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Validation and Reliability of the 12-item Zarit Burden Interview among Informal Caregivers of Elderly Persons in Nigeria

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Abstract

Research on ageing in Nigeria has shown that informal care places economic and psychological strain on the caregivers of the elderly persons. However, objective method of assessment of the burden of care for the elderly among caregivers is lacking. This study was aimed at validating the 12-item Zarit Burden Interview (ZBI) among caregivers of elderly persons in Nigeria in correlation with the Katz Index of Independence in Activities of Daily Living (Katz-ADL), the General Health Questionnaire (GHQ-12) and the Modified Conflicts Tactics Scale for Elder Abuse (MCTS). Eighty primary caregivers of community-dwelling elders were selected using a two-stage cluster sampling from two communities. Principal component analysis with varimax rotation was used to determine the factor structure of the ZBI. Construct validity was assessed using Spearman's correlations between the ZBI, the GHQ-12, Katz ADL and MCTS. Internal consistency and instrument reliability were examined with the Cronbach's alpha split-half correlation. Three factors with eigenvalues greater than 1.0 were extracted on the exploratory factor analysis comprising all 12 items accounting for 68.0% of the total item variance. The reliability analysis gave a Cronbach's α of 0.90 and a split-half correlation coefficient of 0.84. Spearman's correlation (r_s) showed good correlation between the ZBI scores and GHQ-12 ($r_s=0.44$, $p<0.001$), MCTS ($r_s=0.43$, $p<0.001$) and Katz ADL ($r_s= -0.50$, $p <0.001$). The 12-item ZBI is a valid and reliable tool for assessing burden in informal settings among caregivers of elderly persons. The tool can be used to assess burden of care among caregivers of elderly persons in community settings.

Keywords

burden of care; Zarit burden interview; caregivers of the elderly; validity and reliability

INTRODUCTION

The proportion of elderly persons is increasing globally and this increase has been found to be greater in developing countries especially (Beach et al. 2010). The reduction in physical strength that occurs with ageing reduces the capacity of older people to work and increases their dependence on others for their daily needs (Ani 2014). The likelihood of having

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disabilities leading to dependence also increases with age due to the possibility of accumulating health risks across a lifespan of disease, injury and chronic illness (Beach et al. 2005, 2010). Care giving may therefore become burdensome to the caregiver and impact negatively on their health resulting in poor quality of care and in some instances abuse of the care recipient (Beach et al. 2005; Chattat et al. 2011). The experience of burden of care among caregivers may be modified by factors like the available support system, the level of dependence of the care recipient, socio-cultural demands and expectations as well as the socioeconomic ability of the caregiver.

Studies in developed countries have assessed the burden of care on caregivers of elderly persons who have some form of cognitive impairment (Brandl and Raymond 2012; Steadman, Tremont, and Davis 2007). In some instances, the burden of care has been related with the perpetration of elder abuse either within community settings or in institutions of care of the elderly (Cooper et al. 2010; Caciula et al. 2010). Findings from Gureje et al's assessment of functional disability among elderly persons in Nigeria revealed that about 19% of the elderly persons were disabled (Oye Gureje et al. 2006). Many of these disabled elderly persons had an unmet need for care as there was no caregiver available to assist in their area of limitation (Oye Gureje et al. 2006). Other studies in Nigeria have examined the socio-cultural expectations from caregivers of elderly persons (Mudiare 2013; Sijuwade 2008; Ajomale 2007a; Uwakwe and Modebe 2007). The expectation is that the care of the elderly remains within the family whether or not the family members have the wherewithal to provide adequate care (Ajomale 2007a; Mudiare 2013; Oye Gureje et al. 2006). This form of informal care is usual within many African communities (Mudiare 2013). Research on ageing in Nigeria has shown that informal care often places a strain on the caregivers of the elderly persons both economically and psychologically (Oye Gureje et al. 2006; Mudiare 2013; Ajomale 2007b). However, research objectively assessing the burden of care for the elderly on the caregivers in this environment is lacking.

