

Determinants of Poststroke Fatigue among Stroke Survivors Undergoing Rehabilitation in Nigeria

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Abstract

Background: Poststroke fatigue (PSF) is a major cause of debility after stroke. This study examined socio-demographic and clinical determinants of PSF.

Methods: A cross-sectional study was conducted to assess the associations between PSF and socio-demographic (age, gender, marital status, educational level, and poststroke employment status) as well as clinical (type, side and nature of stroke, poststroke duration and function disability) characteristics of stroke survivors undergoing outpatient physiotherapy at 2 government hospitals in Nigeria. Functional disability and PSF were respectively assessed using the Modified Rankin Scale and the Fatigue Severity Scale through face-to-face interviews. Multiple linear regression analysis was used to examine the associations between PSF and the socio-demographic and clinical characteristics of the participants.

Results: One hundred stroke survivors with a male majority (66%) participated in the study. The mean age of participants was 55.3 ± 13.8 years while mean post-stroke duration was 12.6 ± 19.3 months. The regression model obtained from the statistical analysis was responsible for 33% (of the variance in PSF ($R^2 = 0.33$)) while only functional disability was independently and significantly associated with PSF ($\beta = 0.59$; $P < 0.0001$; 95% CI = 0.35 - 0.75).

Conclusions: Functional disability was the sole significant determinant of PSF. The need to effectively address functional disability through effective and proven rehabilitation strategies is emphasized.

Keywords: Functional Disability, Poststroke Fatigue, Stroke, Nigeria

1. Background

Stroke is a major cause of mortality and debility in Nigeria (1, 2) as it is globally. The debility from stroke often results from several consequences of the disease. One major, but often-neglected stroke sequela that has a profoundly distressing effect is poststroke fatigue (PSF) (3, 4).

PSF can be described as a feeling of exhaustion, weariness, lack of energy, and aversion of effort after stroke (5, 6). It is known to adversely affect functional ability (3), quality of life, and well being of stroke survivors (3, 7). With prevalence rates as high as 75% (8), PSF remains a major source of concern to stroke survivors and their caregivers. Additionally, the stroke survivor's ability to actively participate in rehabilitation strategies including physical therapy may be markedly restricted by PSF. Going by these debilitating effects of PSF, gaining insight into the mechanism of PSF, is of utmost importance and information on features that may represent its risk factors is therefore very crucial. For instance, successful and effective management of PSF would be dependent on addressing its risk factors. Furthermore, information on the determinants of PSF would assist in identifying stroke patients at risk of PSF and consequently

facilitate the provision of early preventive and management strategies.

Several studies have been conducted in various regions of the world on the determinants or risk factors of PSF (4). While findings are largely conflicting and apparently inconclusive (9), some studies have shown significant associations between PSF and demographic factors such as female gender (10-12) and older age (10, 11, 13). Similarly, there is some evidence that clinical factors such as functional ability and pre-stroke fatigue influence PSF (3, 4, 14, 15).

While an overwhelming majority of data on determinants of PSF is from Asian and developed Western countries (3, 10-15), there is a dearth of information on the subject in developing countries including African countries such as Nigeria. There is however a need for country-specific data especially as there are reports on association between race/ethnicity and fatigue (16, 17). To bridge the existing gap in the literature, this study therefore examined determinants of PSF among stroke survivors undergoing physiotherapy on outpatient basis in Nigeria. The associations between PSF and distinctive personal factors, namely socio-demographic and clinical characteristics of stroke survivors, were examined.

2. Methods

Study design: A hospital-based cross-sectional study was conducted.

Study site: Physiotherapy facilities at 2 government hospitals in Northeast Nigeria.

Participants: Participants included community dwelling stroke survivors who were recipients of physiotherapy at the time of the study. Those aged 18 years and above, who were able to communicate verbally (in order to respond to the interview questions), and who expressed their willingness to participate in the study were recruited. Those with conditions that often result in fatigue such as cancers and arthritis were excluded from the study.

Instruments: Researcher-designed data forms were utilized to record socio-demographic (gender, age, marital status, education level, prestroke occupation, and post-stroke employment status) and clinical (type and side of stroke, poststroke duration, and nature of stroke [first-ever/recurrent]) data obtained from the participants.

Fatigue severity scale (FSS): the 9-item FSS (18) was used to assess PSF. Each item evaluates the effect of fatigue on performance of daily activities using a 7-point Likert scale of 1 (strongly disagree) to 7 (strongly agree). The overall FSS score ranges from 1 to 7 and is obtained from the arithmetic mean of the summation of scores from each of the 9 items. Higher overall score depicts higher level of fatigue. The FSS has good reliability (19) and appears to be the tool most commonly used to assess PSF in stroke studies (9).

Modified rankin scale (mRS): the mRS is a global disability assessment tool (20), which was used to assess functional ability of the study participants. It assesses disability on a 6-point ordinal scale, which ranges from 0 (no disability) to 5 (severe disability). The mRS is reliable and valid and one of the most common scales used in stroke studies (20, 21).

2.1. Procedure

Ethical approval was obtained from the institutional ethical committee of one of the participating hospitals. Consenting stroke survivors were consecutively recruited into the study written informed consent was obtained from each participant. The study instruments were administered through face-to-face interviews by the second author. The study was conducted in the year 2013.

