PROGRESS IN MEDICAL SCIENCES, 2017
VOL 1, NO. 1, PAGE 1 – 5
DOI: doi.org/10.47363/PMS/2017(1)103

ORIGINAL ARTICLE

Open Access

Abdominal obesity in stroke: An exploratory survey of stroke survivors attending physiotherapy facilities in Nigeria

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ABSTRACT

Background: Abdominal obesity is a risk factor for many life threatening and life-changing chronic conditions. A survey was conducted to determine the prevalence of abdominal obesity among stroke survivors undergoing rehabilitation.

Methods: Ninety stroke survivors attending three physiotherapy outpatient facilities in a metropolitan city in Nigeria participated in this cross-sectional survey. Abdominal obesity was determined with the measurement of waist circumference. Data on participants' personal factors namely age, gender, post-stroke duration, and level of disability (Modified Rankin Scale) were also obtained and the prevalence of abdominal obesity was explored in relation to these factors using Chi-square statistics.

Results: Mean (SD) age of participants was 58.9 (9.7) years, and male stroke survivors were in the majority (62.2%). Twenty-two participants were observed to have abdominal obesity giving a prevalence rate of 24.4%. Females had a significantly higher prevalence (44.1%) compared to males (12.5%). No other personal factors, however, resulted in significantly different prevalence rates.

Conclusion: Approximately one in four stroke survivors in this study was observed to have abdominal obesity with a significantly higher prevalence among female stroke survivors. Further studies would be required to document outcomes of abdominal obesity after stroke and identify effective preventive and intervention strategies to address abdominal obesity among stroke survivors.

ARTICLE HISTORY

Received November 23, 2017
Accepted December 3, 2017
Published December 23, 2017

KEYWORDS

Abdominal obesity; stroke; risk factors

Introduction

Stroke is a major cause of morbidity and mortality worldwide [1]. Aside from the debilitating conditions experienced by stroke survivors including disability [1-3], pain [4], and falls and their negative outcomes [5], recurrent stroke also constitutes a major stroke sequel [2,6]. Research findings have shown that the risk of repeated stroke events could be as high as 44% after the incident stroke [2]. It is, however, important to note that a previous stroke is not the sole contributor to the risk of a recurrent stroke. Rather, in addition to a history of stroke, the presence of other established stroke risk factors heightens the risk of recurrent stroke especially those risk factors that existed prior to the first-ever stroke [6,7]. With the debilitation that often accompanies stroke, primary prevention and secondary prevention of stroke remain the best and most cost-effective option [1,7].

The preventable and modifiable nature of many stroke risk factors has increasingly resulted in the emphasis and efforts to identify and mitigate such risk factors [1]. Smoking cessation, reduction in alcohol intake, weight reduction, and regular physical activity are common lifestyle modifications that are often emphasized in achieving stroke prevention, either for first-ever or recurrent stroke [7-8].

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However, a seldom addressed risk factor that predisposes to several cardiovascular diseases, especially those that are associated with stroke, is abdominal obesity.

Abdominal obesity, also regarded as central fat accumulation, is considered a health risk especially in cases of intra-abdominal adiposity where visceral fat accumulates around organs within the abdominal cavity [9-10]. Abdominal obesity can be determined using markers such as waist circumference and waist-to-hip ratio [11]. Unlike the more popular and more commonly used body mass index which indirectly assesses total body obesity (also known as general adiposity) through weight and height measurements, abdominal obesity is indicative of the location of excess fat and an indirect measure of central obesity which has far reaching effects on the health and well-being of individuals [12-14]. Although total body obesity has been linked to positive outcomes such as reduced mortality after stroke—the so called obesity paradox [15-16], abdominal obesity increases the risk of the two major risk factors of stroke, namely, diabetes and hypertension as well as the risk of other debilitating conditions [13]. It is, therefore, obvious that abdominal obesity does not confer any protection or possess any benefit after stroke.

In spite of the dangers of abdominal obesity, only few studies have reported on its prevalence among stroke survivors [17-19] and this dearth may have implications for effective primary and secondary stroke prevention. For instance, information on abdominal obesity among stroke survivors may provide insight into its contribution to stroke incidence [17-19] and may also indicate the possibility of a recurrent stroke in the future. It is, however, heartening that abdominal obesity can be successfully mitigated through educational and enlightenment programs to create awareness, and deliberate research and clinical focus on its prevalence, risk factors, prevention, and management. On the issue of awareness, a previous study in Nigeria showed that majority of persons at risk of stroke did not identify obesity as a stroke risk factor [20]. Going by the scarcity of information and lack of focus on abdominal obesity and how it relates to stroke, the above mentioned finding by Vincent-Onabajo et al [20] may not be surprising. As a necessary first step therefore, this study assessed the prevalence and potential personal risk factors of abdominal obesity among stroke survivors receiving physiotherapy care in a Nigerian community.

