Original Article

Prevalence and Determinants of Stress of Informal Caregiving: A Cross-Sectional Study among Informal Caregivers of Hospitalised Patients in a Tertiary Hospital in Nigeria

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Abstract

Background: Caring for patients in the hospital can cause a lot of stress for the caregivers, especially those who are involved with informal caregiving such as family members. Little is known in Nigeria on the stress of informal caregiving in the hospital environment. This study assessed the informal caregivers' stress level and their determinants in a tertiary hospital in Ilorin, Nigeria. **Methodology:** This was a hospital-based cross-sectional study. Between September and October 2019, using a simple random sampling method, data were collected from 400 informal caregivers of patients in University of Ilorin Teaching Hospital with interviewer-administered questionnaire which included socio-demographic characteristics, Caregivers Strain index (CSI) and caregivers' stress from institution and other factors index (CSIOI). Analysis was performed, and prevalence and determinants of stress of informal caregiving were presented using descriptive statistics and logistic regressions. $P < 0.05$ was considered statistically significant. **Results:** The majority, 381 (95.2%) of the informal caregivers, reported great stress levels using CSI, while 227 (56.7%) experienced a great level of stress with the CSIOI. Predictors of caregiver stress were perception that staying around was stressful (odds ratio [OR] - 17.5, $P < 0.001$), felt their patients will not be well cared for if not around (OR - 6.1, $P < 0.001$), staying at the hospital for >30 days (OR - 2.6, $P = 0.001$). **Conclusion:** The informal caregivers experienced a great level of stress taking care of their patients on admission in the hospital. It is, therefore, expedient that issues surrounding the comfort of the informal caregivers as they care for their patients should be included in hospital policies.

Keywords: Caregivers, hospitalised patients, informal caregiving, stress

Introduction

Caregivers are known to provide various kinds of help to the care receivers. This care ranges from assistance with activities of daily living to running errands as well as providing company and/or emotional support.[1] An informal caregiver is an individual who assists a person who is in a debilitating condition,[2] he or she could be a relative, a friend or a neighbour who gives aid to the patient due to his or her limitations without financial compensation.[3] Providing care to someone, whether full-time or part-time, formal or informal, takes a huge toll, both emotionally and physically.[1] Informal caregivers of patients provide invaluable instrumental and emotional support to their ill loved ones, at times, at a great cost to their own physical and psychological health.[4]

Caregiving stress and strain are often used interchangeably by studies.[5,6] Informal family caregivers of patients report higher stress than the general population, and they are more vulnerable to disease than noncaregivers.[7,8] Furthermore, family members and friends who provide unpaid care to an ill relative tend to experience higher levels of stress, more depressive symptoms and greater vulnerability to disease than

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the general population.[4] The effect of caregiving on health can also be indirect. Studies have consistently shown that caregiving is associated with reduced attention to other family members, lower marital quality and decreased involvement in social activities.[9,10] Caregivers also often experience financial burdens as a result of caregiving,[11,12] this is because they often incur financial loss due to absenteeism from paid job, man-hour loss and logistics. In the extreme situation, caregivers may have to quit their jobs which may induce financial strain. Caregiving also may incur catastrophic spending to provide food, clothing, transportation, housing and utility fees for the care recipients.[13] Aside, informal caregivers of patients in hospitals in the developing countries often run different types of errands on behalf of the patient, which includes; submitting samples for investigations to the laboratory, retrieving investigation results from the laboratory, purchase of medications , food and other materials.

In Africa, there is a relative lack of attention paid to the caregiving burden.[14] Aside from formal caregivers such as doctors and nurses, the informal caregivers (family members and friends) are essential partners in the delivery of complex health-care services.[15] The burden of caregiving impacts the quality of physical, emotional, spiritual and social health.[16] However, in Africa, study site inclusive, only few studies have been carried out on the stress of caregiving, especially among hospitalised patients.