2.2. Statistical Analyses

Descriptive statistics of frequencies, percentages, range, mean, and standard deviation were used to summarize the data obtained. Multiple regression analysis ('enter' method) was used to identify the independent

determinants of PSF among the socio-demographic and clinical data obtained from the participants. The dependent variable was PSF (represented by the overall score on the FSS) while the independent variables were gender, age, marital status, education level, poststroke employment status (returned to work or not), type, side and nature (first/recurrent) of stroke, poststroke duration, and functional ability. Level of statistical significance was set at alpha equals 0.05.

3. Results

One hundred stroke survivors participated in the study. Males (66%), the married (83%), and survivors of ischemic stroke (70%) were the majority. Mean age and mean post stroke duration was 55.3 ± 13.8 years and 12.6 ± 19.3 months, respectively. Details of the socio-demographic and clinical characteristics of the participants are presented in Table 1.

3.1. Determinants of PSF

The result of the multiple regression analysis that $R^2 = 0.33$ indicating that the regression model that included all the socio-demographic and clinical data was responsible for 33% of the variance in PSF. However, only functional ability emerged as a significant determinant of PSF at $P < 0.001$ with $\beta = 0.59$ (Table 2).

4. Discussion

Poststroke fatigue (PSF) is known to result in a number of adverse consequences and negatively impacts on the well-being and quality of life of stroke survivors (3, 7). Understanding the mechanism of PSF, especially as it concerns its risk of factors is therefore of utmost importance. This study explored the determinants of PSF among stroke survivors undergoing outpatient rehabilitation at physiotherapy facilities in Nigeria.

Of the socio-demographic and clinical data obtained from the participants in the study, only level of functional ability was found to be significantly and independently associated with PSF with poor level of function emerging as a determinant of PSF. While many of the previous studies that investigated the determinants of PSF have reported conflicting and inconclusive findings, the impact of level of functional ability (or disability) appears to be fairly consistent across studies (4, 15, 17, 22, 23). A recent systematic review of PSF literature showed that 25 studies found a significant association between PSF and functional ability while 15 studies did not (4). While the above mentioned studies were conducted in Western and Asian countries, this present study represents one of the few from

Table 1. Socio-Demographic and Clinical Characteristics of Participants (N = 100)^a

Characteristic	Value
Age, y	
Mean ± SD	55.3 ± 13.9
Range	18 - 85
Poststroke duration, mo	
Mean ± SD	12.6 ± 19.3
Range	0.5 - 144
Gender	
Male	66 (66)
Female	34 (34)
Marital status	
Married	83(83)
Single	7 (7)
Widowed	10 (10)
Educational level	
None	8 (8)
Primary	9 (9)
Secondary	19 (19)
Tertiary	35 (35)
Qur'anic	29 (29)
Side of stroke	
Right	49 (49)
Left	51 (51)
Type of stroke	
Ischemic	70 (70)
Hemorrhagic	30 (30)
Occupation status	
Civil servant	18 (18)
Housewife	18 (18)
Retiree	22 (22)
Student	2 (2)
Self employed	38 (38)
Unemployed	2 (2)
Nature of Stroke	
First-ever	68 (68)
Recurrent	32 (32)

^aData are presented as mean ± SD or No (%).

Africa. The observed significant impact of functional disability on the occurrence of PSF across studies notwithstanding the location and setting of the studies buttresses

Table 2. Multiple Regression Analysis for Determinants of Poststroke Fatigue

Independent Variable	β	P Value
Age	-0.09	0.33
Gender	-0.11	0.31
Marital status	0.04	0.71
Educational level	0.07	0.44
Employment status	0.02	0.82
Poststroke duration	0.06	0.53
Type of stroke	0.01	0.92
Side of stroke	0.16	0.09
Nature of stroke	-0.06	0.48
Functional ability, mRS	0.58	0.00 ^a

Abbreviation: mRS, modified rankin scale.

^aSignificant at P < 0.0001; R² = 0.33.

the crucial need for evidence-based stroke rehabilitation strategies that are capable of reducing functional disability after stroke. This need is particularly important in low-resource settings like ours where rehabilitation personnel and facilities are grossly inadequate to effectively address post stroke functional disability. Hence, the finding of this study adds further credence to the perennial call for urgent financial, training, and organizational interventions to improve the standard of stroke rehabilitation in Nigeria as these will assist in the successful management of post-stroke functional disability and subsequently combat PSF and its debilitating effects.

In addition to level of functional disability, other clinical factors that have been previously identified as determinants of PSF include pre-stroke fatigue and depression (3, 14, 15). Although no information was obtained regarding these 2 factors in the present study, the fact that they are both potentially amenable to appropriate interventions is especially important given the negative consequences of PSF. It would therefore be necessary for future studies in our settings to evaluate the impact of pre stroke fatigue and depression on post stroke fatigue.

The cross-sectional design of the study constitutes a limitation especially because the identification of poor functional ability as the risk factor for PSF using this design does not rule out reverse causality in the relationship between functional ability and PSF. Future studies utilizing prospective and longitudinal designs would therefore be required. The small size of the sample of stroke survivors and the fact that they were recruited from hospital settings may also decrease the external validity of the findings.

3.1. Conclusions

Among factors such as gender, age, marital status, education level, post stroke employment status, type, side and nature of stroke, as well as post stroke duration, only poor functional ability emerged as an independent and significant determinant of PSF among stroke survivors in the study. This important association between functional disability and PSF has implications for effective and proven functional ability-enhancing stroke rehabilitation strategies.

Supplementary Material

Supplementary material(s) is available [here](#).

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