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Psychometric Testing of a Cross-Culturally Adapted Fall Efficacy Scale (FES) Scale for Igbo Stroke Survivors

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Stroke Survivors are predisposed to certain fall risk factors like impaired gait, impaired balance and coordination, as a result of associated motor dysfunctions and disability. This influences their quality of life and causes limitations in their daily living activities. FES is a reliable and valid instrument for assessing confidence level while performing activities of daily living without falling. However, its psychometric properties have not been tested among Igbo Stroke Survivors. Hence this study aimed to translate the Falls Efficacy Scale (FES) and investigate its psychometric properties in the Igbo Stroke Survivors (SS). A total of 40 participants involving 20SS and 20 age- and sex-matched normal subjects completed an Igbo version of the FES. The internal consistency and test-retest reliability of the Igbo translated FES tool were assessed using cronbach-α and Spearman correlation respectively while the construct and criterion-related validities were evaluated using independent t-test and Spearman correlation respectively. Level of significance was set at α = 0.05. The items of the FES instruments, demonstrated an excellent internal consistency with a Cronbach's alpha of 0.90. The FES Igbo version had an excellent test-retest reliability (r = 0.977, p = 0.001), criterion-related validity(r =0.992, p = 0.001) and construct validity (t = 14.576, p<0.001). FES Igbo version is a reliable and valid tool for assessing confidence level of SS without falling while performing activities of daily living.

Keywords: Fear of Falling, Igbo, Fall Efficacy Scale, Psychometric Testing, Stroke Survivors.

INTRODUCTION

Stroke can cause physical impairments such as motor weakness and paralysis, sensory disturbances, and impaired postural control, Michael, (2003); it can also cause mental fatigue, depression and impaired cognitive function (Johansson and Rounback, 2012). Both physical and mental impairments can contribute to a fall (Nyherg and Gustafson, 1995). Fall a common complication post stroke is defined according to the World Health Organization, as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level, with or without injury" (WHO, 2007). Although previous studies have reported varying fall rates among elderly patients, there is a general consensus regarding higher fall rate in stroke patients as compared to the general population of the same age (Rubenstein, 2006; Davenport, et al., 1996). Among people who have survived a stroke, 22–48% have experienced at least one fall during a hospital stay, Nyerg and Gustafson, (1995); Davenport, et al., (1996); Teasell, et al., (2002) or a later stage of recovery(Goh, et al., 2016; Persson, et al., 2011). The experience of falling increases the fear of falling. Fear of falling a psychological condition associated with excessive worrying about losing one's balance (Weerdesten, et al., 2008), decreases physical activity, resulting in deconditioning. Deconditioning leads to decreased physical activity, resulting in lower functioning that increases the incidence of falls in stroke patients (Watanabe, 2005; Mackintosh, et al., 2005; Botner and Miller, 2005). Falling and fear of falling form an endless loop. An FOF prevalence of 81% was reported in a Nigerian stroke sample (Akosile, et al., 2011). Previous studies showed that up to 51% of inpatients, Persson, et al., (2008), 59% after hospital discharge, Watanabe, (2005), and 48% of community-dwelling people, Ng, (2011), report fear of falling after stroke. At 6 months post stroke, when individuals are likely to have adapted their behavior to reduce falling to some extent, more than 50% of the individuals reported fear of falling after stroke (Kim, et al., 2012, Schmid, 2015). Also a small qualitative study showed that individuals after stroke continue to report fear of falling as late as 7 years after stroke and require physical and cognitive adjustment to combat their fear of falling (Da Silva, 2014). Due to the widespread prevalence and the long-lasting negative consequences that FOF has on rehabilitation, early identification of SS as being at risk of FOF is crucial in order to prevent its occurrence and equally help during rehabilitation process.