Recognition of the possible effects and challenges of caregiving is supposed to be a critical component of preventive care.[15] The results from this study will serve as a reference baseline and a guide for policy development and implementation of intervention to reduce the stress level as a result of informal caregiving. This study, therefore, assessed the stress level and the determinants among caregivers of patients in a tertiary hospital in Nigeria.

Methodology

Data collection for this study started on the 26 September 2019 and ended 25 October 2019.

Ethical consideration

Ethical approval was obtained from the Ethical Review Committee of the University of Ilorin Teaching Hospital (UITH), Ilorin. The approval number is ERC PAN/2019/09/1934. The date of full committee approval was 24 September 2019. A duly signed or thumb-printed written informed consent was obtained from each respondent. Participation in the study was voluntary. Apart from maintaining confidentiality, the study participants were assured of their right to withdraw their consent at any stage of the study. The financial implications were borne by the researchers.

Study area

UITH is a federal tertiary hospital located in Ilorin, the capital city of Kwara state. It renders all levels of care to patients across Nigeria's North-Central states. It is a 650-bedded capacity hospital with an average of a thousand in-patients on a monthly basis. There are over 10 wards in the hospital. With the exception of very important personality that is the private ward, there are no dedicated accommodations for the patients' caregivers except for the open space lounges around the several wards. However, there is a 10 room private guest house within the hospital premise for lodging. The local market within the hospital serves as the main source of food, consumables and confectionaries for the patients and their personal caregivers. The informal caregivers are responsible for running errands like buying food and other items, payment of bills at the pay points for medication purchase and other medical consumables. The informal caregivers attending to the patients in the hospital are neither profiled nor documented.

Study design

This study was a hospital-based cross-sectional study among the informal caregivers attending to admitted patients in UITH, Ilorin.

Study population

Informal caregivers who cared for hospitalised patients in UITH.

Inclusion criteria

Caregivers who cared for hospitalised patients in UITH and whose patients had been on admission for at least one night.

Exclusion criteria

The informal caregivers of patients who were on admission in the hospital, who were <18 years of age, were exempted from the study.

Sample size determination

The minimum sample size was determined first by using the formula for the proportion or prevalence of a cross-sectional.[17]

$n = Z^2pq/d^2$

n = the desired sample size.

Z = the standard normal deviate set at 1.96.

p = the proportion of the target population who are stressed will be assumed to be 50% (literature review did not reveal similar studies that have found the prevalence of stress among informal caregivers of hospitalised patients in Nigeria).

q = the proportion of the same population without the particular characteristic, = 1 − p.

d = the degree of accuracy desired, 0.05.

$n = 1.96^2\ (0.5)\ (0.5)/0.05^2 = 384$.

However, because the population of the target population is <10,000, the sample size was corrected for a population <10,000 with the formula $N_f = n/1 + (n/N)$.

n is sample size for population >10,000.

N is population of caregivers in UITH (This was taken as 650 because it is a 650 size bedded hospital).

$N_f = n/1 + (n/N) = 384/1 + (384/650) = 384/1 + 0.590 = 384/1.590 = 241.51 = 242$

Adjustment for non-response

The new minimum sample size $n_a = N_f/(100 - r\,\%)$

where r % is the anticipated nonresponse rate = 10%
Substituting; $n_a = 242/0.9 = 268.88 \approx 270$

A total of 400 caregivers were, however, recruited across the hospital over a period of 1 month.

Sampling method

There was no official list of the caregivers in UITH, but the health care workers usually engage at least an informal caregiver per patient to run errands. Therefore, we enlisted these caregivers through the list of the in-patients in all the wards and randomly selected caregivers into the study proportionate to the sizes of the patients in each ward during the period of the study. When there was more than one caregiver per patient, at the time of data collection, the informal caregiver who spent the most time with the patient as determined by the patient and health care worker was recruited.

Data collection/study instrument

Data were collected using an interviewer-administered questionnaire which was structured into five sections. The questionnaire elicited responses on sociodemography, information of the patient cared for, use of basic amenities/facilities within the hospital, financial issues and stress level, which was assessed using the caregivers strain index (CSI) and caregivers' stress from institution and other factors index (CSIOI).

