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Reliability and Validity of Gujarati Version of Tinetti Assessment Tool: Validation Study

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Abstract:

Background: The Tinetti Assessment Tool is a valid and reliable self-reporting Tool evaluating the patient's problems toward the effect of their activities of daily living (ADLs) and works on their balance and gait disorder. Till the date it was translated into various languages but is not available in Gujarati language. This study aimed to translate Tinetti Assessment Tool into Gujarati and to study reliability and validity of Gujarati version**.**

Methodology: Translation and cross culture adaptation were performed according to the guidelines. Content validation was executed by the panel of 6 members who were experts in using Gujarati and English. They were completed the content validity .The psychometric properties were tested by administering the tool to 60 samples (40 to 70 years) was recruited by Purposive sampling. For test-retest reliability, people with Balance Gait disorder were tested after a week by Intra-class correlation coefficient (ICC) and internal consistency was assessed by Cronbach's alpha (α).

Result : The content validity of Gujarati translated Tinetti Assessment Tool by a panel of 6 experts were found to be, I-CVI of individual items of Gujarati version of Tinetti Assessment Tool ≥ 0.93 and the overall S-CVI for idiomatic equivalence (S-CVI =0.89) semantic equivalence (S-CVI=0.91) and content relevance(S-CVI=0.92). The test-retest reliability of Gujarati version Tinetti Assessment Tool was good (ICC (2,1) = 0.986 and 0.977). Internal consistency was found to be good (Cronbach's alpha = 0.993 and0.988).

Conclusion : The Gujarati version of Tinetti Assessment Tool was cross-culturally adapted and validated can be use patient with balance and gait disorder in the Gujarati-speaking populations.

Keywords : Cross cultural adaption, Tinetti Assessment Tool, Reliability, Validity , Balance and Gait disorder

INTRODUCTION

Balance and gait disorders are among the most common causes of falls in older adults.[1] more than one third of persons 65 years of age or older fall each year, and in half of such cases the falls are recurrent. Approximately 1 in 10 falls results in a serious injury, such as hip fracture, other fracture, ,subdural hematoma, other serious soft-tissue injury, or head injury.[2] Chronic diseases and aging can affect the balance ability of older people; therefore, an assessment of balance ability is valuable predicting and preventing falls and a reduction in independent living in older people. [3]

Balance is required for maintaining static posture, stabilizing dynamic movements, performing daily activities and moving around the community.[3] The loss of balance response and increased incidence of falls is of concern to physical therapists. Improvement of the balance may be a desired functional outcome for many patients. Balance function has been reported to decline with age, as evidenced by increased postural sway and decreased stability.[4]

Balance difficulties are reported by 13% of patients at age 65,35%at age 75, and 46% at age 85. Gait impairment has been estimated to occur in 8% to 19% of elderly individual living in the community.[5]

Balance can be affected in various ways which include joint motion limitation, weakness, altered muscular tone, sensory deficits, anomalous postural reactions and cognitive problems.[6] Most of changes in gait that occur in older are related to underlying medical conditions, particularly as condition increase in severity, and should not be viewed as merely an inevitable consequence of aging.[1]

Other causes of balance is the dizziness, vertigo, neurological disorder, vestibular migraine and vestibular neuritis. Balance disorders are recognized risk factors for falls. especially in the elderly with high associated morbidity, mortality, and economic cost.[7] Only few studies describe the distribution of gait disorders. Obviously, the spectrum of underlying illnesses will depend on the population under consideration and the assessment technique. Within a relatively healthy subgroup of 153 community residents aged 88 years and older, about 61% reported distinct diseases as a cause of gait impairment.[0] Non-neurological disorders were the leading causes of gait impairment, in particular joint pain (52 of 87 people), whereas many others had multiple causes for their gait impairment.[8]

Non-neurological disorders were the leading causes of gait impairment, in particular joint pain (52 of 87 people), whereas many others had multiple causes for their gait impairment. Stroke was the most common neurological cause. In another study of 120 elderly outpatients seen in a neurological reference practice, the most common causes for gait disorders were sensory ataxia (18%), myelopathy (17%), multiple strokes (15%), and parkinsonism (12%).2 Largely the same causes dominated in a series of 493 neurological inpatients, 60% of whom had a gait disorder.[8]

Determining that a gait is abnormal can be challenging, because there are no clearly accepted standards to define a normal gait in an older adult.10 Studies comparing healthy persons in their 70s with healthy persons in their 20s demonstrate a 10 to 20 percent reduction in gait velocity and stride length in the older population.18,19 Other characteristics of gait that commonly change with aging include an increased stance width, increased time spent in the double support phase, bent posture, and less vigorous force development at the moment of push off. These changes may represent adaptations to alterations in sensory or motor systems to produce a safer and more stable gait pattern.[1]

They may contribute to gait and balance disorders for a variety of reasons, such as causing pain, dyspnea, imbalance, diminished strength, limited range of motion, poor posture, decreased sensory perception, fatigue, deformity, and decreased awareness of and ability to adapt to and traverse through possibly hazardous surroundings.[1]

In addition, recent surgery or hospitalization and other acute medical illnesses may lead to gait and balance disorders. The use of multiple medications, as well as specific classes of medications, can lead to gait disorders and an increased rate of falls.[00] Although data are limited, surgery may improve gait for patients with cervical spondylotic myelopathy,51 lumbar spinal stenosis,52 normal-pressure hydrocephalus,53 or arthritis of the knee or hip.[1]