Assessment is the first step to reaching a targeted rehabilitation intervention (Eun amd Choi, 2015). Choosing an appropriate tool that measures the fear of falling is the foundation for planning an appropriate course of therapy for post-stroke intervention and assessing the effects of an intervention (Park and Choi, 2014). To assess FOF, different approaches have been developed over the years (Kempen, et al., 2007; Ulus, et al., 2012). The Single Item Question is being commonly used, in large scale surveys or prevalence studies, but this assessment does not ask about the intensity of FOF and make it hard to detect specific changes in FOF over time (Schmid, et al., 2009; Kempen, et al., 2007). The Fall Efficacy Scale (FES) was added to resolve these potential issues because it assessed the confidence of the patients while they did 10 basic activities of daily living without falling (Tinnetti, et al., 1990). However, this assessment did not measure FOF symptoms in social and highly physical activities, Bula, et al. (2008), thus the result cannot be applied in different cultural contexts (Ulus, et al., 2012). The modified Fall Efficacy Scale International (FES-I) developed by Yardley, et al. (2005), has been found to be an excellent clinical tool for assessing concerns about falling in easy, difficult, and social activities(Delbaere, et al., 2010). Acceptable validity and reliability have been reported for the original version of FES and modified versions in diverse languages and cultures (Kempen, et al., 2007; Hellstorm and Lindmark, 1999; Bula, et al., 2008). Using a culturally adapted and validated instrument of measurement in research ensures the reliability of results and also contributes to clinical reasoning and to an accurate evaluation (Marques-veira, et al., 2015; Sousa, et al., 2015; Leung, et al., 2012). Modified version of FES has been cross-culturally translated and validated into Igbo language among community dwelling older adults. Igbo is the principal native language of the Igbo people, an ethnic group of south-eastern Nigeria, Marufat, et al., (2020), made up primarily of Anambra, Abia, Ebonyi, Enugu and Imo States. Igbo language being one of the most widely voiced languages of West Africa is spoken by about 27 million speakers mostly from eastern Nigeria and minority language in Equatorial Guinea (Eberhard, et al., 2019; Slattery, 2010). Prominent Igbo communities outside Africa include Finland, Malaysia, London, UK, Houston, Atlanta and Washington DC, USA (Slattery, 2010). Studies on the psychometric testing of a cross-cultural adapted Igbo FES version among Igbo SS have not been investigated. As a result, clinicians are faced with some restrictions and challenges of translation during patient's evaluation. This is because some Igbo SS patients are reportedly not literate and fluent in English language and so find most terms in the original version difficult. Also, trying to translate this instrument among stroke participants might cause some bias influences as these translations are not validated and so may differ with each participant. Hence this study aimed to investigate the Psychometric properties of a cross-culturally adapted FES version among Igbo SS.

METHODS

Participants

In total, the study involved 40 participants, 20 community-dwelling stroke survivors u(recruited from tertiary hospitals in Enugu, South-east, Nigeria), and 20 other community-dwelling age- and sex-matched normal individuals as control. Subjects were only recruited if (i) they have no other neurological condition that could influence reintegration other than stroke, (ii) were able to communicate in English and Igbo languages conveniently and (iii) are community-dwelling adults.

Fall Efficacy Scale

The FES has been developed by Tinetti et al. to evaluate the perceived confidence in avoiding falls while per- forming indoor BADL. This scale consists of 10 items, and each item is scored from 1 (very confident) to 10 (not confident at all). The total score, obtained by sum- ming up the item scores, ranges from 10 to 100. A total score of greater than 70 indicates FOF in the person (Tinnetti, et al., 1990).

Procedure

Ethical clearance was sought and obtained from Ethical Research and committee, University of Nigeria Teaching Hospital, Enugu. Informed consent of all the participants was duly obtained. Forward and back translation was done by two linguists from the department of Nigeria and African Languages University of Nigeria. The consensus back translation into the original language was done by two independent translators who are blinded to the forward translation.

Data analysis

The data were analyzed using version 20 of the SPSS software suit. Desrciptive statistics of frequency and percentages were used to summarize the demographic and clinical variables of the participants. Internal consistency and test-retest reliability were evaluated using Cronbach's alpha coefficient and spearman's correlation coefficients respectively. Also, Spearman's correlation coefficient and independent t-test were used to establish the criterion-related and construct validities of the Igbo translated version of ABC scale. The level of significance was set at 0.05.

RESULTS

Characteristics of the subjects

In this study, majority of the participants in this study were male (60%), and between 55 – 69 years (70%). Among the stroke survivors, most of them had ischaemic type of stroke (70%) predominantly on the left sides of their bodies (60%), most of whom had had the condition between 3-4 years (45%) and had received physiotherapy for 4 – 7 months (40%) as shown in table 1.

Test-retest Reliability

The Igbo translated version of the FES instruments test-retest reliability were established by correlating

the scores obtained on two consecutive administrations of the instruments using spearman correlation. There was a strong correlation between the tests of the translated instruments (r = 0.977, p = 0.001) as shown in table 2.

Criterion-related validity

There was a strong correlation coefficient between the English version and the Igbo translated version of the FES instrument (r = 0.992, p = 0.001) as shown in table 3.

