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Exploration of the Psychometric Properties and Correlates of the 10 item Connor-Davidson Resilience Scale among Family Caregivers of Nigerian Patients with Psychiatric Disorder

Olutayo Aloba[1]*, Olayinka Ajao[2], Sanmi Akinsulore[1], Boladale Mapayi[1], Taiwo Alimi[1] and Olufemi Esan[1]

Abstract

Background: Despite studies in developed countries repeatedly reporting on the positive influence of resilience on the ability of family caregivers to withstand the burden of providing care for their relatives no literature is currently available regarding the construct and the factors associated with resilience among the family caregivers of Nigerian psychiatric patients.

Methods: This is a cross-sectional descriptive study in which 234 family caregiver-patient dyads were consecutively recruited over a period of 6 months from the psychiatric outpatients' clinics of two university teaching hospitals in South-western Nigeria. The caregivers completed the 10 item Connor-Davidson Resilience Scale (CDRISC-10) in addition to other measures. Exploratory factor analysis was used to evaluate the dimensionality of the scale. The scale's reliability and validity were also examined.

Results: Exploratory Factor Analysis revealed a uni-dimensional model of the 10 item CD-RISC among the family caregivers. Internal consistency of the scale's items was modestly satisfactory (Cronbach's alpha 0.87). The evidence for the convergent validity of scale was provided by statistically significant correlations with the family caregivers' scores on the Zarit Burden Interview ($r=-0.276$, $p<0.001$), MINI Suicidality module ($r=-0.312$, $p<0.001$), General Health Questionnaire-12 ($r=-0.220$, $p<0.001$) and Patient Health Questionnaire-9 ($r=-0.282$, $p<0.001$). Hierarchical linear regression analyses showed that, the main variance in the family caregivers' score on the CDRISC-10 was accounted for by the MINI Suicidality module.

Conclusions: The scale has exhibited satisfactory psychometric qualities as a tool for the assessment of resilience among the family caregivers of Nigerian patients with psychiatric disorders in terms of its reliability and validity. Our study further affirms that the construct of resilience measured with the 10 item CDRISC is best explained by a one dimensional factor.

Keywords

Connor-Davidson Resilience Scale-10 item; Nigerian family caregivers; Psychiatric patients; Reliability; Validity; Factor structure

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Introduction

Resilience as a concept has been described as an individual's ability to adjust or adapt to significant adverse or traumatic circumstances (through a process) in a manner that facilitates the recognition and enhancement of positive and protective factors [1]. Resilience is a multifaceted construct that is influenced by the combination of hereditary, psychosocial, biological and circumstantial factors [2,3]. Resources that are available in the context of the individual's self or circumstances can expedite the capability to be resilient in the presence of stressful situations [4]. As a result of its significant impact on general health and quality of life, increased attention has been given to the concept of resilience in some developed countries national health care policies [5,6]. In developed countries such as Nigeria, family caregivers play a crucial role in the maintenance of the wellbeing and rehabilitation of their relations with mental illness [7]. The presence of a family relation with a severe mental disorder can jeopardize the physical and mental health of other family members and disrupt the family functioning, especially when the relation is resident with them [8,9]. Likewise, family members have exacerbated risk for adverse health when their psychiatrically ill relation warrants constant guidance and individualized care [10]. The overwhelming burden associated with the provision of care for a relation with severe mental illness can negatively influence the psychological health of the family caregiver [11]. Thus, resilience as a concept which is the ability to withstand adversity will be vital to the ability of the family caregivers to withstand the burden associated with the provision of care for a relative with severe mental illness.

The correlates of resilience in family caregivers of patients with psychiatric disorders have been reported in different studies. It has been demonstrated that an inverse relationship exists between resilience and the burden of caregiving, such that higher levels of resilience in the family caregivers of patients with severe mental disorder is associated with lower levels of caregiver burden [12]. A cross-sectional study that involved eighty family caregivers of patients with chronic organic mental disorders, reported significant negative correlations between resilience and the level of caregiver burden [13]. It has also been reported that family caregiver burden has a negative effect on their resilience [14]. A recent systematic review of the determinants of resilience among the family caregivers of patients with chronic organic mental disorders reported that higher levels of family caregiver resilience was associated with reduced rates of depressive disorders in the caregivers [15]. A relatively recent descriptive cross-sectional study that examined the correlation between resilience and the well-being of Chinese family caregivers of patients with schizophrenia reported that increased psychopathological disturbances in the patients was significantly associated with reduced family caregiver resilience [16]. Resilience has also been reported to have an important relationship with suicidality. A study involving 107 community dwelling adults demonstrated that resilience has a significant negative correlation with suicidal ideation [17]. A systematic review that examined 77 published studies concluded that resilience which incorporates a number of psychological factors has a protective effect against suicidality [18]. The available information regarding the family caregivers of relatives with chronic medical disorders has consistently demonstrated