The CSI is a brief and reliable, 13-item dichotomous (yes/no) questionnaire developed by Robinson in 1983.[18] It comprised five major domains (employment, financial, physical, social and time) and focused on stressors which can burden the caregiver when providing care to a patient. The questionnaire has a maximum score of 13 points since for each question, yes is 1 point while no is 0 point. A score ≥7 represents great stress level while a score of <7 represents less stress level.

In our setting, being a low and middle income country, there are additional factors which could cause stress which are more of institutional factors. These are but not limited to running errands, making payments at pay points, taking investigation samples to the laboratory, availability of places to sleep, urinate/defaecate and attitude of the health care workers. Therefore, we designed and validated the CSIOI.

The CSIOI is 8-item dichotomous (yes/no) questionnaire which was developed by the researchers based on an adaptation of the CSI to reflect contextual health institutional factors typically found in the study setting. It comprised six domains: errands ran, availability of drugs, laboratory and radiological services, attitude of health workers, privacy and hospital environment. The CSIOI questionnaire has a maximum score of 8 points since for each question, yes is 1 point while no is 0 point. A score ≥5 represents great stress level and a score of <5 represents less stress level.

The research tools were pretested in General Hospital Ilorin, which is a secondary health facility in the state. A total of 40 questionnaires were pretested. The tools were validated using face validity, content validity and construct validity. The 13-item CSI tool had a good internal reliability with a Cronbach's alpha of 0.77. The 8-item CSIOI had an acceptable internal reliability with a Cronbach's alpha of 0.68.

Data analysis

Analysis was carried out with the IBM- Statistical Package for Social Sciences (SPSS) software package version 23. Descriptive statistics were summarised using percentages, mean and standard deviation. Bivariate and multivariate analyses using Chi-square, *t*-test and logistic regression were applied to the data to find the association between independent variables and stress level. The level of significance was set at $P < 0.05$ at 95% confidence limit. Data were presented using frequency tables.

Results

As shown in Table 1, the respondents were predominantly young adults with a mean age of 38.32 years (±12.8). The proportion of female respondents was 264 (66.0%), and a larger proportion, 327 (81.7%) of the carers were married. Over two-third of the carers were from monogamous settings, 303 (75.7%) and 142 (35.4%) of the respondents had tertiary education. More than two-thirds 277 (69.2%) were employed and trading was the most common occupation 123 (44.2%).

Regarding the information of the patients that were being cared for by the caregivers, the mean age of the patients was 39.22 ± 24.97 years. Slightly over half (51.3%) were females and most of them (54%) were married. More than half (56.4%) had less than secondary school education and the highest proportion (35.5%) were parents of the caregivers, others were children (18.8%), other relatives (15.8%), siblings (13.8%) or spouses (11.0%). The proportion of patients of caregivers in this study in the male medical ward, female medical ward, paediatric emergency ward were 19.8%, 17.8% and 11.8%, respectively. Close to 80% of the caregivers were at the hospital all day, while 17.7 and 3.3% were there only in the day and night, respectively.

Almost all the respondents, 381 (95.2%), reportedly experienced great level of stress using the CSI tool [Table 2]. The proportion of the caregivers that experienced great level of stress ranged from 'some behaviours of patients being distressing' 90 (22.6%) to 'caregiving seen as a financial strain' 394 (98.5%). Using the CSIOI tool, more than half 227 (56.7%) experienced a great level of stress. The proportion of caregivers that experienced a great level of stress ranged from those that reported that 'laboratory services were unavailable' 103 (25.8%) to those that reported 'running lots of errands' 363 (90.7%) [Table 2].