In many studies ,risk factor for falls have been determined. These are classified as intrinsic and extrinsic factors. Muscular weakness of the Lower extremities ,decreased grip force, impaired postural balance, Functional and cognitive disorders, and visual problems constitute Intrinsic factors ,while extrinsic factors include environmental factors Such as inadequate illumination, slippery floors and lack of safety equipments in bathrooms. Besides, a decrease in the ability to perform daily living activities and usage of walking aids contribute to the frequency of falls.[9,10]

Tests and functional scales used in proportion to variation in risk factors for falls, and excess number of components of postural control are also numerous.[9] One of these scale tinetti balance was developed by mary tinneti 1986 so as determine as risk falls.[9]

One of the most widely used version of the Tinetti Assessment of Balance and Gait scale. It is composed of two separate categories as balance and gait tests. Balance and gait are evaluated with nine and eight items, respectively. Total score of balance category consists of sitting balance, balance on arising to stand, immediate standing balance (within first 5s), standing balance, maintenance of balance when the subject turns 360 degree around him /herself, and tries to sit down from standing position is 16 points. Total score of the gait category which evaluates initiation of gait, step length and height , step symmetry and continuity deviation from a specified path, sways of patient's trunk and the position of heels while walking is 28 points. As a result, the total score of the amounts to 28 points. The highest score indicates the best performance.[9]

REVIEW OF LITERATURE

1. **Jinse Park. Seong-Beom Koh, Hee Jin Kim, Eungseok Oh, Joong-Seok Kim, Ji Young Yun, Do-Young Kwon, Younsoo Kim, Ji Seon Kim, Kyum-Yil Kwon, Jeong-Ho Park, Jinyoung Youn, and Wooyoung Jang. (2018)[10] :-** ·Validity and Reliability Study of the Korean Tineti Mobility Test for Parkinson's Disease**.:-** Twenty-four patients diagnosed with PD were enrolled in this study. For the interrater reliability test, thirteen clinicians scored the TMT after watching a video clip. We also used the test-retest method to determine intrarater reliability. The interrater reliability and intrarater reliability of the Korean Tinetti balance scale were 0.97 and 0.98, respectively. The interrater reliability and intra-rater reliability of the Korean Tinetti gait scale were 0.94 and 0.96, respectively. The Korean TMT scores were significantly correlated with the other clinical scales and three-dimensional motion capture. The cutoff values for predicting falling were 14 points (balance subscale) and 10 points (gait subscale).
2.
3. **Seung-Heon An, Dong-Geon Lee, PT, Yun-Bok Lee, Gyu-Chang. (2014)[11]**. Inter –rater ? absolute Reliability and Concurrent Validity of Tinetti – gait Scale (Korean version) in stroke patients**. :-** The purpose of this study was to investigate the inter-rater absolute reliability and the concurrent validity of the Tinetti-gait scale that was translated into Korean for chronic stroke patients. Fifty-two with post-stroke participated in this study. Results was The inter-rater reliability of the Tinetti-gait scale was high; ICC(3,1)=.91 ICC(3,1)=.91 (95% CI=.85~.95) (very reliable), the range of Kappa coefficient were .73~.92 (substantial~good). The inter-rater agreement of the each item in Tinetti-gait scale ranged from .74 to .92 (95 % CI=.59~.95) (reliable~very reliable). The SEM and MDC were .56 and 1.55, respectively. In the results of concurrent validity, there were moderate positive correlation between Tinetti-gait scale and DGI (r=.78), 10WT (r=.74), OLST (r=.65~.73), FM-LE (r=67). And there was moderate negative

correlation between Tinetti-gait scale and STS (r=-79) (p<.01). The Tinetti-gait scale(Korean version) was a reliable and valid tool to measure gait ability in stroke patient.

4. **Serap D. Yücel & Füsun Şahin & Beril Doğu & Tülay Şahin, Banu Kuran & Sevda Gürsakal.(2012)[9].** Reliability and Validity of the Turkish version of the Performance- Oriented Mobility Assessment 1. **:-** The aim of this study was translate POMA-l to Turkish and to assess its reliability and validity people with amputated lower extremities. Eighty participants enrolled in the study with a mean age of 76.5 ± 6.75 years.The turkih version of POMA were ICC(0.70)and cronbach's alpha(0.72,0.83,0.88). In the reliability evaluation of the scale in validation study POMA total score had a strong positive correlation with BBS total score ($r = 0.86, p < 0.0001$), and also a negative correlation with TUG ($r = - 0.75, p < 0.0001$). According to the results of this study, the Turkish version of the POMA-l scale has been found to be a reliable and a valid scale for elderly Turkish peopl

5. **Camila Rodriez Guevara. Luz Helena Lugo. (2012)[12] .** Validity and reliability of Tinetti Scale for Colombian people :- A validity study was conducted in 2012 to a validate the Tinetti Scale for its use in Colombian populations. The Spanish version of Tinetti scale was applied by two evaluators to elderly persons with different degress of gait and balance functionally. Results of this study was the The content validity suggests the re-structuring of the items in the domain of equilibrium with a Cronbach's alpha of 0.948 and a variance of 13,894, in the construct validity, 46 of the 48 responses of the scale differences statistically significant in the ability to detect changes in a group without alterations in gait and balance (healthy) and a group with these conditions (sick); the concurrent validity had a high correlation r = -0.82 with Timed up and go. The inter and intra- rater reliability was between 0.4 to 0.6 and 0.6 to 0.8, respectively. The Cronbach's alpha was 0.91 so the scale was valid and reliable.