associations between the degree of the relation's psychological health status, the extent of supervision to be provided and the severity of the burden being experienced by the caregiver [19]. Resilience fosters the ability of family caregivers to achieve within themselves, physical and psychological well-being and to provide adequate healthcare for their relative [20]. It has been demonstrated that resilience has as an inverse relationship to depressive disorder, use of psychoactive substances, caregiver burden and a positive correlation with physical and psychological well-being [12,21].

Different scales are available for the evaluation of resilience [4], and one that has been extensively utilized is the Connor-Davidson Resilience Scale (CD-RISC) [22]. The CD-RISC in its original format is a subjectively completed 5 point Likert scale with five factors that has been reported to possess satisfactory psychometric properties [22]. The 10 item (CDRISC-10) version of the scale which consisted of items 1, 4, 6, 7, 8, 11, 14, 16, 17 and 19 from the original scale, was developed following the identification of certain inconsistencies in the initial multiple dimensional construct of the 25 item version [23]. The CDRISC-10 has been extensively described as a tool with adequate reliability and validity, and all the previous studies in developed countries involving diverse sample populations consistently reported a single factor model [23-28]. The scale has been applied as a measure of resilience among nurses [29], young adults [30], the general population [31], adolescents [32], and earthquake survivors [33].

To the knowledge of the authors, no study has previously examined the construct and correlates of resilience exclusively among the family caregivers of Nigerian patients with psychiatric disorders. Therefore, the objective of this study is to examine the reliability, construct validity (convergent and discriminat), factorial structure and correlates of the 10-item CDRISC among the family caregivers of Nigerian patients receiving treatment for psychiatric disorders in two tertiary healthcare facilities in South-western Nigeria. We hypothesized that resilience among the family caregivers will have significant correlations with the burden associated with caregiving, their level of suicidality, psychological distress, depressive symptoms and the severity of psychopathological symptoms in the patients.

Materials and Methods

Participants

This was a cross-sectional descriptive study involving 234 family caregiver-patient dyads, who were recruited over a period of 6 months (July, 2015 to December, 2015), from the outpatient psychiatric clinics of two tertiary healthcare centers in South-western Nigeria. The diagnoses of the patients in both centers were made according to the criteria in the 10th version of the International Classification of Diseases and Disorders [34]. The criteria to be fulfilled by the patients for recruitment into the study include:

- Aged 18 years and above
- Must have been receiving treatment as an outpatient for at least 6 months
- Can read and communicate in English Language and
- Severity of psychopathological symptoms being experienced by the patient is not to the extent where it will affect their ability to give their consent to participate in the study.

The eligibility criteria for family caregivers were:

- Resident with the patient and is the sole caregiver (as corroborated by the patient) without any financial benefit for the preceding 3 months
- Must be aged 18 years and above
- Ability to read and write in English Language
- Must not have a history of previous or current mental or medical disorder that could independently affect their functioning
- Must give consent to participate in the study. The Ethics and Research Committees of both institutions approved the research protocols.

Measures

Measures completed by the patients

Patients' sociodemographic and illness-related questionnaire: A semi-structured questionnaire that included variables such as; age, gender, marital status, number of years of education, employment status, income per month if employed, and age at onset of illness, number of previous illness episodes, and number of previous hospitalizations due to the illness and duration of illness.

Positive and Negative Syndrome Scale (PANSS): The severity of psychopathological symptoms among the outpatients was assessed with this scale. The scale consists of 30 items evaluating positive (7 items), negative (7 items) and general (16 items) symptoms of psychosis. Each item was measured on a 7 point Likert scale [35]. This scale has been employed in the assessment of the severity of positive and negative symptoms of psychosis in previous studies involving Nigerian patients with schizophrenia in one of the study centers [36,37].