The Zarit Burden Interview (ZBI) is a standardized and validated tool, which has been used widely for the assessment of caregiver burden (Bedard et al. 2001; Flynn Longmire and Knight 2011; Braun et al. 2010). The tool has proven reliability for the subjective assessment of burden of caregivers of dementia patients in different settings (Bedard et al. 2001; Wang et al. 2008). Both the 22-item and the 12-item ZBI for the assessment of caregiver burden have been validated in different settings (Bedard et al. 2001; Flynn Longmire and Knight 2011; Wang et al. 2008; Cooper et al. 2009; Hirono, Kobayashi, and Mori 1998; Braun et al. 2010; Seng et al. 2010; Chattat et al. 2011; Ballesteros et al. 2012; Higginson et al. 2010). Higginson et al demonstrated that the 12-item ZBI performs as well as the 22-item ZBI in clinical conditions like advanced cancer, dementia, acute brain injury and palliative care (Higginson et al. 2010). The 12-item ZBI has however not been tested among informal caregivers of elderly persons with no clinical diagnosis of illness. The aim of this study was to validate the 12-item version of the ZBI for use among informal caregivers of elderly persons irrespective of level of cognition within the Nigerian cultural context. The reliability of the ZBI for assessing burden of care experienced by the informal caregivers was assessed. The correlation of the ZBI with the Katz Index of Independence in Activities of Daily Living (Katz ADL) for the care recipients, (Wallace and Shelkey 2007; Katz et al. 1963) the 12-item General Health Questionnaire (GHQ-12) (O Gureje 1991;

Chattat et al. 2011) and the Modified Conflicts Tactics Scale for Elder Abuse (MCTS) (Cooper et al. 2009, 2008) was also tested. Burden of care (measured by the ZBI) which may predispose caregivers to perpetrate elder abuse is determined by their perception of the level of disability of the elderly (measured with the Katz ADL), their ability to successfully handle conflict (measured using the MCTS) and their own mental health status (assessed by the GHQ-12) which may be affected by care giving. It is expected that the ZBI will be used in combination with the other three tools to assess the burden of care experienced by informal caregivers of elderly persons within communities or in health facilities.

MATERIALS AND METHODS

Ethical approval

Ethical approval for the study was obtained from the Oyo State Ministry of Health Ethics Committee. The approval number for the study was AD/13/479/794.

Methodology

This was a community-based cross-sectional study carried out in Oyo State, Nigeria between February and June 2016. Primary caregivers (aged 18 to 59 years) of community-dwelling elderly persons were selected by a two-stage cluster sampling from two communities (one urban and one rural). Stage one involved the selection of one rural (from 12) and one urban from (12) Local Government Areas (LGAs) in Oyo State by balloting. Ibarapa (rural) LGA and Akinyele (urban) LGA were the selected for the study. The second stage involved the selection of one out of 10 wards in each of the selected LGAs by balloting. The third stage was the selection of one community from each of the selected wards in the study LGAs by balloting. All eligible and consenting caregivers in the selected communities were interviewed. Health workers in the primary health care centres covering the selected communities assisted with the data collection.

Measures and instruments

Sociodemographic information was obtained from the caregivers using semi-structured, interviewer-administered questionnaires. Other aspects of the questionnaire were the 12-item ZBI (Bedard et al. 2001), the Katz ADL (Wallace and Shelkey 2007), the GHQ-12 (Craig Jackson 2007) and the MCTS for elder abuse (Cooper et al. 2008, 2009).

The Zarit Burden Interview—This study used the 12-item version of the ZBI to assess caregiver burden.(Bedard et al. 2001) The short version was preferred in this context for its length and easier administration. The 12-item ZBI had responses never, rarely, sometimes, quite frequently and nearly always graded from 0 to 4. The cut-off points for the varying degrees of burden for the short version were measured in quartiles with the first quartile equivalent to mild burden being three (3) followed by 9, the second quartile and 17, the third quartile (Bedard et al. 2001). The ZBI has been shown in different studies to have good construct validity and internal consistency, with Cronbach α ranging between 0.83 and 0.95 (Bedard et al. 2001; Chattat et al. 2011; Cooper et al. 2010). The internal consistency for the short version developed by Bédard et al was 0.88 and the findings were comparable to both the 22 and 18-item formats (Bedard et al. 2001). The 12-item version has also been shown to

have good discriminatory ability in determining caregivers with low and high burden in different contexts (Higginson et al. 2010).

Other measures—The level of dependence of the elderly care recipients on the caregivers was assessed using the Katz ADL (Wallace and Shelkey 2007). The Katz ADL measures independence of function in six domains – bathing, dressing, toilet, transfer, continence and feeding. The caregivers in this study described the level of dependence of the elderly care recipients using the scores in the Katz ADL. The GHQ-12 was used to assess the level of psychological distress among the informal caregivers (Craig Jackson 2007) while the MCTS was used to determine the perpetration of physical or psychological elder abuse by the caregivers (Cooper et al. 2009, 2008).

The instrument was translated into Yoruba, the local language using the iterative back-translation method and administered by health workers in the primary health care centres of the selected communities who had been trained for this purpose.

