design used included translating and adapting the original English language version of the TFI into Amharic language and undertaking validity and reliability testing of the TFI-AM version. The study was carried out using a cross-sectional study design with older people living in Bahir Dar City, Amhara Region, Ethiopia from October to November 2022.

Eligibility Criteria
The year that "old age" commences is determined by a setting and the formal cutoff point legislated in social policy for each country.[47] In Ethiopia, the cutoff point for old age is 60 years.[48,49] The inclusion criteria for this study were older people 60 years or over, residing in Bahir Dar, Ethiopia, who were community-dwelling, able to communicate verbally, not wholly immobile (bed-ridden) and intact cognitive status.

Sample Size and Procedures
In previous studies, it has been found that a sample size of 50 or more is needed for a reliability estimate of an instrument.[41,50] Furthermore, for the calculation of a reliability coefficient on a scale measurement a sample size of 50 and more is sufficient.[50] Moreover, other studies suggest the minimum sample size should be at least five times larger than the number of variables being analysed.[25,41] The TFI consists of a total of 15 items that will be analysed. Therefore, a minimum of 75 community-dwelling older people were required for this validity and reliability study. To ensure a larger sample, the data were collected from 96 community-dwelling older people living in Bahir Dar, Ethiopia. After

obtaining a written informed consent, a survey conducted on convenient samples of community-dwelling older people using the new TFI-AM version. The TFI-AM was administered using a face-to-face interview technique conducted by a Registered Nurse who worked in a public health facility in Bahir Dar, Ethiopia. This study was in complied with The Declaration of Helsinki.

Instrument Description

The TFI comprises of 15 self-reported items separated into three distinct domains of health for older people: (i) physical domain consists of eight items related to the physical health, (ii) psychological domain consists of four items related to the psychological health; and (iii) social domain consists of three items related to social relations and social support. Eleven items of the TFI have two response categories of "yes" or "no", while three items from the psychological domain and one item from the social domain have three response categories as "yes", "no", or "sometimes". Except item 19 in the TFI, "Yes" or "sometimes" responses were allocated a score 1 point each, while item 19 in the TFI, "no" and "sometimes" responses were allocated a score of zero (0). For all other items, "no" responses were scored as zero (0). The instrument's total score ranged from 0 to 15: the higher the score, the higher one's frailty. Frailty is diagnosed when the total TFI score is $\geq$5.[22,41]

Instruments Development: Language Translation and Adaptation

Written permission to perform the TFI translation and adaptation was obtained from the developer of the TFI.[21] A standard guideline was used for translation and cultural adaptation of the original English language version of the TFI[51–53] into Amharic. Translators were given information regarding the instrument and the population to be investigated to make sure that the original concept underlying each item was maintained in the translation process.[54] The translations emphasised the conceptual equivalent of a word or phrase, not a word-for-word translation.[51]

Two Amharic-speaking academics from universities in Ethiopia who are fluent in English language independently translated the TFI English language version into Amharic. The translations from these two individuals were merged/created into a single Amharic form by a third person who is proficient both in English and Amharic languages. The TFI translated instrument created in Amharic was back translated into English language by second person proficient in English and Amharic languages who was not involved in the other stages of the translation. The final English translated version from Amharic was sent to the developer of the original TFI for approval before the reliability study was commenced. The developer provided approval of TFI-AM version with no changes. The final Amharic version of the TFI (TFI-AM) was adapted and tested for its reliability on a selected sample of community-dwelling older people living in Bahir Dar, Ethiopia.

Validity and Reliability Assessment

Validity

Validation of the instrument was completed before administration of the final TFI_AM instrument to any study participant. Face validity and content validity were used to test the validity of the TFI-AM. To evaluate whether respondents had a clear understanding of the items in the instrument, and the time required to complete the final translated and adapted TFI-AM version was piloted on a randomly selected sample of 20 older people living in Bahir Dar.