Construct validity

The construct validity of the Igbo translated version of the FES was confirmed by comparing the scores of stroke survivors and the participants without stroke on the scale. The participants without stroke had a significantly higher scores than those with stroke (t = 14.576, p <0.001) as shown in table 4.

DISCUSSION

Post Stroke challenges comes with lots of dysfunctions and disabilities as a result of impaired motor function, impaired cognitive function, impaired balance, coordination and gait problems, which predispose the individual to falls. Falls are a common and serious complication after stroke, Schmid, et al. (2013) and approximately one-third of hospital-related falls lead to potentially serious injuries, such as a fracture(Teasell, et al., 2002). Although the physical consequences of a fall receive the most attention, the psychosocial effects are not to be overlooked (Park and Choi, 2015). FoF can be defined as low confidence in one's ability to carry out everyday activities while maintaining postural control without falling (Tinnetti, et al., 1990). Individuals with fear of falling worry about the physical harm and consequent lasting functional disability which could occur as a result of falling (Yardley and Smith, 2002). They are also concerned about the social embarrassment and indignity associated with falling (Yardley and Smith, 2002). FoF can lead to uncertainty, inactivity, reduced physical function, affected social relationships and impaired quality of life (Dalbere, et al., 2004; Tinnetti, et al., 1994; Lachman, et al., 1998). Furthermore, studies have revealed an association between FoF and earlier falls, Anderson, et al. (2008); Watanabe, (2005); Guan, et al., (2015), and between FoF and activity after stroke, such as balance and functional mobility (Guan, et al., 2015). Given that falls in stroke patients are associated with FOF, lower rehabilitation potential and functional recovery, Hyndman, et al. (2002), prevention of falls is a major rehabilitation goal (Amanda, et al., 2018). The Falls Efficacy Scale (FES) is one of the most common instruments for assessing

Table 1: Descriptive Analysis of the clinical and demographic data of participants

Variables	Categories	Frequency	Percentage
SEX	Male	24	60
	Female	16	40
AGE	45-49	6	15
	50-54	2	5
	55-59	10	25
	60-64	10	25
	65-69	8	20
	70-74	4	10
Type of Stroke	Ischaemic	14	70
	Haemorrhagic	6	30
Side of Stroke	Left	12	60
	Right	8	40
Duration of Stroke	≤ 2 years	8	35
	3 -4 years	9	45
	≥ 5 years	1	5
	Unknown	2	10
Duration of PT	≤ 3 months	6	30
	4 – 7 months	8	40
	≥ 8 months	6	30

Table 2: Test-reliability of the Igbo translated version of FES (n=40)

	No.	Means (Standard Deviation)		Spearman Correlation Coefficient (p-value)	Wilcoxon Signed Rank Test (p-value)
		Test	Retest		
Falls-Efficacy Scale (Swedish)	20	38.95 (27.72)	50.20 (26.60)	.977 < .001*	< .001

Table 3: Correlation between the Igbo translated version of FES and the English version

	No.	Means (Standard Deviation)		Spearman Correlation Coefficient	p-value
		English Version	Igbo Version		
Falls-Efficacy Scale (Swedish)	20	38.95 (27.72)	38.95 (27.72)	.992	< .001*

Table 4: Independent sample t-test for comparison of scores of participants with stroke and without stroke obtained on the Igbo translated version of the ABC instrument

	Stroke Patients X±SD	Non Stroke Patients X±SD	t-value	p-value
Falls-Efficacy Scale (Swedish)	38.95 ± 27.72	129.45 ± 1.54	14.576	P < .001

fear of falling (Tinnetti, et al., 1990). It has been translated and validated into a modified version in developed countries so as to properly suit environmental and cultural differences. However the FES modified version may not be specifically sensitive in developing countries due to barriers from environmental and cultural differences. Nigeria as a developing country has 3 major languages; Igbo, Hausa and Yoruba. Igbo is the major speaking language of southeast Nigeria and is made up majorly of five states; Ebonyi, Enugu, Anambra, Imo and Abia States. A modified version of FES has been cross-culturally translated and validated into Igbo language among community elderly individuals. No validated Igbo FES tool exists that assesses fall-related self-efficacy among Igbo SS. Therefore, the aim of this study was to investigate the psychometric properties of a cross-culturally adapted Igbo FES scale among SS.