The association between caregivers' socio-demographic variables and the level of stress experienced by caregivers using CSI revealed that there was no significant association

Table 1: Socio-demographic variables of informal caregivers (*n*=400)

Variables	Frequency (%)
Age groups	
<20	9 (2.3)
20-29	91 (22.7)
30-39	140 (35.0)
40-49	82 (20.5)
50-59	44 (11.0)
60-69	28 (7.0)
≥70	6 (1.5)
Mean±SD	38.32±12.82
Gender	
Male	136 (34.0)
Female	264 (66.0)
Marital status	
Married	327 (81.7)
Single	65 (16.3)
Widowed	8 (2.0)
Type of family	
Monogamy	303 (75.7)
Polygamy	97 (24.3)
Level of education	
No formal education	64 (16.0)
Primary education	85 (21.3)
Secondary education	105 (26.3)
Tertiary education	142 (35.4)
Quranic education	4 (1.0)
Employment status	
Employed	277 (69.2)
Unemployed	108 (27.0)
Retiree	15 (3.8)
Nature of employment	*n*=277
Employee	102 (36.8)
Self employed	175 (63.2)
Main occupation	
Farming	24 (8.6)
Trading	123 (44.2)
Civil servant	54 (13.5)
Private establishment	43 (15.8)
Artisan	33 (11.9)
Residence	
Within ilorin	292 (73.0)
Outside ilorin	108 (27.0)

SD: Standard deviation

between these variables. However, there was a significant association between employment status and strain from other sources using CSIOI ($P < 0.001$) [Table 3].

The association between patient-related factors and the stress experienced by carers using the CSI and CSIOI [Table 4] revealed that for the former, there was a significant association between level of stress experienced and grouped length of stay ($P = 0.026$), the perception that staying around is stressful ($P < 0.001$), and the perception that patient will not be well cared for if s(he) is not around ($P = 0.001$). The latter

Table 2: Caregiver strain index and caregivers' stress from institutional factors and other sources index (caregivers' stress from institution and other factors index) (*n*=400)

Variables	Yes (%)	No (%)
CSI		
Sleep is disturbed	327 (81.7)	73 (18.3)
Caregiver is inconvenient	368 (92.0)	32 (8.0)
Care giving is a physical strain	360 (90.0)	40 (10.0)
Caregiver is confining	375 (93.7)	25 (6.3)
Family adjustment	361 (91.2)	39 (9.8)
Changes in personal plan	326 (81.5)	74 (18.5)
Other demands on time	323 (80.7)	77 (19.3)
Emotional adjustment	144 (36.0)	256 (64.0)
Some behaviour is distressing	90 (22.6)	310 (77.4)
Distressing to find the person cared for change	97 (24.3)	303 (75.7)
Work adjustments	349 (87.2)	51 (12.8)
Care giving is financial strain	394 (98.5)	6 (1.5)
Completely overwhelmed	313 (78.2)	87 (21.8)
Aggregate score	381 (95.2)	19 (4.8)
Caregivers' stress from institutional factors and other sources index (CSIOI)		
Lots of errand to run	363 (90.7)	37 (9.3)
Unavailable laboratory services	103 (25.8)	297 (74.2)
Unavailable radiological services	157 (39.3)	243 (60.7)
Unavailable drugs and consumables	210 (52.6)	190 (47.5)
Poor attitude of health workers	170 (42.5)	230 (57.5)
Hassles at service points	225 (56.3)	175 (43.7)
Lack of proper privacy	271 (67.8)	129 (32.2)
Non-conducive hospital environment	285 (71.3)	115 (28.7)
Aggregate score	227 (56.7)	173 (43.3)

CSI: Caregiver strain index, CSIOI: Caregivers' stress from institution and other factors index

revealed that there was a significant association between the stress experienced by caregivers and grouped length of stay ($P = 0.002$), mean length of stay ($P = 0.001$) and period of stay ($P = 0.011$).

There was a significant association between the use of toilets (urination/defecation) while in the hospital premises ($P = 0.043$) and the stress experienced by caregivers using the CSI tool. Using CSIOI [Table 5], other factors found to be statistically significant with the caregivers stress were; staying overnight in the hospital ($P = 0.004$), number of errands in 3 h ($P < 0.001$) and mean number of errands in 3 h ($P < 0.001$).