Face Validity

The TFI-AM version was rated by eight healthcare professionals who are either currently working or who previously worked in primary healthcare including nurses, community health workers, public health professionals, and public health researchers. The raters were provided with a cover letter and response sheet. The cover letter provided directions to guide them and outline their responsibilities on how to rate the face validity of the instrument. In determining the face validity of the instrument, the percentage (%) of agreement between raters was calculated using each question and overall agreement using the equations below.

$$(\% \ for \ question) = \frac{No. \ of \ agreed \ raters \ per \ question}{Total \ number \ of \ raters \ per \ question} *100\% \tag{1}$$

$$(\% \ overall \ agreement) = \frac{Sum \ of \ \% \ of \ all \ questions \ No. \ of \ agreed \ raters \ per \ question}{Total \ number \ of \ questions} \tag{2}$$

In determining the face validity of the instrument, percentage (%) of agreement less than 80%, 80–89% and greater than or equal to 90% indicates a poor, substantial and full strength of agreement respectively. When items in an instrument are rated as a poor and substantial strength of agreement they need restructured and revised, respectively.[55]

Content Validity

The TFI-AM was rated by six researchers and healthcare professionals with expertise in community healthcare including the care of older people. The group of raters consisted of professionals from nursing, dietetics, physiotherapy, psychiatry, and public health. They were provided with a cover letter and response sheet. The cover letter provided directions to guide them and outline their responsibilities on how to rate the content validity of the instrument. They rated the items in the translated version in terms of clarity and relevance on a 4-point scale as (1: The item is not relevant and not clear, 2: The item is somewhat relevant and needs some revision, 3: The item is quite relevant and clear, and 4: The item is highly relevant and clear).[56,57] The item level content validity index (I-CVI) was computed as the number of experts giving a rating 3 or 4 to the relevancy of each item, divided by the total number of experts.[56]

The I-CVI values range from 0 to 1 where I-CVI > 0.79 is acceptable and the item is relevant, 0.70 to 0.79, items need revised, and items with values below 0.70 need removed.[56] A total content validity index average of the scale (S-CVI/Ave) of 0.80 or higher was taken as an acceptable level.[58]

Internal Consistency

The internal consistency of the instrument was measured after the data were collected from the eligible 96 community-dwelling older people who completed the TFI-AM version. It was measured using the Cronbach's coefficient alpha. This statistic provides an indication of the average correlation among all of the items that make up the scale. Values range from 0 to 1, with higher values indicating the instrument is more reliability.[59] Cronbach's alpha values <0.60, 0.60 to < 0.70, 0.70 to <0.80, 0.80 to <0.90 and 0.90 and more indicate poor, moderate, good, very good and excellent level of internal consistency, respectively.[60,61]

Ethics

This study has been approved by the University of Wollongong (UOW) Human Research Ethics Committee, approval number of 2022/212. This study has also been approved by the Institutional Review Board (IRB) of College of Medicine and Health Sciences, Bahir Dar University (BDU), approval number of 563/2022. After the participants agreed to participate in this study, a written informed consent was taken.

Data Analysis

The collected data were checked for completeness and accuracy. Fully completed and cleaned data were entered into the IBM SPSS 26.0 (IBM Corp., Armonk, NY, USA) for analyses. Categorical data were presented as numbers and percentages and continuous data as mean (± SDs). Correlation of the scores of the three domains of the TFI-AM with the total score of TFI-AM was conducted using Pearson correlation test. A correlation coefficient of 0.1 to 0.3, 0.3 to 0.5, and >0.5 was considered as weak, moderate, and strong correlations, respectively.[40] Cronbach's alpha was used for the analysis of the internal consistency of the TFI-AM.[61] Percentage (%) of agreement among raters were conducted to evaluate the face validity of the instrument. The item level content validity index (I-CVI) and the total content validity index average for the scale (S-CVI/Ave) were undertaken using an Excel spreadsheet to determine the validity of the instrument.

Result

Sociodemographic Characteristics

A total of 96 older people were recruited to carry out the instrument adaptation, validity and reliability testing. More than sixty-four percent (64.6%) of the study participants were female. The mean age of the study participants was 65.16 (± 5.08) with age range from 60 to 88 years. Based on the TFI cutoff point of 5 for assessing frailty, 55.2% of the study participants were frail. Of these, 56.5% were female older people. More than sixty-four percent (64.6%) of the study participants were living with their spouse. Of these, 54.8% were screened as frail. More than 80% of the study participants had caregivers/ assistants to support them in their daily living. More than 60% of those who had no care giver assistant were screened for frailty (Table 1).