6. **Huma Parveen. Majumi M. Noohu.(2016)[13].** Evaluation of Psychometric properties of Tinetti Performance-Oriented Mobility Assessment Scale In Subjects with Knee Osteoarthritis :- The objective of this study was to determine the psychometric properties of the (POMA) scale to measure balance and gait impairments in individuals with (OA).A convenient sample of 25 individuals with bilateral OA knee were recruited. The Results Score of BBS was significantly correlated with POMA-B scores, $r_s = 0.63$, $p = 0.001$, whereas TUGT showed a negative correlation with POMA-G, $r_s = -0.481$, $p = 0.020$, showing moderate convergent validity. ICC results of the total POMA scale (POMA-T), POMA-B, and POMA-G were 0.96, 0.93, and 0.96, respectively, indicating high test retest reliability. SEM, for POMA-T, POMA-B, and POMA-G was 0.35, 0.27, and 0.35, respectively; MDC values were 0.97 for POMA-T, 0.75 for POMA-B, and 0.63 for POMA-G. The findings indicate that the POMA is a valid and reliable tool to assess balance and gait impairments in people with OA knee.

7. **Anne D Kloos, Deb A. Kegelmeyer ,Gregory S. Young, Sandra K Kostyk.(2010)[14].**Fall risk assessment using the Tinetti mobility test in individuals with Huntington's disease. :- The Tinetti Mobility Test (TMT) is a clinical balance and gait test that predicts fall risk in the elderly. This study examined the concurrent validity, usefulness of the TMT as a fall risk screening tool, and the potential ability of the TMT to predict falls in individuals with Huntington's disease (HD). Data from a retrospective review of 94 patient records were used. TMT scores were correlated with Unified Huntington Disease Rating Scale motor scores. The ability of the TMT to accurately assess fall risk was determined using validity index measures. Logistic regression was used to assess the ability of the TMT to predict falls. TMT scores correlated with motor scores ($r_s = -0.751$, $P < 0.0001$). Using a cutoff value of 21, the TMT had a sensitivity of 74% and a specificity of 60% to identify fallers. Lower TMT scores and younger age were significant predictors of falls. The TMT is a for assessing balance and gait status and fall risk of individual with HD.

8. **Anne D. Kloos.Nora E. Fritz, Sandra K. Kostyk, Gregory S, Deb A. Kegelmeye Young. (2014)[15].**Clinimetric properties of the Tinetti Mobility Test, Four Square Step Test , Activities-Specific Balance Confidence Scale, and spatiotemporal gait measures in individuals with Huntington's disease:- This study examined the reliability and concurrent validity of spatiotemporal gait measures, the TMT, FSST and ABC scale in individuals with HD. Results of this study was participants Spatiotemporal gait measures, the TMT total and the FSST showed good to excellent test–retest reliability (ICC > 0.75). MDC values were 0.30 m/s and 0.17 m/s for velocity in forward and backward walking respectively, four points for the TMT, and 3 s for the FSST. The TMT and FSST were highly correlated with most spatiotemporal measures. The ABC Scale demonstrated lower reliability and less concurrent validity than other measures. The high test–retest reliability over a six week period and concurrent validity between the TMT, FSST, and spatiotemporal gait measures suggest that the TMT and FSST may be useful outcome measures for future intervention studies in ambulatory individuals with HD.

9. **Lorenzo Panella, Tinelli Carmine, Buizza Angelo, Lombardi Remo, Gandolfi Roberto.(2008)[16].** Towards objective evaluation of balance in the elderly: validityand reliability of measurement instrument applied to the tinetti test **:-** The aim of present study was the validation of an instrument for evaluating balance, applied Tinetti test. Trunk inclination was measured by inclinometers during thr Tinetti test in 163 healthy participants. Reliability was evaluated by cronbach;s alpha and its validity by itemscale correlation, discriminant validity and concurrent validity. Influence of age and gender was assessed by regression model. Repeatable and distribution consistent measurement were obtained (cronbach;s alpha=0.88). parameter distribution was significantly different in control and patients ($p<0.001$). optimal threshold fpr discriminating between normal and abnormal performance (153.9/200) corresponded to sensitivity of 84.7% and area under the receiver operating characteristics curve of 93.

10. **Cipriany-Dacko LM, Dana Innerst, Joann Johannsen, Vicki Rude.(1997)[17].** Interrater reliability of the tinetti balance scores in novice and experienced physical therapy clinicians:- A reliability design was used to assess the interrater agreement and consistency of the BPOMA scores in an elderly population. Twenty-six residents of a skilled nursing home, ranging in age from 66 to 90yrs ($\bar{x}$ = 80.4, SD = 6.8), participated in Phase 1. Twenty-four hospital inpatients and five residents of a skilled nursing home, ranging in age from 60 to 92yrs ($\bar{x}$ = 74.7, SD = 7.9), participated in Phase 2.Phase 1 demonstrated fair to excellent κ coefficients (.40–1.00) in all maneuvers across all raters. The ORs had higher agreement compared with the AR, ranging from good to excellent (.75–1.00). Phase 2 demonstrated fair to good κ coefficients (.40–.75) in 5 of 8 maneuvers across all nine raters. When comparing proportion of observed agreement to evaluate the years of experience on rater agreement, there was no significant difference between clinician groups.Fair to good reliability of BPOMA scores occurred across many raters of varied experience with a small amount of BPOMA scores occurred across many raters of varied experience with a small amount of training..