Hamilton Depression Rating Scale (HDRS): All the outpatients were administered this clinician completed scale consisting of 17 items measuring the severity of depressive symptoms over the preceding week [38]. Eight of the scale's items are scored on a 5-point Likert scale (0=absent, 1=mild, 2=moderate, 3=severe, 4=very severe) while the remaining nine items were scored using a 3-point Likert approach (0=absent, 1=mild, 2=definite). The scores on the 17 items are aggregated to produce a total score, with higher scores reflecting greater severity of depressive symptoms. The scale has been described to possess satisfactory validity among Nigerian patients [39,40].

Young Mania Rating Scale (YMRS): Our outpatients receiving treatment for bipolar disorder were administered this scale consisting of 11 items with an aggregate total score ranging from 0 to 60, with higher scores indicative of greater mental state disturbance in the context of a manic episode [41]. This scale has been used to evaluate the severity of manic symptom among Nigerian patients with bipolar disorder [36].

Measures completed by the family caregivers

Caregiver sociodemographic information form: This consist of family caregivers' variables such as age, gender, marital status, employment status, and relationship to the patient, number of years of education, duration of providing care for the patient (in months), income per month for those employed and the average number of hours spent per day with the patient.

10 item Connor-Davidson Resilience Scale (CD-RISC 10): Each of the 10 items of the scale is evaluated on a 5 point Likert scale (0=not true at all; 1=rarely true; 2=sometimes true; 3=often true; 4=true nearly all the time). The original version of the scale exhibited

a one-dimensional factor structure [23]. The caregivers completed the scale based on the extent to which each item applied to them in the preceding one month. The summation of the response to each scale's item yields a total score that ranges from a minimum of 0 to a maximum of 40 which indicates the highest level of resilience. Previous studies have reported reduced scores in individuals with anxiety and depressive disorders [22]. Permission to examine the psychometric characteristics of the scale was obtained form the original authors of the scale [22].

Mini International Neuropsychiatric Interview (MINI) Suicidality module: Suicidality among the family caregivers was evaluated applying the MINI suicidality module [42]. This section of the MINI evaluates suicidal risk in the preceding one month by asking the respondents a number of questions. The total score on this module was calculated by summing up the points per questions depending on the respondents' responses. It has been employed in the evaluation of suicidality among Nigerian patients with psychiatric disorders [43].

Zarit Burden Interview (ZBI): The level of burden subjectively being experienced by the family caregivers was measured with the 22 item ZBI [44]. Each item is measured on a 5 point Likert scale, ranging from 0 (never) to 4 (almost always). The aggregate score on the scale ranges from 0 to 88, with higher scores indicating a more severe level of subjective burden. The scale has exhibited satisfactory reliability in the assessment of subjective burden among the family caregivers of Nigerian patients with chronic mental disorders. A previous study in Nigerian that involved 181 family caregivers reported that the items of the scale had an internal consistency of 0.93 [45]

General Health Questionnaire-12 (GHQ-12): This 12 item non-specific scale was employed to measure the level of psychological distress among the family caregivers. Each of the items was scored using the 0-0-1-1 method and individuals with an aggregate score of 3 points and above were identified as been psychological distressed [46]. The reliability and dimensionality of the GHQ-12 has been previously investigated in Nigerian, with the scale's items having a high degree of internal consistency (Cronbach's alpha 0.90) [47].

Patient Health Questionnaire-9 (PHQ-9): This brief 9-item subjectively completed scale was used to screen and measure the severity of depressive symptoms among the family caregivers [48]. Each item is scored on a 4 point Likert scale (not at al-0 to nearly every day-3), producing a total score ranging from 0 to 27. Adequacy of psychometric properties in terms of its reliability and validity has been described among the Nigerian population [49-51]. A previous study in Nigeria reported internal consistency of 0.85 and satisfactory concurrent validity with other measures of depression [50].