Methods

Study design: A cross-sectional survey approved by an institutional review committee in Maiduguri, Nigeria.

Study setting: Three physiotherapy outpatient facilities in Maiduguri, Nigeria.

Participants: Ninety out of 160 community-dwelling stroke survivors receiving physiotherapy care participated in the study. Those aged 18 years and above, and who expressed willingness to participate in the study through provision of informed consent, were included in the study.

Instruments

Researcher-designed data forms were used to obtain information on each participant's gender, age, and post-stroke duration, and to record participants' waist circumference. An inelastic tape measure to measure the waist circumference and the modified Rankin scale (mRS) was used to assess global disability among the participants. The mRS assesses disability on a 6-point ordinal scale of 0 to 5. While "0" indicates no symptoms and "5" represents extreme disability. The mRS is a valid and reliable measure of global disability after stroke [2].

Procedure

Researcher-designed data forms and the mRS were, respectively, used to obtain the basic demographic and clinical data from the participants, namely, age, gender, and post-stroke duration, and level of disability. The data were obtained from the participants, or their caregivers, and their clinical records for those who were not able to provide the required information. To detect the presence of abdominal obesity, waist circumference was measured using an inelastic tape measure. The measurement was carried out with the participant in standing, and the tape measure placed parallel to the ground at approximately midpoint between the lower margin of the last palpable rib and the top of the iliac crest [11]. Participants were requested to take their shoes off, stand with their feet together, and expose their abdomen for the measurement to be carried out. Waist circumference was measured to the nearest 0.1 cm and recorded on the data forms. Abdominal obesity was classified as a waist circumference >102 cm in males and >88 cm in females [11]. All data were collected by the second author (HD) from March to June 2015.

Data Analyses

Descriptive statistics of mean and standard deviation, range, frequency, and percentages were used to summarize the demographic and clinical data of the participants. Prevalence rates of abdominal obesity were presented as percentages. Chi-square test was used to explore difference in the prevalence of abdominal obesity based on participants' age, gender, post-stroke duration and level of global disability at alpha equals 0.05. For the purpose of the Chi-square test, age was dichotomized into "<65 years" and "≥65 years." Level of global disability was also dichotomized into "can walk without assistance" (mRS 0 to 3) and "cannot walk without assistance or bedridden" (mRS 4 to 5) while post-stroke duration was categorized into "within the first year after stroke" (1 to 12 months), "within the second year after stroke" (13-24 months) and "beyond two years after stroke" (>24 months).

Results

Age of the participants ranged from 39 to 80 years with a mean (SD) of 58.9 (9.7) years. Mean (SD) post-stroke duration was 15.14 (25.42) months. Majority (62.2%) of the participants were males, whereas 34 (37.8%) participants were females. In terms of global disability, 53.2% could walk without assistance (mRS 0-3) while 46.8% could not walk without assistance or were bedridden (mRS 4-5).

Prevalence and Risk Factors of Abdominal Obesity

Twenty-two (24.4%) out of the ninety participants in this study were observed to have abdominal obesity. Prevalence of abdominal obesity differed significantly only based on gender of the participants ($P < 0.01$). A significantly higher prevalence (44.1%) of abdominal obesity was observed among the female stroke survivors compared to the 12.5% prevalence observed among their male counterparts. Other personal factors explored, namely, age, post-stroke duration, and level of global disability did not result in statistically significant difference ($P > 0.05$) in the prevalence of abdominal obesity (Table 1). The P values for age, post-stroke duration, and level of global disability were 0.66, 0.63, and 0.95, respectively (Table 1).

Discussion

Abdominal obesity is an important risk factor for cardiovascular and metabolic diseases such as hypertension and diabetes [13,21] and these conditions are the two most common risk factors of stroke [22-24]. This study examined the prevalence of abdominal obesity among stroke survivors undergoing post-stroke physiotherapy in some centers in Nigeria.