Face Validity

Five TFI items (item 5, 6, 7, 12 and 15) of the translated version of TFI-AM was between 80% and 89%. The score of the five items of the TFI-AM was between 80% and 89% and the scores of the rest of each item were over 90%. The overall scale agreement was found to be excellent, with overall agreement of 95.8%. The comments received on the readability and clarity of the items were discussed with the raters. A minor revision on the five items (item 5, 6, 7, 12 and 15) whose score was between 80% and 89% was undertaken after a discussion with the raters.

Content Validity

The item level content validity index (I-CVI) and total content validity index average for the scale (S-CVI/Ave) of the TFI-AM was rated. The I-CVI of the TFI-AM revealed an acceptable value ranging from 0.83 to 1.0 and an S-CVI/Ave value of 0.91 (Table 2).

Table 1 Sociodemographic Characteristics of the Study Participants, 2022 (n = 96)

Variables		Non-Frail (n, %)	Frail (n, %)	Total (n, %)
Sex	Male	16 (47.1)	18 (52.9)	34 (35.4)
	Female	27 (43.5)	35 (56.5)	62 (64.6)
Age	=< 64	26 (49.1)	27 (50.9)	53 (55.2)
	≥ 65	17 (39.5)	26 (60.5)	43 (44.8)
Education	Cannot read or write	9 (50.0)	9 (50.0)	18 (18.8)
	Able to read and write with no formal education	23 (36.5)	40 (63.5)	63 (65.5)
	Primary school completed	8 (72.7)	3 (27.3)	11 (11.5)
	High school and above	3 (75.0)	1 (25.0)	4 (4.2)
Living arrangement	With spouse	28 (45.2)	34 (54.8)	62 (64.6)
	With children	4 (40.0)	6 (60.0)	10 (10.4)
	With both spouse and children	7 (70.0)	3 (30.0)	10 (10.4)
	Alone	4 (28.6)	10 (71.4)	14 (14.6)
Caregiver/ assistant	Yes	37 (46.3)	43 (53.8)	80 (83.3)
	No	6 (37.5)	10 (62.5)	16 (16.7)

Table 2 Content Validity of the TFI-AM, 2022

Item No.	Item Description	I-CVI for the Instrument TFI-AM Version							I-CVI
		Ept 1	Ept 2	Ept 3	Ept 4	Ept 5	Ept 6	Number of Agreements	
Item 1	አሁን ባሉበት ሁኔታ አካላዊ ጤንነት ይሰማዎታል? Do you feel physically healthy in your current state?	4	3	4	4	4	4	6	1
Item 2	ያለፍላጎትዎ ብዙ የክብደት መቀነስ አሳይተዋል? (ብዙ ማለትም 6ኪ.ግ ወይም ከዚያ በላይ ባለፉት ስድስት ወራት ውስጥ ወይም 3ኪ.ግ እና ከዚያ በላይ ባለው የመጨረሻ ወር ጊዜ ውስጥ) Have you recently lost a lot of unwanted weight? (a lot means 6 kg or more in the last six months or 3 kg or more in the last month)	3	4	4	4	4	4	6	1
Item 3	በመራመድ ችግር ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to difficulty in walking?	4	4	4	3	4	4	6	1
Item 4	የሰውነት ሚዛንዎን ጠብቆ ማቆየት ባለመቻል ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to difficulties in maintaining your balance?	4	4	3	4	4	3	6	1
Item 5	በድምፅ መስማት መቀነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had a problem with your daily activities due to poor hearing?	3	3	4	2	4	3	5	0.83
Item 6	በዓይንዎ እይታ መቀነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to poor vision?	3	2	3	3	4	3	5	0.83
Item 7	በእጆችዎ ጥንካሬ ማነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had a problem with your daily activities due to a lack of strength in your hands?	4	3	4	4	2	4	5	0.83
Item 8	በአካላዊ ድካም ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to physical tiredness?	4	3	4	4	4	4	6	1
Item 9	የማስታወስ ችሎታዎ ላይ ችግሮች አሉብዎት? Do you have problems with your memory?	4	4	4	4	2	4	5	0.83
Item 10	ባለፈው አንድ ወር ውስጥ የመጨነቅ ስሜት ተሰምቶዎት ያውቃል? Have you ever felt down in the last month?	4	4	4	4	4	4	6	1
Item 11	ባለፈው አንድ ወር ውስጥ ብስጭት ተሰምቶዎት ያውቃል? Have you ever felt nervous in the last month?	4	2	4	3	4	4	5	0.83

(Continued)

Table 2 (Continued).