Data analysis

This was conducted with the IBM Statistical Products and Service Solutions (SPSS) 21st version software. Descriptive statistics such as mean (standard deviations) and frequency (percentages) were employed to depict the family caregivers' and patients' sociodemographic data, patients' illness related data and the scores on the other study measures completed by the patients and their family caregivers. The outcome variable in this study was the mean score on the CDRISC-10 among the family caregivers while the exploratory variables were the family caregivers' sociodemographic data and mean scores on the ZBI, PHQ-9, MINI Suicidality module and GHQ-12 scales, in addition to the patients' sociodemographic and illness related variables. The reliability of the CDRISC-10 was examined by calculating the Cronbach's alpha (a correlation coefficient) while the convergent validity of the CDRISC-10 was examined applying correlational analyses with selected family caregivers' and patients' sociodemographic and illness related characteristics and the scores on the other scales completed by the respondents. In addition, the discriminative concurrent criterion validity was examined through the comparison of the CDRISC-10 scores between the family caregivers with a likely depressive disorder (PHQ-9 ≥ 5) [52] and higher psychological distress (GHQ ≥ 3) [46] and those without a likely depressive disorder and lower psychological distress. Exploratory Factor Analysis (EFA) applying Principal Axis Factoring (PFA) with Varimax rotation and Kaiser Normalization was used to examine the loading patterns of the items of the CDRISC-10 among the family caregivers. The appropriateness of the data for factor analysis was examined with Kaiser-Meyer-Olkins (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. Multiple linear regression analyses applying the hierarchical method with 95% Confidence Interval, were conducted to identify which of the family caregivers' and patients' related variables significantly predicted the family caregivers' score on the 10 item CDRISC. The level of statistical significance in this study was set at p value less than 0.05 and all statistical tests were 2 tailed.

Results

Descriptive statistics of the family caregivers and the patients (n=234)

As shown in Table 1, the mean age of the caregivers was 51.52 (SD 13.87) years. Female caregivers constituted the larger percentage (70.9%). Majority of the caregivers were married (86.8%). In terms of the caregivers' relationship to the patients, most of them were parents (44.9%). The mean duration of providing care among the caregivers was 58.84 (SD 53.93) months while the average hours spent with the patient on a daily basis was 8.31 (SD 6.41) hours. The mean score of the caregivers on the 10 item CDRISC was 26.90 (SD 6.12). None of the caregivers had a score of 0 on the CDRISC and only 1.3% had a maximum score of 40, thus our data was not affected by either floor or ceiling effects. The male family caregivers had significantly (p=0.037) higher mean scores (28.21 / SD 6.07) on the CD-RISC scale compared to the females (26.37 / SD 6.08). There were no significant differences regarding the CDRISC-10 scores among the family caregivers in relation to the patients' diagnoses (schizophrenia patients' family caregivers: mean (SD) –26.68 (5.98); bipolar affective disorder patients' family caregivers: mean (SD) –26.27 (6.60); depressive disorder patients' family caregivers: mean (SD) –28.53 (6.00), F=1.682, p=0.188).

Descriptive characteristics, psychometric details and factor loading of the 10 items of the CD-RISC among the family caregivers (n=234)

The Cronbach's alpha for the scale was 0.87 and the item scale correlations of the scale's items ranged from 0.36 to 0.79. The elimination of any of the scale's items did not significantly increase the Cronbach's alpha. Factor loading of the items applying Principal Axis Factoring ranged from 0.383 to 0.861. All the scale's 10 items loaded on a single factor with an Eigen value of 4.7 and this factor accounted for 47% of the total variance (Table 2).

Correlational analyses between the CDRISC-10 and the family caregivers and patients related variables

Table 1: Sociodemographic details of the family caregivers (n = 234) and patients (n = 234) .