The prevalence of abdominal obesity reported in this study was lower than the 66.6% reported in a study of hypertensive patients in Brazil [25], the 58.2% observed among diabetic patients in Iran [26], the 32.4% reported among elderly persons in Saudi Arabia [27], and the 28.3% prevalence rate observed among the general population in Iran [28]. This present study's prevalence rate was, however, higher than the 12.2% reported among the general population in China [29]. The observed variations in these prevalence rates, however, appear to be more indicative of geographical disparities in the prevalence of abdominal obesity than population-based differences. The probable geographical disparities may be due to a number of factors such as diet, sedentary lifestyle, and level of physical activity that may be unique to the different localities. For instance, Mediterranean diet has been linked to lower abdominal adiposity [30] with persons in Mediterranean countries reaping the health benefits of diet and it is not surprising that populations in many non-Mediterranean countries are also adopting the Mediterranean diet. Similarly, level of physical activity of residents of a particular countries or regions, which would impact energy expenditure and consequently abdominal obesity, may be dependent on the physical and built environment, transport systems, and relevant government policies of those countries or regions [31]. It, therefore, follows that geographic disparities in the prevalence of abdominal obesity would need to be considered in planning effective strategies capable of preventing and reducing abdominal obesity.

A common feature between this study and many of previous studies cited, however, is the significantly higher prevalence of abdominal obesity among females compared with their male counterparts [25-26,28]. This implies an association between the female gender and abdominal obesity notwithstanding the population studied. The implication of this finding is that more attention should be focused on effective and culturally sensitive means of addressing the problem of abdominal obesity among women. For instance, in some African countries, including some parts of Nigeria, excess fat in women is regarded as a sign of beauty [32] and is often preferred [33]. Such beliefs and cultural norms may need to be addressed

Table 1. Prevalence of abdominal obesity by participants' demographic and clinical characteristics (N = 90).

Characteristic	Abdominal obesity, f (%)	No abdominal obesity, f (%)	c^2	P value
Gender			11.45	0.001*
Male	7 (12.5)	49 (87.5)		
Female	15 (44.1)	19 (55.9)		
Age (years)			0.20	0.66
<65	16 (25.8)	46 (74.2)		
≥65	6 (21.4)	22 (78.6)		
Global disability (mRS)			0.004	0.95
Independent mobility	10 (24.4)	31(75.6)		
Assisted mobility/bedridden	9 (25)	27 (75)		
Post-stroke duration (months)			0.93	0.63
1-12	17 (26.2)	48 (73.8)		
13-24	2 (14.3)	12 (85.7)		
>24	3 (27.3)	8 (72.7)		

*Statistically significant.

to forestall the epidemic of abdominal obesity and its negative sequelae.

Although this study provides preliminary data on the frequency of abdominal obesity among stroke patients undergoing rehabilitation at outpatient physiotherapy facilities in Nigeria, further studies are urgently needed. For instance, future studies would be required to examine the consequences of abdominal obesity in stroke survivors. Findings from such studies would likely create the necessary impetus for routine assessment and monitoring of abdominal obesity during stroke rehabilitation with a view of preventing or reversing it as appropriate. Incorporating physical activity training and education capable of reducing abdominal obesity into post-stroke physiotherapy care may be particularly beneficial especially as physiotherapy is unarguably the most accessed rehabilitation service among stroke patients in Nigeria. Clinical trials of culturally sensitive physiotherapeutic and other interventions would, therefore, be required to identify means to prevent and manage abdominal obesity among stroke survivors.

Limitations of the Study

An important limitation of this study was the study design which made it impossible to determine the contribution of abdominal obesity to the incidence of stroke among the participants. Case-control and cohort studies are therefore required to provide information on the risk of stroke among Nigerians with abdominal obesity. The small size of the study sample and the hospital-based recruitment of the sample also constitute a significant limitation. The lack of data on the hypertensive and diabetic status of the participants is also a shortcoming that should be addressed by future studies especially as these conditions are associated with abdominal obesity and are the two most common risk factors of stroke.

Conclusion

Approximately one in four stroke survivors in this study was observed to have abdominal obesity with females having a significantly higher prevalence. The findings of the study is an indication of the need for routine assessment, and effective prevention of and intervention for abdominal obesity among stroke survivors, and female stroke survivors may require even more intensive preventive and intervention strategies. Future studies on outcomes of abdominal obesity in stroke survivors, and effective preventive and intervention strategies are, however, needed.

Conflict of Interest

The authors declared no conflicts of interest.

Funding

This research received no specific grant from any funding agency.

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