Data analysis

The data obtained were analysed using SPSS version 22. Exploratory factor analysis of the burden data was conducted using principal components analysis and varimax rotation to determine the factorial structure in the data. The adequacy of the sample was evaluated using the Bartlett test of sphericity and the Kaiser-Meyer-Olkin (KMO) test. Internal consistency was determined with the Cronbach's alpha where a Cronbach's α of at least 0.70 was accepted as demonstrating good internal consistency (Bedard et al. 2001; Chattat et al. 2011). The instrument reliability was also tested with the Guttman split-half correlation, a correlation coefficient calculated between the scores on two halves of the test. A high value >0.70 means good reliability (Chattat et al. 2011). Consistency of the items in the scale was assessed using item total correlations. Construct validity was assessed using Spearman's correlations between the ZBI and the GHQ-12, the Katz ADL and the MCTS for elder abuse perpetration.

Limitation

Most studies found in literature have reviewed the 22-item version of the ZBI in different settings. However, the preference for the short version of the ZBI in this study was for easier administration in community settings where caregivers are likely to be less responsive when the tool is lengthy. This study was therefore unable to compare the mean ZBI scores with those derived from previous validity tests of the ZBI.

RESULTS

Sociodemographic information

Data obtained from 80 informal caregivers were analyzed. All the caregivers were unpaid relatives of the elderly persons to whom they provided care. The mean age of the respondents was 35.8 ± 9.7 years with 50 (62.5%) in the 21–39-year age bracket (Table 1). There were more females (57.5%) than males and the most common occupation was trading (51.2%).

Construct validity

The correlation of the ZBI with other instruments is shown in Table 3. Spearman's correlation (r_s) showed a significant positive correlation between the ZBI scores and GHQ-12 ($r_s = 0.44$, $p = <0.001$). There was also a positive correlation with the MCTS for elder abuse perpetration scale ($r_s = 0.43$, $p = <0.001$). On the other hand, the Spearman's correlation between the ZBI scores and Katz assessment of ADL for the care recipients was a significant negative correlation ($r_s = -0.50$, $p <0.001$).

Reliability

The reliability analysis gave a Cronbach's α of 0.90 and a Guttman split-half correlation coefficient of 0.84. The internal consistency of the scale was not improved by withdrawal of any of the items (Table 2). The total scores of the individual items in the ZBI ranged from 0.00 to 41.00 while the mean scores ranged from 0.36 to 1.08 and the corrected item-total correlation was positive (>0.50) for all the items in the ZBI.

Factor analysis

The Bartlett Test of Sphericity was statistically significant ($\chi^2 = 516.08$, $df = 66$, $p < 0.001$) while the Kaiser-Meyer-Olkin measure of sample adequacy was 0.831, which was an excellent justification for the factor analysis. Three factors with eigenvalues greater than 1.0 were extracted on the exploratory factor analysis comprising all 12 items and these accounted for 68%.0 of the total item variance (Table 4). Seven items (1, 2, 4, 5, 6, 9 and 10) loaded on the first factor, which accounted for 48.5% of the total item variance while the second (items 8, 11 and 12) and third (items 3 and 7) factors accounted for 10.7% and 8.8% of the total variance respectively.

DISCUSSION

The results of this study demonstrate strong construct validity of the tool. There was a good correlation between the ZBI and GHQ-12 scores in this study. Strong correlation between GHQ-12 and GHQ-28 scores and the 22-item ZBI has been reported in previous studies (Seng et al. 2010; Chattat et al. 2011). Other studies have also shown correlation between burden scores on the ZBI and emotional or psychological distress in the caregivers (Braun et al. 2010; Scazufca 2002; Hébert, Bravo, and Prévile 2000). The correlation of the 12-item ZBI with the GHQ is consistent with these findings making it an appropriate format for the assessment of caregiver burden in relation with psychological distress in instances where the length of the full ZBI may be a problem. The relationship between subjective caregiver burden and psychological distress can be explored by combining the tools.

The Katz ADL and the MCTS also showed good correlation with the 12-item ZBI. Although the ZBI has been found to correlate well with level of independence among the care recipients (Bedard et al. 2001), this is the first time the 12-item ZBI has been correlated with the Katz ADL. The significant negative correlation of the ZBI with the Katz ADL implies an inverse relationship between caregiver burden and independence in the care recipient. One can therefore infer that caregivers whose care recipients are independent are likely to have lower ZBI scores. When used in combination with the Katz ADL, associations between the

ZBI scores and the care recipient's independence for functional activities of daily living can be explored. The MCTS has been validated in previous studies and shown to be acceptable for assessing elder abuse by their caregivers (Cooper et al. 2008). This study shows good correlation of the MCTS with the 12-item ZBI making it an ideal tool for testing the association between caregiver burden and elder abuse perpetration. Thus, this short form of the ZBI is a versatile tool that can be used in conjunction with other instruments in the assessment of caregiver burden in relation with other factors affecting the caregiving process.