The study results revealed stroke to be more common in male than female. It could therefore be affirmed that stroke affects more men than women. This is in line with other stroke related studies (Falcone and Chong, 2007; Lin et al, 2010; Lin et al, 2011; Akinpelu et al, 2012; Chen et al, 2012; Vijaya, et al., 2008a; Bhatta, 2005; Pathak, et al., 2006; Devota, et al., 2006; Naik, et al., 2006; Pandit, et al., 2006; Sacco, et al., 1997; Boosman, et al., 2010; Ewert and stucki, 2007; Lynch, et al., 2008; Xie, et al., 2006). Majority of SS were above 54years. Age is said to be an important risk factor for all stroke types (Sacco, et al., 1997a). It could equally be said that the chances of stroke likely increases with age. This is similar to the findings of other studies that reported stroke as affecting people in their middle age (Bhatta, 2005b; Pathak, et al., 2006b; Devota, et al., 2006b; Naik, et al., 2006b; Pandit, et al., 2006b; Lima, et al, 2008; Lynch et al, 2008; Boosman et al, 2010; Hamzat et al, 2014). Although stroke risk increases with age as stated from these studies, stroke can occur at any age (Smajlović, 2015; Sacco, et al., 1997b) while time from stroke varies considerably among the survivors. Duration of stroke is likely to increase with presence of co-morbidities, poor medical care and lack of awareness as in developing countries. Ischaemic type of stroke was reported to be more common than haemorrhagic stroke. This is in agreement with the report of other studies (Vijaya, et al., 2008b; Smith, et al., 2005; Bhatta, 2005c; Pathak, et al., 2006c; Devota, et al., 2006c; Naik, et al., 2006c; Pandit, et al., 2006c) and similar to the report of Andersen et al, (2009) and Ekechukwu, et al (2017), who equally reported ischemic stroke as being more common than haemorrhagic stroke. In addition, majority of the SS had left sided affectation, this is in contrast to other studies (Hedna, et al., 2013; Ahmed, et al., 2018), as they reported right sided affectation.

The result of the study further reported an excellent internal consistency and test-retest reliability among Igbo stroke survivors since there was a strong correlation between the scores obtained on the two consecutive administration of the FES instrument. The strong correlation and the agreement between the measurements indicate that the scale is reliable in presenting stable repeated results. This is in line with the work carried out by Park and Choi, (2015), on the Investigation of Psychometric properties of the Falls Efficacy Scale using Rasch analysis in patients with hemiplegic Stroke. The results of their study suggested that the 6-point Falls Efficacy Scale is an appropriate tool for measuring the self-perceived FOF in patients with hemiplegic stroke. This is also similar with the results found in modified FES version of previous studies(Daniella and Sonia, 2017; Nordell, et al., 2009; Halaweh, et al., 2016; Fadavi-Ghaffani, et al., 2019; Daniela and Martina, 2018; Debamos, et al., 2020; Donald, et al., 2019; Azad, et al., 2014; Ulus, et al., 2012; Kisvetrova, et al., 2019; Flavia, et al., 2010).

The study findings showed a strong criterion-related validity as there was a strong correlation coefficient between the English version and the Igbo translated version of the FES. This strong correlation showed that the scale would be useful and practical when used in a different cultural context for the assessment of balance confidence. Similar results were also reported for the modified FES version(Marques-veira, et al., 2017; Kempen, et al., 2007; Marcella, et al., 2013; Alexandra, et al., 2018; Evdokia, et al., 2011; Marques-veira, et al., 2016; Eva, et al., 2017; Okoye, et al., 2020).

The construct validity of the FES scale was confirmed by comparing the scores of stroke survivors and the control participants. The study revealed that the participants with stroke had significantly lower scores than their age- and sex-matched control. These results therefore showed that the Igbo FES version has excellent construct validity and may be useful for assessing balance confidence among stroke survivors during activities of daily living given that it can distinguish participation restriction between strokes from non-stroke survivors. This results is in correspondence with similar studies (Park and Choi, 2015; Fadavi-Ghaffani, et al., 2019). Also in correlation with similar studies for the modified FES version (Halaweh, et al., 2016; Daniella and Sonia, 2017; Daniela and Martina, 2018; Kempen, et al., 2007; Debamos, et al., 2020; Donald, et al., 2019; Azad, et al., 2014; Ulus, et al., 2012; Kisvetrova, et al., 2019; Flavia, et al., 2010).

CONCLUSION

In clinical practice and future research, the Igbo FES instrument could be used to effectively assess concern about falling among Igbo SS. It is recommended that clinicians should take cognitive of

falls during evaluation of Stroke Survivors so as to prevent its occurrence in them.

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