Using the CSI [Table 6], significant predictors of the caregiver stress were perception that staying around was stressful (OR - 17.58, $P < 0.001$), perception that their patients will not be well cared for if not around (OR - 6.08, $P < 0.001$).

Using the CSIOI, significant predictors of stress included, duration of hospital admission of the patients of the caregivers that is stayed longer at the hospital more than 30 days (OR-2.86, p = 0.001) and between 20-24 days (OR-2.45, p = 0.049). Furthermore, period of stay that is, those who stayed in the hospital only at night (OR-9.38, p = 0.006) and, those who

Table 3: Association between caregivers' socio-demographic variables and caregivers' stress using caregivers' stress from institution and other factors index

Variables ($n=400$)	Caregivers' stress from other sources		Test statistic	*P*
	Less stress (%)	Great level of stress (%)	χ^2/t	
Age groups				
<20	4 (44.4)	5 (55.6)	2.184	0.902
20-29	43 (47.3)	48 (52.7)		
30-39	63 (45.0)	77 (55.0)		
40-49	31 (37.8)	51 (62.2)		
50-59	19 (43.2)	25 (56.8)		
60-69	11 (39.3)	17 (60.7)		
≥70	2 (33.3)	4 (66.7)		
Mean±SD	37.33±12.28	39.07±13.19	−1.350	0.178
Gender				
Male	54 (39.7)	82 (60.3)	1.055	0.304
Female	119 (45.1)	145 (54.9)		
Marital status				
Married	141 (43.1)	186 (56.9)	0.159	0.923
Single	29 (44.6)	36 (55.4)		
Widowed	3 (37.5)	5 (62.5)		
Type of family				
Monogamy	129 (42.6)	174 (57.4)	0.232	0.630
Polygamy	44 (45.4)	53 (54.6)		
Level of education				
No formal education	30 (46.9)	34 (53.1)	1.777	0.939
Primary not completed	16 (48.5)	17 (51.5)		
Primary completed	23 (44.2)	29 (55.8)		
Junior secondary	11 (37.9)	18 (62.1)		
Senior secondary	33 (43.4)	43 (56.6)		
Post-secondary	59 (41.5)	83 (58.5)		
Quranic	1 (25.0)	3 (75.0)		
Employment status				
Employed	141 (50.9)	136 (49.1)	21.865	<0.001*
Unemployed	27 (25.0)	81 (75.0)		
Retiree	5 (33.3)	10 (66.7)		
Nature of employment		*n*=277		
Employee	51 (50.00)	51 (50.0)	0.053	0.819
Self employed	90 (51.4)	85 (48.6)		
Residence				
Within ilorin	127 (43.5)	165 (56.5)	0.026	0.872
Outside ilorin	46 (42.6)	62 (57.4)		

*$P<0.05$ (statistically significant). *t*: *t*-test, SD: Standard deviation

stayed both during the day and at night were greatly stressed (OR-3.30, p = 0.001).

Those who ran more than 4 errands in 3 hours were not as stressed as those who ran 1-3 errands in 3 hours. (OR-0.371, p = 0.001).

Discussion

This study revealed that two-thirds of the caregivers were females. This was similar to findings from other studies.[12,19-23] This may be because conventionally, caregiving is seen as the responsibility of a woman.[20] More than three-quarters of the caregivers were married, which was in keeping with other studies in the United States and Nigeria that also reported a higher proportion of married caregivers.[12,19,23] More of the selected caregivers had tertiary levels of education. This was corroborated by studies from the United States and Nigeria that found out that the majority of the caregivers were high school graduates.[12,19,23] However, in a Nigerian study conducted among informal caregivers of cancer patients, those with only secondary level of education had the highest proportion.[21]

More than two-thirds of the caregivers were employed. This was similar to findings from other studies that had more of the carers being employed.[19,22,23] This is, however different from a study in the United States where majority of the