Variable	Family caregivers (*n*=234) N (%)	Patients (*n*=234) N (%)
Sex:		
Males	68 (29.1%)	108 (46.2%)
Females	166 (70.9%)	126 (53.8%)
Marital status:		
Single	15 (6.4%)	105 (44.9%)
Married	203 (86.8%)	104 (44.4%)
Divorced / separated	6 (2.6%)	25 (10.7%)
Widow/er	10 (4.3%)	-
Employment status:		
Yes	191 (81.6%)	120 (51.3%)
No	43 (18.4%)	114 (48.7%)
Relationship to patient:		
Parents	105 (44.9%)	-
Spouses	46 (19.7%)	-
Sibling (brother/sister)	40 (17.1%)	-
Child (son/daughter)	38 (16.2%)	-
Grandparents	5 (2.1%)	-
Patients diagnosis:		
Schizophrenia	-	152 (65.0%)
Bipolar disorder	-	44 (18.8%)
Depressive disorder	-	38 (16.2%)
Variable	**Family caregivers (*n*=234) Mean (SD) Range**	**Patients (*n*=234) Mean (SD) Range**
Age	51.52 (13.87) [22-87]	41.21 (14.42) [18-82]
No of years of education	11.51 (4.45) [3-19]	11.70 (4.15) [3-19]
Income per month (in Naira)	48813.76 (67104.15) [1000-500000]*	42025.0 (54189.5) [500-350000]**
Duration of care giving (months)	58.84 (53.93) [6-264]	-
Average hours spent with patient per day	8.31 (6.41) [1-24]	-
ZBI score	37.39 (18.54) [3-77]	-
PHQ-9	4.41 (4.24) [0-23]	-
MINI Suicidality	1.08 (1.72) [0-8]	-
GHQ-12	2.80 (2.64) [0-11]	-
CDRISC-10	26.90 (6.12) [9-40]	-
Age at onset of illness		41.21 (14.42) [18-82]
Duration of illness (in months)	-	75.74 (64.76) [6-420]
Previous no of episodes	-	3.21 (2.85) [0-15]
Previous no of hospitalizations	-	1.33 (1.66) [0-9]
PANSS positive	-	12.74 (5.71) [7-38]
PANSS negative	-	12.79 (6.98) [7-48]
PANSS general	-	25.58 (10.87) [16-67]
HRSD (all patients)	-	9.39 (7.21) [0-45]
YMRS (bipolar patients)	-	9.69 (5.61) [0-22]

Note: *81.6% of employed family caregivers, **51.3% of employed patients.

As shown in Table 3, the convergent validity of the 10 item CDRISC was supported by its significant negative correlations (Pearson's) with the ZBI (r=−0.276, p<0.001), PHQ-9 (r=−0.282, p<0.001), MINI Suicidality module (r=−0.312, p<0.001) and GHQ-12 (r=−0.220, p<0.001). Positive correlation was observed between the CDRISC-10 and the average number of hours spent daily with the patient (r=0.228, p<0.001) while negative correlations were observed with the previous number of episodes of illness (r=−0.155, p=0.018), previous numbers of hospitalizations (r=−0.201, p=0.002), the patients' PANSS positive score (r=−0.188, p=0.004), patients' HRSD score (r=−0.196, p=0.003) and the bipolar patients scores on the YMRS (r=−0.336, p=0.045).

Discriminant concurrent criterion validity of the CD-RISC-10 among the family caregivers

Table 4 shows the discriminative concurrent criterion validity of the scale and effect size (Cohen's d) among the family caregivers based on their GHQ-12 and PHQ-9 cutoff scores. Family caregivers with GHQ-12 scores of 3 and above and PHQ-9 scores of 5 and above had significantly lower resilience scores.

Multiple linear regression models

The variables that significantly correlated with the family caregivers CDRISC-10 score were categorized into family caregivers' variables (MINI Module Suicidality, ZBI, PHQ-9, GHQ-12 and average hours spent daily with the patient) and patients' variables (number of previous episodes and admissions, PANSS positive and HRSD scores), before loading into the regression model applying the hierarchical method. As depicted in Table 5, the family caregivers' MINI Module suicidality, burden score and the average number of hours spent on a daily basis with the patient were the only variables that significantly predicted their scores on the CDRISC-10. The largest variance in the CDRISC-10 scores among the family caregivers was contributed by the MINI Suicidality module. The regression model predicting the family caregivers' CDRISC-10 score is: −0.645* MINI Suicidality +(0.049)* ZBI + 0.197* average hours spent daily with the patient.