11. **Bahman Moulodi., Akram Azad, Ghorban Taghizadeh, Mahtab Roohi-Azizi, Parvaneh Mohammadi.(2020)[18].**Reliability and Validity of Persian Version of Performance Oriented Mobility Assessment (POMA) in Community- dwelling Iranian older adults:- This study aimed at investigating the construct validity, factor analysis, internal consistency, test-retest and inter-rater reliability, and ceiling/floor effects of the Persian version of Performance-oriented Mobility Assessment (POMA) in community-dwelling elderly**.** One hundred and forty-five older adults aged 65 years and older were recruited from daily care centers of Tehran by convenience sampling method. Timed Up and Go (TUG) test and Berg Balance Scale (BBS) were used to investigate the construct validity of the POMA. Test-retest (7-14 days with interval) and inter-rater reliability of the gait and balance subscales and the total score of the POMA were moderate to very high correlation ($r= 0.67-0.9$, $P\leq 0.05$) was found between the total score of the POMA and BBS, Fullerton Advanced Balance Scale, step test (right and left), TUG, Dynamic Gait index, and walking speed, whereas the correlation between the total score of the POMA and step length was poor ($r= 0.39$, $P\leq 0.05$). The results of confirmatory factor analysis showed a poor goodness-of-fit of POMA with the two-factor

model (balance and gait) in community-dwelling elderly. Internal consistency (Cronbach's alpha= 0.94), test-retest reliability (ICC = 0.97), as well as inter-rater reliability (ICC = 0.92) of the POMA were excellent. The results revealed no floor effect for the total score of the POMA; however, its ceiling effect was 3.44%.The Persian version of POMA showed excellent psychometric properties for evaluating different aspects of balance in community-dwelling

NEED OF STUDY

Tinetti Assessment Tool is one of the most common Tool that has been used by physiotherapist all over the world. Also it is already translated in many language like Turkish,[9] Korean[10], Spanish[12], persian[18] etc. I want to translate this scale in my mother language i.e. Gujarati because it will be more beneficial for patients to understand the scale in Gujarati and it will be helpful to physiotherapists also who are from Gujarat.

OBJECTIVE OF THE STUDY

- To translate Tinetti Assessment Tool in to Gujarati language.
- To find out test-retest reliability and internal consistency of Gujarati version
- Tinetti Assessment Tool.
- To find out face and contact validity of the Gujarati version Tinetti Assessment Tool.

HYPOTHESIS

- NULL HYPOTHESIS : Tinetti Assessment Tool for balance and gait will be not reliable and valid on Gujarati population.
- RESEARCH HYPOTHESIS : Tinetti Assessment Tool for balance and gait will be reliable and valid on Gujarati population.

METHODOLOGY

The study was carried out on elderly people aged 40 to 70 years in Gujarat, India. Those peoples who have balance and gait disorder.

INCLUSION CRITERIA

1) Patients who can write , reading and understand Gujarati language
2) Age group 40 – 70 years
3) Patient who is having problems with balance and gait

EXCLUSION CRITERIA

1) Subjects who don't know Gujarati
2) Subjects who had fracture within 6 months
3) Patient with neurological and psychological problem

The Tineeti Balance Scale had been cross-culturally adapted into Gujarati version of Tinetti Assessment Tool in following eight steps:

1. Initial translation to Gujarati language/ forward translation: The translation of Tinetti Assessment Tool in Gujarati language was performed by two individuals whose native language is Gujarati.

2. Synthesis: After discussion, the 2 translators produced a consensus version of the Tinetti Assessment Tool

3. Back translation: Back translation of preliminary Tinetti Assessment Tool into English was conducted by two native English speakers who were fluent in both English and Gujarati. The two translators were neither aware nor be informed of the concepts explored, and they had no medical background.

4. Reviewer's committee: An expert committee comprising of panel of 6 members performed cross-cultural adaption and validation. After back translation, the Scale were forwarded to back translators. They reviewed all translation and developed the
Pre-final version of Tinetti Assessment Tool with emphasis on semantic, idiomatic, experimental and conceptual equivalence in relation to original back- translated Tinetti Balance Scale versions. Then the Scale was content validation by the expert committee.

5. Content validation: Content validation was excuted by the panel of 6 pre-identified members who experts in using Gujarati and English. They were provided with five options, "agree", "strongly agree", "neutral", "disagree", and "strongly disagree". For providing their valuable opinion regarding Gujarati version of Tinetti Assessment Tool.. Eighty percent consensus of agreement among the experts were required to validate the translated version of Tinetti Assessment Tool .Eighty percent of agreement between the experts were fixed in recommendation by Lynn to yield the item-level content validation index (I-CVI) of 0.93. According to Lynn's (1986) criteria a minimum I-CVI of 0.78 for 6 to 10 experts is required to validate each item in a scale.[19] Hence, we have used an expert panel with 6 members to validate the Gujarati translated content of Tinetti Assessment Tool .They were provided with options, agree, strongly agree, neutral, disagree and strongly disagree in a five point likert scale with Gujarati translated content of Tinetti Balance Scale Neural, disagree and strongly disagree were considered as negative response while agree and strongly agree was considered as positive. Content validation of Tinetti Assessment Tool was performed until the overall scale-level content validation index (S-CVI) reaches SCVI/Ave $\geq$ 0.90.[19]