Table 4: Relationship between patient-related factors and caregivers strain index and caregivers' stress from institution and other factors index

Variables	Strain of caregivers		Test statistic χ^2/t	*P*
	Less stress (%)	Great stress (%)		
CSI				
Length of stay (days)				
1-4	14 (9.9)	128 (90.1)	14.348	0.026*
5-9	1 (1.1)	87 (98.9)		
10-14	1 (1.8)	55 (98.2)		
15-19	1 (8.3)	11 (91.7)		
20-24	0	27 (100.0)		
25-29	0	7 (100.0)		
≥30	2 (2.9)	66 (97.1)		
Mean (SEM)	9.58 (4.21)	15.72 (1.01)	−1.320	0.188
Period of stay				
During the day	7 (9.9)	64 (90.1)	5.470	0.065
At night	1 (7.7)	12 (92.3)		
Both day and night	11 (3.5)	305 (96.5)		
Perceived its more stressful staying around				
Yes	6 (1.8)	335 (98.2)	45.696	<0.001*
No	13 (22.0)	46 (78.0)		
Patient will be well cared for if not around				
Yes	16 (8.2)	178 (91.8)	10.184	0.001*
No	3 (1.5)	203 (98.5)		
CSIOI				
Length of stay (days)				
1-4	72 (50.7)	70 (49.3)	20.847	0.002*
5-9	43 (48.9)	45 (51.1)		
10-14	20 (35.7)	36 (64.3)		
15-19	6 (50.0)	6 (50.0)		
20-24	8 (29.6)	19 (70.4)		
25-29	6 (85.7)	1 (14.3)		
≥30	18 (26.5)	50 (73.5)		
Mean (SEM)	11.61 (1.2)	18.3 (1.5)	−3.406	0.001*
Period of stay				
During the day	41 (57.7)	30 (42.3)	8.993	0.011*
At night	3 (23.1)	10 (76.9)		
Both day and night	129 (40.8)	187 (59.2)		
Perceived its more stressful staying around				
Yes	148 (43.4)	193 (56.6)	0.022	0.883
No	25 (42.4)	34 (57.6)		
Patient will be well cared for if not around				
Yes	88 (45.4)	106 (54.6)	0.684	0.408
No	85 (41.3)	121 (58.7)		

*P<0.05 (statistically significant). *t*: *t*-test, CSI: Caregiver strain index, CSIOI: Caregivers' stress from institution and other factors index, SEM: Standard error of mean

carers were retired[12] and also different from another study in Nigeria where the majority of the carers were unemployed.[21] The majority of the caregivers in this study were parents of the patients. This may be adduced to the young age group of the patients being cared for during the period of the study. It is therefore expected that the parents will be the caregivers. Others were children, relatives, spouses and siblings of the patients. Some studies also reported similar findings with regard to the relationship of caregivers with patients.[23,24] The majority of the carers were aware of the ailment of the patients they cared for.

Using the CSI tool, almost all of the caregivers experienced a great level of stress while caring for their loved ones in the hospital. Using the CSIOI tool, more than half of those studied experienced great level of stress while giving care. This study revealed that carers who were 20 years and younger and those who were 70 years and older experienced greater stress levels than other age groups. Although Bauer *et al.* reported great stress

Table 5: Relationship between institutional factors and caregiver strain index and caregivers' stress from institution and other factors index