Item No.	Item Description	I-CVI for the Instrument TFI-AM Version							I-CVI
		Ept 1	Ept 2	Ept 3	Ept 4	Ept 5	Ept 6	Number of Agreements	
Item 12	የሚፈጠሩ ችግሮችን እና ሁኔታዎችን በጥሩ ሁኔታ መቋቋም ይችላሉ? Can you cope problems and situations well?	3	3	4	2	4	4	5	0.83
Item 13	ብቻዎን ነው ሚኖሩት? Do you live alone?	4	4	4	4	4	4	6	1
Item 14	አንዳንድ ጊዜ በአካባቢዎ ያሉ ሰዎችን አጥተው ወይም ናፍቀው ያዉቃሉ? Do you sometimes miss people around you?	4	4	4	3	3	2	5	0.83
Item 15	ከሌሎች ሰዎች በቂ ማህበራዊ ድጋፍ ያገኛሉ? Do you get enough social support from other people?	2	4	4	4	4	4	5	0.83
Ept: Expert, I-CVI: Item level content validity index, S-CVI/Ave: Total content validity index average for the scale, TFI-AM: Tilburg Frailty Indicator Amharic Version								S-CVI/Ave	0.91
								Total Agreement	7

Reliability Test Statistics

The total TFI-AM mean score was 5.76 (±2.89). There was a range in the mean scores across the TFI-AM domains: (i) the mean score of the physical domain which had eight items was the highest with 3.36 (±2.06); (ii) the psychological domain which has four items had a mean score of 1.32 (± 1.17) and (iii) the social domain with three items had a mean score of 1.07 (±0.42). The internal consistency of the TFI-AM was very good with an overall Cronbach alpha value of 0.82. The physical domain showed the highest reliability with a 0.75 Cronbach's alpha value which corresponds to good reliability. The psychological and social domains showed good and moderate reliability with Cronbach's alpha value of 0.70 and 0.68, respectively. The physical and psychological domain scores were strongly and positively correlated to the total TFI score, r (96) = 0.91, p < 0.01 and r (96) = 0.71, p < 0.01, respectively. The social domain score had moderate correlation with the total TFI-AM score, r (96) = 0.41, p < 0.01. The statistical characteristics of individual items in the TFI-AM and their mean ranged from 0.09 to 0.58 (Table 3).

Table 3 Statistical Characteristics and the Reliability of Items of the Amharic Version of the Tilburg Frailty Indicator (TFI-AM), 2022

Item	Variables in the Domain	Mean ± SD	Corrected Item-Total Correlation
	Physical Domain/Physical Frailty	3.36 ± 2.06	
1	አሁን ባሉበት ሁኔታ አካላዊ ጤንነት ይሰማዎታል? Do you feel physically healthy in your current state?	0.58 ± 0.49	0.36
2	ያለፍላጎትዎ ብዙ የክብደት መቀነስ አሳይተዋል? (ብዙ ማለትም 6ኪ.ግ ወይም ከዚያ በላይ ባለፉት ስድስት ወራት ውስጥ ወይም 3ኪ.ግ እና ከዚያ በላይ ባለው የመጨረሻ ወር ጊዜ ውስጥ) Have you recently lost a lot of unwanted weight? (a lot means 6 kg or more in the last six months or 3 kg or more in the last month)	0.36 ± 0.48	0.43
3	በመራመድ ችግር ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to difficulty in walking?	0.31 ± 0.46	0.42

(*Continued*)

Table 3 (Continued).