6. Pretesting: According to inclusion and exclusion criteria, the pre-final Scale was administered to 10 balance and gait disorder patients. The interviewer reported on each respondents understanding the Scale items and making decision on them. As no further adaptation is indicated, the pre-final and final Tinetti Assessment Tool is identical. The objective was to assess whether the translated Scale was understandable, the vocabulary was appropriate and also the expression was relevant for Gujarati culture

7. Validation study: Face validity and Content validity was obtained by the Experts and the translators.

i. Test-retest reliability: The recruited patients with balance and gait disorder were asked to fill Gujarati version of Tinetti Assessment Tool by themselves twice with minimum gap of one week duration. So that person may not copy the same data as well as he/she will not forgot.[19] The readings were recorded to report test-retest reliability.

ii. Internal consistency: Internal consistency was measured with Cronbach's alpha (α), a statistic which was calculated from the pair wise correlations measured between paired readings of Gujarati version of Tinetti Assessment Tool.

Fig: 6.1 (a)

Patient performing Tinetti Assessment Tool

Fig: 6.1 (b)

Patient performing Tinetti Assessment Tool

Process Discussion Result

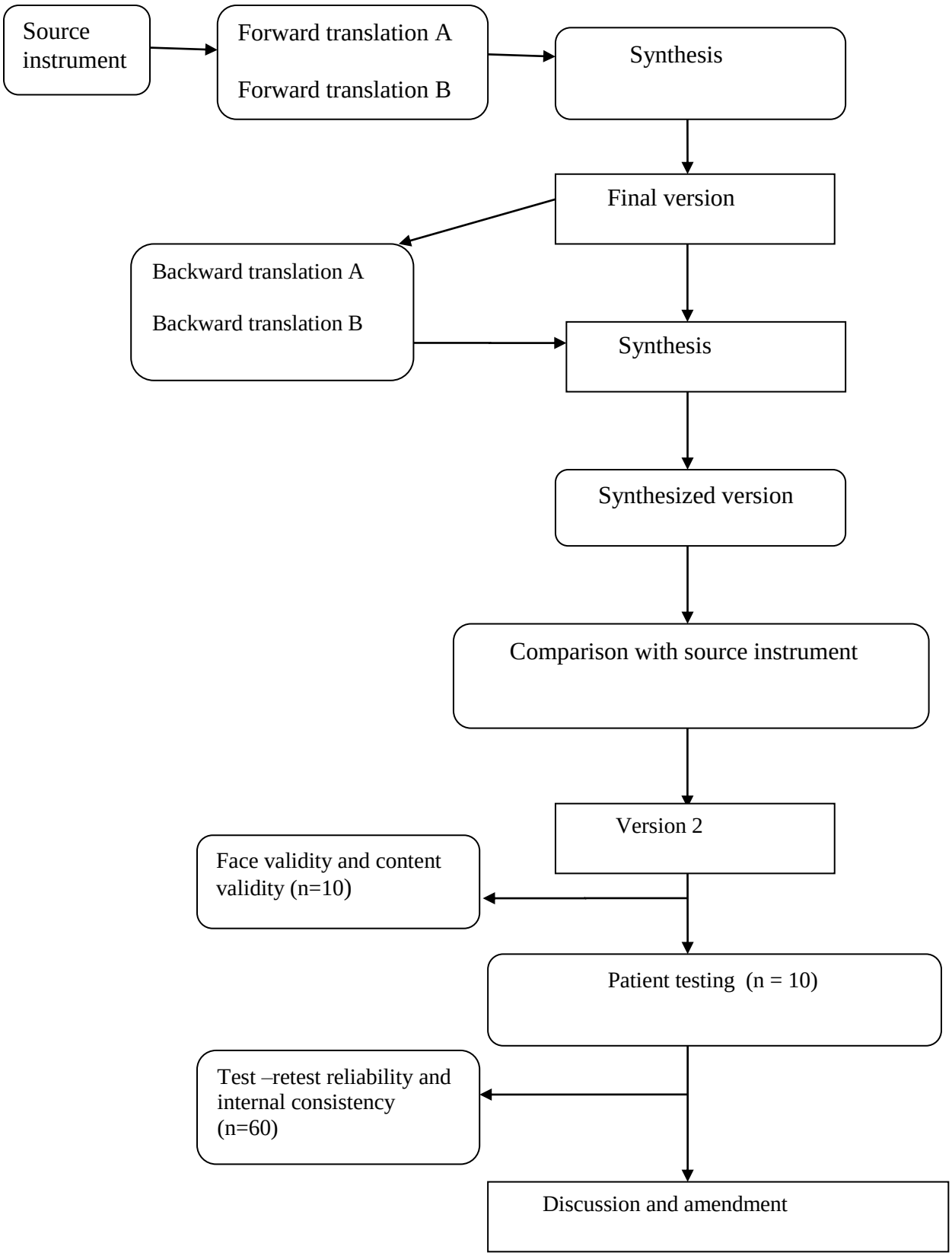
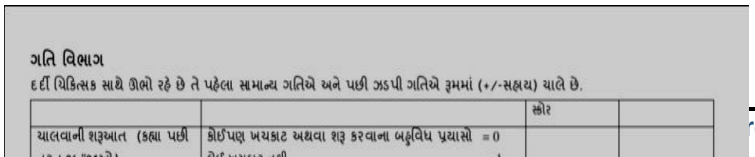
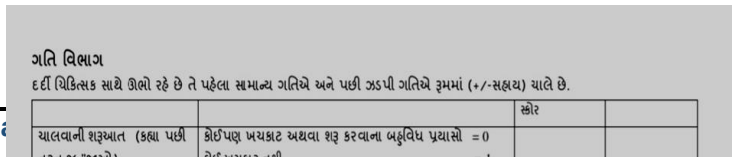


CHART 6.1 CROSS CULTURAL ADAPTION


ગતિ વિભાગ
દર્દી ચિકિત્સક સાથે ઊભો રહે છે તે પહેલા સામાન્ય ગતિએ અને પછી ઝડપી ગતિએ રૂમમાં (+/-સહાય) ચાલે છે.