Variables	Stress/strain of care giver		Test statistic	*P*
	Less stress (%)	Great level of stress (%)	χ^2/t	
CSI				
Urinated/defecated while in the hospital premises				
Yes	5 (2.6)	191 (97.4)	4.107	0.043*
No	14 (6.9)	190 (93.1)		
Sleeps in hospital				
Yes	1 (1.40)	69 (98.6)	2.069	0.150
No	18 (5.5)	312 (94.5)		
Took bath in the hospital premises				
Yes	5 (2.6)	191 (97.4)	0.149	0.928
No	14 (6.9)	190 (93.1)		
Frequency of request for items				
Never	0	1 (100.0)	0.149	0.928
Sometimes	15 (5.0)	288 (95.0)		
Most times	4 (4.2)	92 (95.8)		
Number of errands in 3 hours				
1-3 times	15 (5.2)	273 (94.8)	0.478	0.490
≥4 times	4 (3.6)	108 (96.4)		
Mean±SD	1.21±0.4	1.28±0.5	−0.690	0.491
CSIOI				
Urinated/defecated while in the hospital premises				
Yes	163 (43.6)	211 (56.4)	0.260	0.610
No	10 (38.5)	16 (61.5)		
Sleeps in hospital				
Yes	119 (49.0)	124 (51.0)	8.256	0.004*
No	54 (34.4)	103 (65.6)		
Took bath in the hospital premises				
Yes	86 (43.9)	110 (56.1)	0.062	0.804
No	87 (42.6)	117 (57.4)		
Frequency of request for items				
Never	0	1 (100.0)	5.677	0.059
Sometimes	122 (40.3)	181 (59.7)		
Most times	51 (53.1)	45 (46.9)		
Number of errands in 3 hours				
1-3 times	102 (35.4)	186 (64.6)	25.714	<0.001*
≥4 times	71 (63.4)	41 (36.6)		
Mean±SD	1.42±0.49	1.18±0.38	5.229	<0.001*

*P<0.05 (statistically significant). *t*: *t*-test, CSI: Caregiver strain index, CSIOI: Caregivers' stress from institution and other factors index, SD: Standard deviation

levels among people of the older age group,[25] this study did not find the higher score observed among the elderly statistically significant.

A study on the burden among caregivers of older adults with advanced cancer and risk factors revealed that being married, divorced/separated/widow showed fewer burdens than unmarried caregivers.[16] In this study, it was found out that the married/widowed had a greater level of stress than those who were single, though this difference was not statistically significant. The difference is not surprising since the married/widowed can be saddled with other family issues other than the care of the patients.

Those that were unemployed significantly had great level of stress than those that were employed or retired (CSIOI). This could be adduced to caregiving being an added stressor to the stress of unemployment. Studies have established higher stress among unemployed people.[26,27] Therefore, informal caregiving can be additional stress for them.

When both indexes were considered using a bivariate analysis, there was a significant association between the length of stay of the patient in the hospital and great stress levels among the Informal caregivers. With the multivariate analysis, those who stayed for more than 30 days were 2.8 times more likely to experience great stress levels as revealed by only the CSIOI. This is likely to be so considering the issues surrounding chronic stress and also staying outside the comfort of one's home for too long. Some other studies also reported the effects of long hospital stays and higher

Table 6: Predictors of stress/strain of caregivers

Variables	OR	95% CI	*P*
CSI			
Perceived its more stressful staying around			
Yes	17.579	5.205-59.375	<0.001*
No	RC		
Patient will be well cared for if not around			
Yes	RC		
No	6.082	1.744-21.218	0.005*
Urinated/defecated while in the hospital premises			
Yes	2.036	0.441-9.436	0.361
No	RC		
CSIOI			
Employment status			
Employed	1.127	0.322-3.947	0.852
Unemployed	2.149	0.572-8.074	0.257
Retired	RC		
Length of stay (days)			
1-4	RC		
5-9	1.076	0.632-1.832	0.786
10-14	1.851	0.978-3.504	0.058
15-19	1.029	0.317-3.342	0.963
20-24	2.443	1.004-5.944	0.049*
25-29	0.171	0.020-1.461	0.107
≥30	2.857	1.520-5.371	0.001*
Length of stay	1.015	1.001-1.030	0.031*
Period of stay			
During the day	RC		
At night	9.378	1.924-45.705	0.006*
Both day and night	3.301	1.639-6.649	0.001*
Sleeps in the hospital			
Yes	0.472	0.264-0.844	0.011*
No	RC		
Number of errands in 3 hours			
1-3 times	RC		
≥4 times	0.371	0.222-0.619	<0.001*