Discussion

This present study involving 234 Nigerian family caregiver-patient dyads has provided evidence that the subjectively completed 10 item CD-RISC is a valid and reliable measure of resilience among the family caregivers of Nigerian patients with psychiatric disorders. The 10 item resilience scale was found to possess satisfactory internal consistency (Cronbach's alpha 0.87), a level of reliability that is comparable to what has been previously described among other diverse samples which include Chinese earthquake victims (Cronbach's alpha 0.91) [24], Chinese adolescents (Cronbach alpha 0.89) [32], elderly population in Spain (Cronbach's alpha 0.81) [27], young Spanish adults (Cronbach's alpha 0.85) [25], in a cross-sectional sample of older native Americans (Cronbach's alpha 0.88) [53] and in a sample of patients with fibromyalgia (Cronbach's alpha 0.91) [28]. In additionally, the reliability of the scale among our respondents was similar to that of the original version of the scale (Cronbach's alpha 0.85) [23]. The item-total correlations among our study respondents was 0.36 to 0.79, a range that differs slightly from what was obtained in a Spanish sample of young adults (0.45 – 0.69) [25], and in patients with fibromyalgia (0.25 – 0.63) [28]. We also noted that the upper limit of the range of our item-total scale correlation was similar to what was reported by the original authors of the scale (0.44 – 0.74) [23]. In terms of normative data, the mean score (26.90) on the CDRISC 10 among our respondents was comparable to what has been reported in previous studies [23,25,54].

Further analyses on our data appear to provide precursory support for the convergent and discriminant validity of the 10 items

Table 2: Descriptive characteristics, psychometric details and factor loadings of the CDRISC-10 among the family caregivers (n = 234).

Items		Mean (SD)	Item scale correlations	Cronbach's alpha if deleted	Factor loadings
7.	Under pressure, I stay focused and think clearly.	2.65 (0.89)	0.79	0.84	0.861
8.	I am not easily discouraged by failure.	2.79 (0.86)	0.73	0.84	0.801
9.	I think of myself as a strong person when dealing with life's challenges and difficulties.	2.67 (0.94)	0.64	0.85	0.695
6.	I believe I can achieve my goals, even if there are obstacles.	2.69 (0.87)	0.62	0.85	0.672
10.	I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	2.63 (0.88)	0.58	0.86	0.637
1.	I am able to adapt when changes occur.	2.79 (0.92)	0.61	0.85	0.636
3.	I try to see the humorous side of things when I am faced with problems.	2.65 (0.85)	0.59	0.86	0.617
5.	I tend to bounce back after illness, injury, or other hardships.	2.98 (0.85)	0.51	0.86	0.539
2.	I can deal with whatever comes my way.	2.39 (1.03)	0.46	0.86	0.504
4.	Having to cope with stress can make me stronger.	2.66 (0.95)	0.36	0.87	0.383
	Eigen values				4.7
	% of total variance explained				47.2%
Overall Cronbach's alpha 0.87 Kaiser-Meyer-Olkins Measure of Sampling Adequacy 0.852 Bartlett's Test of Sphericity: X^2 = 1010.82 p<0.001					

Table 3: Correlational analyses between the CDRISC-10 and the family caregivers and patients related variables.

Variable	*r* value	*p* value
ZBI (caregiver)	-0.276	**<0.001**
PHQ-9 (caregiver)	-0.282	**<0.001**
MINI Suicidality (caregiver)	-0.312	**<0.001**
GHQ-12 (caregiver)	-0.220	**<0.001**
Caregivers' age	0.066	0.314
Average number of hours spent per day with patient (caregiver)	0.228	**<0.001**
Duration of care giving	0.068	0.302
Patients' age	-0.038	0.558
Previous no of episodes (patients)	-0.155	**0.018**
Previous number of admissions (patients)	-0.201	**0.002**
Duration of illness (patients)	0.041	0.532
Patients' PANSS positive	-0.188	**0.004**
Patients' PANSS negative	-0.060	0.365
Patients' PANSS general	-0.087	0.183
Patients' HRSD score	-0.196	**0.003**
YMRS (bipolar patients)	-0.336	**0.045**