		સ્કોર	
ચાલવાની શરૂઆત (કહ્યા પછી	કોઈપણ ખચકાટ અથવા શરૂ કરવાના બહુવિધ પ્રયાસો = 0		


ગતિ વિભાગ
દર્દી ચિકિત્સક સાથે ઊભો રહે છે તે પહેલા સામાન્ય ગતિએ અને પછી ઝડપી ગતિએ રૂમમાં (+/-સહાય) ચાલે છે.

		સ્કોર	
ચાલવાની શરૂઆત (કહ્યા પછી	કોઈપણ ખચકાટ અથવા શરૂ કરવાના બહુવિધ પ્રયાસો = 0		

Fig: 6.2

TRANSLATED TINETTI BALANCE SECTION

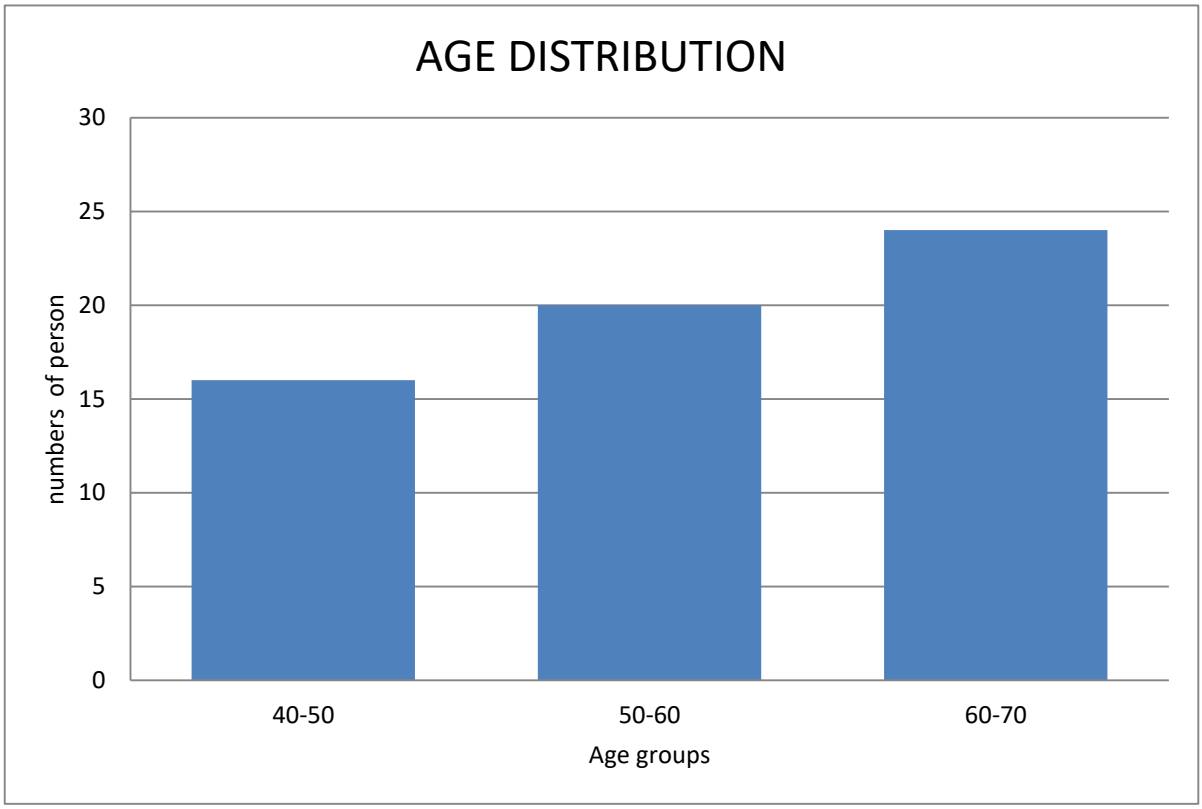
Fig: 6.3

TRANSLATED TINETTI GAIT SECTION

RESULT

1. Age distribution

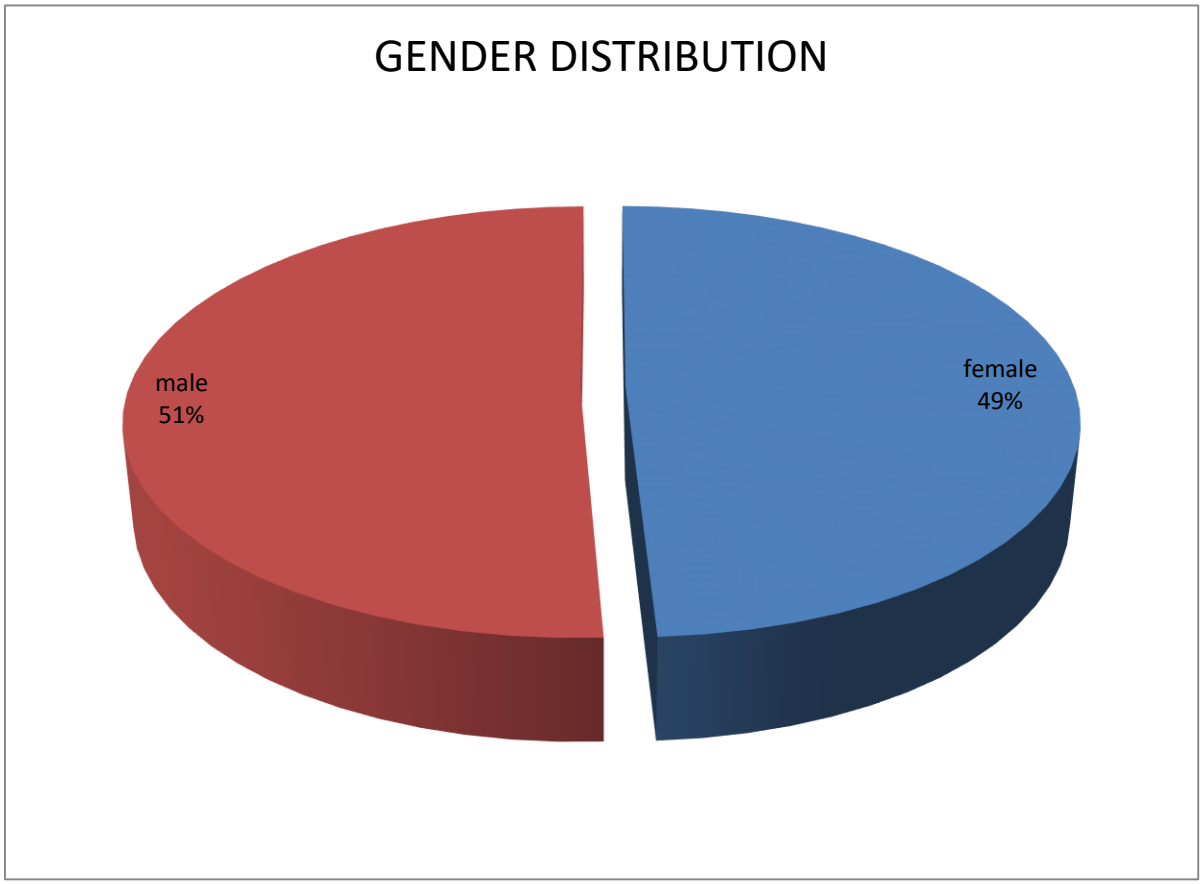