**P*<0.05 (statistically significant). OR: Odd ratio, CSI: Caregiver strain index, CSIOI: Caregivers' stress from institution and other factors index, RC: Reference category

stress levels. This trend could also result from caregiver's experiencing high levels of psychological symptoms as a result of long-term caring.[28-31]

Those who had the perception that their patients would not be well cared for when they were not around significantly had great stress level for the CSI. Those who felt that their patients will not be cared for when they are not around were six times more likely to be stressed compared to those who felt that their patients will be cared for. This has implications on the perceived quality of care and patient safety. A study in Greece also revealed that one of the reasons why informal caregivers stay with the patient even after visiting hours is due to fear of patient safety.[32]

Informal caregivers who stayed with the patient only at night had significantly greater stress level than those who stayed during the day only and those who stayed during the day and at night for the CSIOI. Those who stayed in the hospital only at night were 9.4 times more likely to experience stress from institutional and other factors compared to those caregivers who only stayed during the day and those who stayed both during the day and at night. This may be due to the unavailability of places where the informal caregivers can sleep. Sometimes, the health workers, when short-staffed could insist that one of the caregivers must stay at the bedside of the patients in case the patient needs help during the night with the movement of bowel, lifting of patients, to help tell them when the intravenous fluid is about to finish and so on. This may lead to the informal caregivers sitting throughout the night because there is no provision of where the informal caregivers can sleep. As a result, lack of and/or poor sleep, can lead to stress which, if continuous, is a risk factor for cardiovascular disease.[33]

Caregivers, who urinated/defecated while within the hospital premises, significantly experienced great stress levels using the CSI. There was a statistically significant association between sleeping in the hospital, number of errands in 3 h and mean number of errands in 3 h and greater stress level using the CSIOI.

It was observed that those who felt that staying around was more stressful were 17.6 times more likely to experience strain compared to those who did not feel that staying around was more stressful. This is probably due to having to see their patient in the state of ill-health as a result of staying around, which could also be heartbreaking on its own especially when the caregiver has little control over the symptoms of the care recipient.[34]

Caregivers who ran ≥4 errands in 3 h were less likely to experience stress from other sources compared to those who ran 1–3 errands in 3 h. One would expect that the more the errands, the greater the stress level; however, in this study, it was the reverse. It could be that those that ran >4 errands may have gotten used to running errands. This is because in Nigerian public health facilities, caregivers of patients tend to assist the health care workers in the care of the patient, which includes but is not limited to feeding the patient, washing clothing, making payments, purchase of drugs, taking investigation specimen to the laboratory and the list goes on. This is also similar to the kinds of care provided by caregivers for their hospitalised patients in the Arab region.[31] Running such endless errands, can be detrimental to the health of the informal caregiver, especially those with morbidities.

The limitation of this study can be said to be the fact that the stress level might not be as a result of caregiving alone but as a result of other causes, which cannot be deduced from this study being a cross-sectional study. Future studies could consider doing longitudinal studies. Furthermore, there was difficulty comparing with other studies since several studies worked on the burden of caregivers among those with chronic illnesses or

psychiatric illnesses. This study, however, was able to determine the stress level of informal caregivers of any hospitalised patients and not restricting to particular diseases or chronicity of the disease.

Conclusion

Both of the indexes (CSI, CSIOI) used to assess the stress level revealed that the informal caregivers had a high proportion (95.2%, 56.7%) of great level of stress caring for their patients on admission. The determinants of great stress level among informal caregivers were the perception that staying around was stressful, long hospital stay and number of errands in 3 h. This study revealed that running errands was the most common form of care provided for the patients and this was mostly to purchase medication. It is, therefore, expedient that issues surrounding the availability of medications, provision of amenities to ease the convenience, infrastructure to accommodate and house the caregivers, electronic medical records and automated payment systems to reduce errands, etc., should be included in hospital policies.

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Conflicts of interest

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