CDRISC among the Nigerian family caregivers. The scores on the scale demonstrated statistically significant negative correlations with the scores on the scales measuring the family caregivers' subjective burden, depression, suicidality and psychological distress among. Overall, the family caregivers who reported higher scores in relation to the burden of caregiving, higher depressive symptoms, higher suicidality and psychological distress had lower scores on the resilience scale. In addition, the 10 item CDRISC was able to discriminate the family caregivers with GHQ-12 and PHQ-9 scores above the cutoff points compared to those with lower scores on these scales. Previous studies in developed countries involving family caregivers of patients with chronic mental disorders have reported findings that are similar to our correlational analyses that lend credence to the convergent validity of the scale among family caregivers of Nigerian psychiatric patients. Various studies have repeatedly reported that resilience in family caregivers of patients with chronic disorders has statistically significant negative correlations with the burden associated with caregiving [12-14]. Higher levels of resilience among caregivers of patients with chronic organic mental disorders have been reported to be related to lower rates of depression [15,21]. Studies have also demonstrated a relationship between lower resilience and greater levels of psychological distress among family caregivers [16,55]. Likewise, higher levels of resilience in caregivers have been reported to be associated with a greater ability to withstand the physical and psychological burden associated with the provision of care [56,57]. The significant negative association between resilience and suicidality observed among our respondents as an evidence for the construct validity of the CD-RISC is supported by previously reported observations that have demonstrated that resilience is a crucial factor in the prevention of suicidal behaviour [17,18]. As reflected in our linear regression model, resilience among our respondents was significantly predicted by a combination of their MINI Suicidality module score and interestingly, the average number of hours spent with their patient relative on daily basis. To further buttress the crucial relationship between resilience in the face of stressful circumstances and suicidality [18], it can be observed that in our regression model, the larger variance in the 10 item CD-RISC score among the Nigerian family caregivers was contributed by their MINI Suicidality module score. We observed some interesting correlates of resilience among the family caregivers. The average number of hours spent by the family caregivers with the patient relative on a daily basis positively predicted their resilience. The reason for this is difficult to determine due to the cross-sectional nature of our study. But, it is hypothetically plausible that this observation may be related to the concept of "acceptance", which has been described in relation to resilience among caregivers. Acceptance in relation to the construct of resilience has been described as the capability to withstand what might be recognized as a displeasing comportment on the part of a relation who has a psychiatric disorder, usually with a profound and emphatic understanding of the behavioural manifestations of the psychiatrically ill relative [58]. Previous studies have alluded that the acceptance of the role of caregiver and the relative's psychiatric disorder is a reflection of resilience [59-61].

We also observed that higher levels of resilience among the family caregivers was modestly associated with reduced severity of psychopathological symptoms among the patients, an observation that

Table 4: Discriminative concurrent criterionvalidity of the CDRISC-10 among the family caregivers.

	No (%)	CDRISC-10 score Mean (SD)	t	*P* Cohen's d
GHQ-12 Scores≤ 2	121 (51.7%)	29.00 (5.59)	5.781	**< 0.001**0.758
GHQ-12 Score ≥ 3	113 (48.3%)	24.65 (5.89)		
PHQ-9 Score ≤ 4	148 (63.2%)	28.49 (5.72)	5.480	**< 0.001**0.747
PHQ-9 Score ≥ 5	86 (36.8%)	24.17 (5.85)		

Table 5: Linear regressions (applying the hierarchical method) showing the variables that significantly predicted the CDRISC-10 score among the family caregivers (n = 234).

Model	Variables	Unstandardized coefficient		Standardized coefficient			95% Confidence Interval
		B	S. E	B	t	p-value	
1	(Constant)	28.377	1.002	–	28.329	**<0.001**	26.404 - 30.351
	MINI Suicidality	−0.623	0.311	−0.175	−2.003	**0.043**	−1.235 - (−0.010)
	ZBI	−0.051	0.023	−0.153	−2.186	**0.030**	−0.096 - (−0.005)
	PHQ-9	−0.133	0.134	−0.092	−0.990	0.323	−0.397 - 0.131
	GHQ-12	−0.143	0.109	−0.078	−0.876	0.412	−0.365 - 0.143
	Daily hours spent with patient	0.193	0.063	0.202	3.084	**0.002**	0.070 - 0.317
	R^2 = 0.170	Adjusted R^2 = 0.151					
2	(Constant)	28.832	1.184	−24.353	**<0.001**		26.499-31.165
	MINI Suicidality	−0.645	0.324	−0.181	−1.994	**0.044**	−1.283-(−0.008)
	ZBI	−0.049	0.024	−0.149	−2.023	**0.041**	−0.097-(−0.001)
	PHQ-9	−0.120	0.139	−0.083	−0.863	0.389	−0.394-0.154
	GHQ-12	−0.132	0.112	−0.073	−0.794	**0.471**	−0.374-0.155
	Daily hours spent with patient	0.197	0.065	0.206	3.040	**0.003**	0.069-0.324
	No of previous episodes (patient)	−0.230	0.201	−0.107	−1.146	0.253	−0.626-0.165
	No of previous admissions (patients)	0.177	0.368	0.048	0.480	0.632	−0.548-0.902
	PANSS positive (patients)	−0.035	0.083	−0.032	−0.415	0.679	−0.199-0.130
	HRSD (patients)	0.026	0.068	0.032	0.397	0.692	0.107-0.161
	R^2 = 0.177	Adjusted R^2 = 0.154					