The research was performed on 60 patient with Balance and Gait disorder between the age of 40-70. There were 14 patients between the ages of 40 to 50, 20 patients between the ages 50 to 60, and 24 patients between the ages of 60 to 70. The Mean of age was 20.



GRAPH 7.1 :- AGE DISTRIBUTION CHART

2. Gender distribution

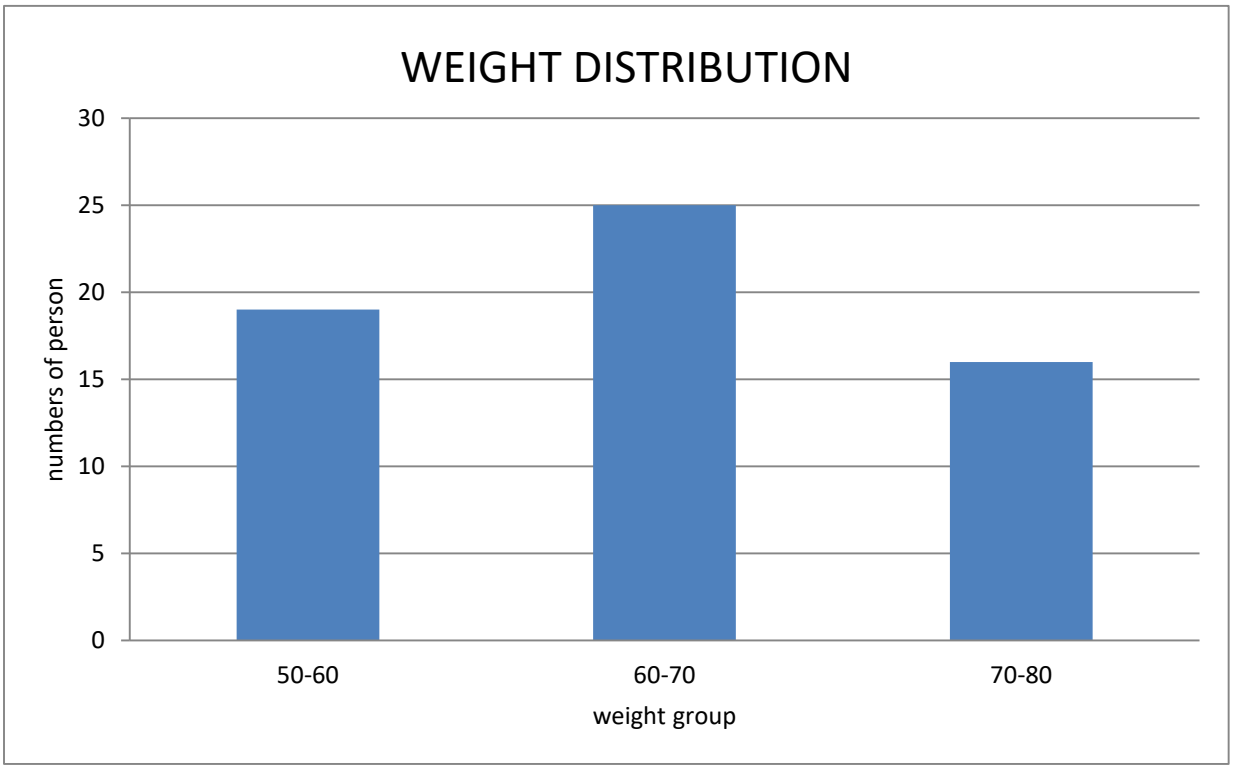
The research was performed on 60 patient with Balance and Gait disorder. In which 30 are Females and 31 are Males. The Mean of gender was 30.5