Item	Variables in the Domain	Mean ± SD	Corrected Item-Total Correlation
4	የሰውነት ሚዛንዎን ጠብቆ ማቆየት ባለመቻል ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to difficulties in maintaining your balance?	0.44 ± 0.49	0.37
5	በድምፅ መስማት መቀነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had a problem with your daily activities due to poor hearing?	0.43 ± 0.49	0.39
6	በዓይንዎ እይታ መቀነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to poor vision?	0.47 ± 0.50	0.55
7	በእጆችዎ ጥንካሬ ማነስ ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had a problem with your daily activities due to a lack of strength in your hands?	0.35 ± 0.48	0.59
8	በአካላዊ ድካም ምክንያት በቀን ከቀን እንቅስቃሴዎ (ተግባርዎ) ላይ እክል/ችግር አጋጥሞዎት ያውቃል? Have you ever had problems with your daily activities due to physical tiredness?	0.42 ± 0.49	0.40
	Psychological domain/Psychological frailty	1.32 ± 1.17	
9	የማስታወስ ችሎታዎ ላይ ችግሮች አሉብዎት? Do you have problems with your memory?	0.39 ± 0.48	0.60
10	ባለፈው አንድ ወር ውስጥ የመጨነቅ ስሜት ተሰምቶዎት ያውቃል? Have you ever felt down in the last month?	0.43 ± 0.49	0.49
11	ባለፈው አንድ ወር ውስጥ ብስጭት ተሰምቶዎት ያውቃል? Have you ever felt nervous in the last month?	0.27 ± 0.44	0.50
12	የሚፈጠሩ ችግሮችን እና ሁኔታዎችን በጥሩ ሁኔታ መቋቋም ይችላሉ? Can you cope problems and situations well?	0.24 ± 0.43	0.34
	Social domain/Social frailty	1.07 ± 0.42	
13	ብቻዎን ነው ሚኖሩት? Do you live alone?	0.09 ± 0.29	0.30
14	አንዳንድ ጊዜ በአካባቢዎ ያሉ ሰዎችን አጥተው ወይም ናፍቀው ያዉቃሉ? Do you sometimes miss people around you?	0.50 ± 0.50	0.17
15	ከሌሎች ሰዎች በቂ ማህብራዊ ድጋፍ ያገኛሉ? Do you get enough social support from other people?	0.48 ± 0.50	0.38

Discussion

Several studies have indicated that the prevalence of frailty is increasing in the global ageing population.[62,63] Commonly adopted frailty assessment instruments evaluate only physical frailty and report a lower rates of frailty in community-dwelling older people, one would expect a higher rate of frailty with the TFI as it encompasses the psychological and social aspects of frailty.[62] The proportion of frailty in the current study was 55.2%. Various validation studies on TFI in Brazil,[46] Portuguese[41] and the Netherlands[64] revealed more than 30%, 40% and 35.7% of older people with frailty. The higher rates of frailty in the current study may be attributed to malnutrition in older people in the region being extremely high.[65] The increasing burden of malnutrition and non-communicable diseases coupled with insufficient access to

healthcare and inadequate living condition for older people in Ethiopia[66,67] may contribute to higher rates of frailty. However, compared to the current result, a TFI validation study from Turkey showed that the rate of frailty was 63.6%.[40] The reason for relatively lower rates of frailty in our study, compared to the Turkey study, may be associated with study participants being recruited from the community with a baseline age of ≥60 years. Whereas participants in Turkey were older people admitted to a geriatric outpatient clinic with a relatively higher age (≥70 years). These factors contribute to a higher frailty rate in Turkey study. Our sample should not be considered representative of a general population of older people because study participants were recruited and examined from only one region in Ethiopia. Thus, a true prevalence of frailty can be either lower or higher and should not be determined on the basis of a validation study.

The finding of the current study demonstrated that the TFI-AM version demonstrated a very good level of reliability and an acceptable content validity. This finding was consistent with studies conducted in other countries. A study from the Netherlands reported that 0.79,[22] 0.80[68] and a study from Brazil showed a 0.78[46] Cronbach's alphas values of reliability statistics for the TFI instrument. Across different studies, it was found that the reliability coefficient of the TFI was acceptable.[21]

The reliability statistics for the Polish version of the TFI were 0.72[41], 0.74[23] and it was 0.66[44] for the Italian version for frailty syndrome. The German translation and psychometric testing also revealed a 0.67[44] reliability statistics of the TFI. In comparison to studies conducted in various countries, the current study's reliability statistics were higher. The higher reliability of the TFI-AM in the current study could be attributed to the fact that the instrument was validated and piloted before being administered to any study participant using a culturally appropriate and contextually relevant processes. These efforts contribute to a more consistent set of questions with a higher overall level of reliability.