The results of this study also show that the 12-item ZBI has good internal consistency with a high Cronbach α (0.90) and split-half correlation coefficient (0.84). This implies that the tool can be reliably used in the study population. The Cronbach α in this study was slightly higher than that derived by Bédard (0.88) for the same version which was used among caregivers of elders with cognitive impairment (Bedard et al. 2001). The value obtained in this study was within the same range as that derived for the full ZBI in studies conducted in Brazil (0.87) (Sczufca 2002), Singapore (0.93) (Seng et al. 2010), Italy (0.90) (Chattat et al. 2011), Japan (0.88) (Hirono, Kobayashi, and Mori 1998) and Germany (0.92) (Braun et al. 2010). Thus, the 12-item ZBI compares favorably with the full version in terms of its reliability.

In conclusion, the 12-item ZBI is a valid and reliable tool for assessing burden in informal settings among caregivers of elderly persons without cognitive impairment or any known medical illness. The tool also has good correlation with the 12-item General Health Questionnaire, the Katz Index of Independence in Activities of Daily Living and the Modified Conflicts Tactics Scale for elder abuse when administered to the caregivers of elderly persons. These instruments have been used in assessing factors associated with caregiver burden.

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Table 1

Sociodemographic characteristics of the study participants

Variable	Frequency (%) N=80
Age (years)	
20	3 (3.8)
21–39	50 (62.5)
40	27 (33.7)
Sex	
Male	34 (42.5)
Female	46 (57.5)
Marital status	
Single	21 (26.3)
Married	59 (73.7)
Occupation	
Farming	8 (10.0)
Trading	41 (51.2)
Artisan	18 (22.5)
Civil servant	8 (10.0)
Unemployed	5 (6.3)
Tribe	
Yoruba	77 (96.2)
Others	3 (3.8)
Level of education	
No formal	9 (11.32)
Completed primary	18 (22.5)
Completed secondary	37 (46.3)
Completed tertiary	16 (20.0)
Religion	
Christianity	46 (57.5)
Islam	33 (41.3)
Traditional	1 (1.2)

Table 2

Mean score for items and item-total (corrected) correlation for ZBI reliability analysis

Item description	Mean \pm SD	Corrected item total correlation	Cronbach's α if deleted
1. Not enough time for myself	0.85 \pm 1.12	.551	.885
2. Stressed for caring & other responsibilities	0.81 \pm 1.03	.583	.883
3. Feel angry	0.38 \pm 0.89	.545	.885
4. Negative effect on relationships	0.36 \pm 0.75	.709	.879
5. Feel strained	0.33 \pm 0.84	.623	.881
6. Health has suffered	0.58 \pm 1.07	.726	.875
7. Lack of privacy	0.44 \pm 0.91	.579	.883
8. Lack of social life	0.36 \pm 0.72	.698	.880
9. Lost control of life	0.38 \pm 0.91	.738	.875
10. Uncertain about what to do	0.50 \pm 1.04	.625	.880
11. Should do more	1.08 \pm 1.36	.478	.893
12. Could do a better job caring	1.08 \pm 1.19	.555	.885

Table 3

Correlation of ZBI with other tools

Measure tools N=80	Correlation with total ZBI scores	<i>p</i> value
The General Health Questionnaire (GHQ-12)	0.440	<0.001
Katz assessment of functional Activities of Daily Living (ADL)	-0.501	<0.001
Modified Conflict Tactics Scale for Elder Abuse perpetration (MCTS)	0.427	<0.001

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Table 4

Factor loadings from exploratory factor analysis for ZBI

Item No	Item description	Factor loadings
<i>Subtheme 1</i>		
1	Not enough time for myself	0.771
2	Stressed for caring & other responsibilities	0.880
4	Negative effect on relationships	0.539
5	Feel strained	0.657
6	Health has suffered	0.738
9	Lost control of life	0.592
10	Uncertain about what to do	0.617
<i>Subtheme 2</i>		
8	Lack of social life	0.519
11	Should do more	0.851
12	Could do a better job caring	0.786
<i>Subtheme 3</i>		
3	Feel angry	0.858
7	Lack of privacy	0.856

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