GRAPH 7.2 :- WEIGHT DISTRIBUTION CHART

3. Weight Distribution

The research was performed on 60 patient with Balance and Gait disorder There were 19 patients between the weight of 50 to 60, 25 patients between the weight of 60 to 70 and 16 patients between the weight 60 to 70 . The Mean of weight was 20.



GRAPH 7.3 :- WEIGHT DISTRIBUTION CHART

The content validity of Gujarati translated Tinetti Assessment Tool by a 6 experts were found to be, I-CVI of individual items Tinetti Assessment Tool of ≥ 0.93 and overall S-CVI for idiomatic equivalence, semantic equivalence and content relevance ≥ 0.90. For content validity equivalence all 6 experts answers were located between mostly agree and strongly agree of Gujarati version of Tinetti Assessment Tool for idiomatic equivalence (average= 0.89) semantic equivalence(average = 0.91) and content relevance (average= 0.92). Test-retest reliability (n=60) was tested by using the intraclass correlation coefficient, ICC (2,1) and Internal consistency (n=60) was reported in terms of cronbach's α measured in two session after 1 week is reported in Table 2.

Tinetti Balance Scale	Session 1	session 2	Cronbach's alpha	ICC	P- value
BALANCE SECTION	10.71±6.34	10.88±6.20	.993	.986	0.980
GAIT SECTION	8.60±3.29	8.41±3.40	.988	.977	0.959

TABLE 7.1 :- TEST-RETEST RELIABILITY OF TINETTI TOO

DISCUSSION

Many elderly people has Balance and Gait disorder caused by neurological disorder, Parkinson, stroke, poor posture, ataxia , myelopathy. They causing pain, dyspnea, imbalance, diminished strength, limited range of motion, poor posture, fatigue. In our study first report of the reliability and validity of the Tinetti Assessment Tool for evaluating patient with Balance and Gait disorder.

In this study 60 patients participated. Gujarati version of Tinetti Assessment Tool was given twice with 1-week interval to measure the test- retest reliability and to validity. The results of the study showed good

correlation Balance scale and Gait scale(ICC= .986,and .977) (P<0.01) and internal consistency (cronbach's alpha = . 993 and .986).

For content validity equivalence all 6 experts answer were located between mostly agree and strongly agree of Gujarati version of Tinetti Assement Tool for idiomatic equivalence (average= 0.89) semantic equivalence (average = 0.91) and content relevance (average= 0.92). Thus, Gujarati version of Tinetti Balance Scale was content validated for idiomatic equivalence, semantic equivalence , content relevance.

In previous studies, interrater reliability and intrarater reliability of the Korean Tinetti balance scale were(ICC =(0.97 and 0.98) respectively. The interrater reliability and intrarater reliability of the Korean Tinetti balance scale were(ICC =0.94 and 0.96). reliability and validity for gait and balance had high sensitivity and specificity for predicting falls among the patient with PD.[10] In Spanish version the concurrent validity had a high correlation (r = 0.74- 0.93). and inter and intra- rater reliability was between 0.4 to 0.6 and 0.6 to 0.8 The tinetti scale is valid and reliable for Colombian population.[12]

Turkish version of the scale was applied on the participants at 2 week intervals. Test-retest shown good reliability (ICC= 0.94) . interrater and intrarater reliability (ICC=0.86 And 0.90).[9] Turkish version of the POMA-1 scale has been found be a reliable and valid.In Persian version of POMA was applied 7-14 days intervals. Internal consistency (cronbach's alpha= 0.94). test-retest reliability (ICC=0.97). inter-rater reliability (ICC=0.92). Persian shown excellent psychometric properties

It was found Gujarati version of Tinetti Assessment Tool items equivalent to those in original version which is intended by translators involve in this study. The results showed that it was translate this scale into other languags without losing psychometric properties of the original English version

CONCLUSION

The Gujarati version of Tinetti Assessment Tool was cross-culturally adapted and validated for use among the Gujarati-speaking populations. The translated version has acceptable reliability and internal consistency.

SUMMARY

The study is find out the reliability and validity of the Tinetti Assessment Tool in Gujarati language on the elderly people with Balance and Gait disorder in Gujarat. 40 people were chosen with the 40-70 age group participated in the study and they were given Tinetti Assessment Tool was given twice with 1 week interval to measure test-retest reliability and to measure validity. The results showed good correlation and internal consistency and content validity

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