The current study also demonstrated an acceptable reliability for the individual domains of the TFI-AM. Accordingly, the finding showed that the physical, psychological, and social domains of the TFI-AM reliability was 0.75. 0.70 and 0.68, respectively. These findings showed a better reliability of the domains of the TFI-AM than studies conducted across other countries. The study from the Netherlands showed that the physical, psychological, and social domains of TFI were 0.74, 0.61, and 0.51,[68] respectively. Another instrument validation study with 479 community-dwelling people of 75 years and older in the Netherlands showed that a 0.70 reliability statistic for the physical domain, 0.63 for the psychologic domain, and 0.34 for the social domain.[22] A study from Turkey also found that the reliability statistics for physical, psychological, and social domains were 0.727, 0.675, and 0.049 respectively.[69]

An instrument has face validity if it seems to identify what it is intended to measure and that it will work.[70] The current study demonstrated that the face validity and scale agreement was excellent. This finding is in line with a study conducted in the Netherlands demonstrating that the face validity was satisfactory.[22] A study in Denmark, however, proposed that the TFI should be further tested in clinical practice.[39] The content validity relates to whether a measurement instrument contains all essential components of the construct to be measured.[71] The content validity of the TFI-AM demonstrated an acceptable value of I-CVI (0.83 to 1.0). According to the current study, the TFI-AM contains the important frailty items. This finding is in line with reports from various studies which reported that the TFI contains the majority of important frailty items.[22,72] However, it was noted that some important items were missed from a study conducted in Denmark.[73]

The TFI has been validated in various populations and countries, showing good reliability and validity.[21,25,74] The TFI assesses frailty across physical, psychological and social domains.[75,76] This multidimensional approach to frailty contributes to clinical trials studying interventions that target different aspects of frailty.

The results of this study can contribute to the understanding of frailty across different cultural, socioeconomic and low-income settings. This can assist to identify context-specific determinants of frailty and inform culturally appropriate and contextually relevant interventions. It can also contribute to developing local research insights related to ageing and frailty. Frailty research such as frailty tool validation in low-income countries will contribute to strengthening the field of research within gerontology and geriatrics.

Strengths and Limitations

This is the first effort to translate and culturally adapt the TFI for use within SSA and specifically from the Ethiopian older persons' perspective. This instrument translation will allow for the assessment of frailty and evaluating

interventions aimed at addressing frailty among older people in Ethiopia. Importantly, this instrument adaptation translation will contribute to researchers, health care professionals and policy makers by serving as an early detection instrument. This will also assist in determining possible interventions for improving the health status of older people in low-income settings. Resulting the insufficient research outputs on frailty with no evidence of interventions to decrease frailty in SSA, a research team aimed to investigate and measure the effectiveness of a nurse-led intervention to decrease frailty status of Ethiopian older people [citation by authors to remain anonymised]. Such efforts will contribute on how to reduce and possibly avert frailty in older people from SSA perspective.

However, the results of the present study should be understood in the context of potential limitations. Other forms of reliability and validity tests need to be carried out. The test–retest reliability or the construct and predictive validity of the instrument were not assessed. Therefore, our results indicate, but do not prove, that the translated version of the TFI is a valid and reliable measure of the common attributes of frailty. Future studies could examine test–retest reliability, construct, and predictive value of the TFI with respect to other health outcomes including, relocation to nursing homes, higher rate of morbidity, admission to hospital, longer length of stay in hospital and increased rates of mortality. Moreover, study participants were recruited from one region in Ethiopia resulting in an unrepresentative result. Future research is needed to increase the sample size and confirm the generalisability in different Amharic speaking regions.

Conclusion

The findings provide initial evidence that the TFI-AM version demonstrated a very good level of reliability and acceptable content validity for assessing frailty among community-dwelling older people from the Ethiopian context. The Amharic adaptation of the TFI proved a useful, easy to administer and fast for assessing frailty on community-dwelling older people. Nevertheless, future research is needed to determine the efficacy of the TFI-AM for detecting frailty in community-dwelling Ethiopian older people.

Ageing research and the development of instruments to screen for age-related problems will benefit policymakers in low-income settings. This will assist them to emphasise on the multidimensional needs of older people and develop strategies to strengthen the healthcare of older people.

Abbreviations

I-CVI, Item level content validity index; ICMF, Integral Conceptual Model of Frailty; TFI, Tilburg Frailty Indicator; TFI-AM, Tilburg Frailty Indicator Amharic Version; SSA, Sub Saharan Africa; S-CVI/Ave, total content validity index average for the scale; UOW, University of Wollongong.

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Disclosure

The authors declare that there is no conflicts of interest in this work.

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