has been previously reported in a study that explored the correlates of resilience in family caregivers of patients with schizophrenia [16]. This may be a pointer to the role that the mental health specialists in our environment need to play in order to contribute positively to family caregivers' resilience by ensuring that patients are maintained in a clinically stable state. The discriminative concurrent criterion validity of the CD-RISC 10 is supported by its ability to indicate reduced resilience among the Nigerian family caregivers with scores on the GHQ-12 and PHQ-9 above the cut-off points. This suggests that the scale as a measure of resilience is able to differentiate our respondents with higher psychological distress and greater severity of depressive symptoms in the context of providing care for family members with psychiatric disorders. Thus, based on these observations, we can conclude that the 10 item CD-RISC has to a reasonable extent demonstrated satisfactory reliability and validity among the Nigerian family caregivers of patients with psychiatric disorders. However, we want to emphasis that our analyses were essentially descriptive cross-sectional in nature and that other causal interactions could have been responsible for the pattern of results observed between resilience and the explanatory variables among the Nigerian family caregivers. Our respondents who were experiencing greater severity of depressive symptoms may have a negative perspective regarding themselves and thus subjectively report themselves as less resilient. The original authors had suggested additional examination of the predictive validity of the CD-RISC-10 in relation to adaptive and adverse reaction to stress [23].

Different opinions with lack of unanimous agreement among authors has been expressed regarding the factorial structure of the original 25 item CD-RISC [62,63]. The removal of the excessively correlated items yielded the 10 item scale which has been described to be capable of capturing the salient features of resilience similarly to the 25 item version [23]. The subjective completion of lengthy questionnaires can be physically tiresome and this may influence the respondent's ability to appropriately fill in the latter aspects of the scale thus negatively affecting the reliability of the scale [64]. It has been previously suggested that lengthy scales can be significantly abridged through the elimination of a number of items (which can be as much as 70%) without significant adverse reduction to the initial reliability and validity properties [65].

Exploratory factor analyses of our data further affirms that among the Nigerian family caregivers of psychiatric patients, a one-dimensional factor best explains the construct of resilience. This observation is similar to the factor structure exhibited by the original version of the 10 item CDRISC [23], and those of other authors who have examined its factorial structure among other populations [24-28].

Our study has a number of limitations that needs to be considered before extending our observations to the family caregivers of psychiatric patients in other parts of Nigeria and Sub-Sahara Africa. First, we recruited family caregivers and patients from only two centers in South-western Nigerian. Second, the direction of the associations between resilience and the other study measures is difficult to determine due to the descriptive cross-sectional nature of our study. Another limitation we considered was that the largest percentage of the family caregivers where those of patients receiving treatment for schizophrenia, although there were no significant differences in the CDRISC-10 scores among the family caregivers in relation to the patients diagnoses. We are of the opinion that this

study been the first to examine the dimensionality and correlates of resilience among Nigeria family caregivers of psychiatric patients will encourage further studies to explore the construct of resilience and identify other factors that significantly contribute to resilience among other family caregiver populations in Nigeria and Sub-Sahara Africa. In conclusion, we have been able to demonstrate that among Nigerian family caregivers of psychiatric patients, the dimensionality regarding the construct of resilience is best explained by a single factor applying the 10 item CDRISC. In addition, we have also shown that the scale possesses satisfactory reliability and validity as a resilience measure among our respondents.

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