



Full length article

Risk of obstructive sleep apnea, excessive daytime sleepiness and depressive symptoms in a Nigerian elderly population

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ABSTRACT

Objectives: To evaluate the risk of obstructive sleep apnea (OSA) in a primary care population of elderly Nigerians and to determine its correlates.**Methods:** Clinical and demographic data of 414 elderly individuals in a primary care clinic were obtained. Their risk of OSA was estimated using Berlin questionnaire while Epworth sleepiness scale and the Center for Epidemiologic Studies Depression Scale (CESD-10) were also administered.**Results:** Of the 414 subjects, 96 (23.2%) met the criteria for a high risk for OSA with a male to female ratio of 1:1. Subjects at high OSA risk (high OSA risk group) were younger than those at low OSA risk (low OSA risk group) (71.4 ± 6.8 vs 73.6 ± 7.7 , $p=0.011$). Mean body mass index (BMI, kg/m^2) (27.3 ± 5.8 vs 24.7 ± 5.1 , $p < 0.001$) and waist circumference (WC, cm) (90.7 ± 13.1 vs 86.5 ± 13.9 , $p=0.011$) were higher in the high OSA risk group compared with the low OSA risk group. A total of 215 (51.9%) and 62 (15.0%) subjects had clinically significant depressive symptoms (CESD-10 score ≥ 10) and excessive daytime sleepiness (EDS), respectively. On regression, the odds of EDS, depressive symptoms, increased BMI and younger age were significantly higher in the high OSA risk group compared with the low OSA risk group. **Conclusions:** High risk for OSA and depressive symptoms are common in our sample of elderly Nigerians. Depressive symptoms, EDS, BMI and age independently predict high OSA risk in the elderly.© 2016 Brazilian Association of Sleep. Production and Hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Sleep-related disorders are common among the elderly. Studies in large populations of older adults have reported prevalence of sleep-related disturbances greater than 50% [1,2]. Obstructive sleep apnea (OSA) is a breathing disorder of sleep that has gained significant recognition in recent years due to its associated morbidity and mortality worldwide. Individuals suffering from obstructive sleep apnea have a higher prevalence of obesity, diabetes, hypertension, dyslipidemia, metabolic syndrome and other related chronic medical conditions [3–5]. There had been a dearth of data

from sub-Saharan Africa compared to the developed world in the OSA literature until recently [6]. There is now an increase in efforts in the direction of exploring factors that are related to the condition among various populations. The trend of recent research findings seems to suggest that OSA might be more frequent than had been previously reported in these populations [7–10]. This justifies the need for more research that will further elucidate factors that are interrelated with the disorder more importantly among different populations in developing countries.

The prevalence of OSA has been studied across diverse populations worldwide. In a review of the epidemiology of OSA, an overall prevalence of 3–7% was reported across various countries, with a higher prevalence among men (3–7%) compared with women (2–5%) [7]. It was reported that these cut across populations in both the developing and the developed world. Among the factors that have been shown to be significantly associated with an increased risk of obstructive sleep disorders across diverse populations is advancing age. Several studies have replicated the

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finding that the disease prevalence steadily increases with age and plateaus at about 60 years [7]. This portends the need to critically explore the prevalence of OSA and its associated factors in the older adult population. Epidemiological data on OSA in the elderly in sub-Saharan African populations are scarce. This study aimed at quantifying the risk of OSA in a primary care population of elderly Nigerians and to determine its correlates.

2. Methods

This cross-sectional study was carried out at the outpatient clinic of State Hospital, Ilesa between June and October 2014. Ilesa, with a population of 212,225 as at 2006 [11], is one of the largest cities in the state of Osun located in South-western Nigeria. The outpatient clinic of the State Hospital, Ilesa, is one of the two largest primary care clinics in the city of Ilesa serving the entire population of Ilesa and some of the adjoining towns and villages.

2.1. Study population

The sample consisted of 414 consecutive community-living elderly men and women, aged 65–100 years. They were consecutively recruited from individuals who had been receiving monthly financial support from the Government of the state of Osun, South-Western Nigeria under a scheme which provided a monthly stipend to support their wellbeing.

2.2. Selection criteria

Ambulant, community-living black men and women of Nigerian extract, aged ≥ 65 years who gave their informed consent were consecutively enrolled. Non-ambulant, institutionalized and individuals of non-Nigerian origin as well as those who were not willing to participate in the study, were excluded. The eligibility of the subjects was first assessed by one of the investigators, a family physician, before they were recruited.

2.3. Subject assessment

Informed consent was obtained from all the subjects participating in the study. The study questionnaires were then administered to them by the investigators and trained research assistants.

2.3.1. Demographic and clinical data

Sociodemographic data including age, sex, highest formal educational level attained and ethnic group; while disease-related variables including history of chronic medical conditions such as hypertension, diabetes, dyslipidemia, coronary artery disease, intermittent claudication and chronic kidney disease were obtained. Other variables obtained include smoking and alcohol history and history of coffee and kolanut consumption. Sitting blood pressure and anthropometric measures including weight and height were measured. Body Mass Index (BMI), a measure of body adiposity, was calculated using the formula weight (kg) divided by the square of height (m^2).

2.3.2. Evaluation of OSA risk

The risk of OSA was determined using the Berlin Questionnaire. The Berlin Questionnaire has three categories. Category 1 has five questions about snoring, Category 2 has three questions about daytime somnolence, and Category 3 has one question about the history of hypertension. In addition, the questionnaire also collects information about age, gender, height, and weight (to calculate the BMI). The overall score is based on the patient's response to each

of the three categories. The patients are classified as high risk for OSA if two or more categories are positive and low risk if less than two categories are positive. This tool has reasonable sensitivity (68.9%), specificity (56.4%), and positive predictive value (77.9%) [12]. It has been used previously among populations in Nigeria [5,13].

2.3.3. Assessment of excessive daytime sleepiness

The Epworth Sleepiness Scale (ESS) is an effective instrument used to measure average daytime sleepiness. The ESS differentiates between average sleepiness and excessive daytime sleepiness that requires intervention. The individual self-rates his/her likelihood of dozing in eight different situations. Scoring of the answers is 0–3, with 0 being “would never doze” and 3 being “high chance of dozing”. A sum of 11 or more from the eight individual scores reflects above normal daytime sleepiness and need for further evaluation [14]. The validity and reliability of ESS has been tested in different groups of individuals across the healthcare continuum [4]. It has also been used previously among populations in Nigeria [13,15].

2.3.4. Assessment of depressive symptoms

The 10-item version of the Center for Epidemiologic Studies Depression Scale (CESD-10) was used to evaluate the participants for depression symptoms. The CESD-10 is a short-form scale with 10 items that is designed to identify depressive symptoms in the general population and has been used extensively in general patient and older adult populations [16,17]. The CESD-10 has shown good predictive accuracy across different studies (kappa, 0.84–0.97) when compared with the full-length 20-item version of the CESD [17]. A 4-point Likert scale ranging from “rarely” (scored 0) to “all of the time” (scored 3), is used to score the responses giving a summed total of 0–30. Responses to at least 9 of the items were included in the analyses. Clinically relevant depressive symptoms were defined as CESD-10 score ≥ 10 .

2.4. Statistical analysis

Data analyses was done using the Statistical Package for the Social Sciences (SPSS), version 16 (SPSS Inc., Chicago, IL, U.S.A.) and presented as means \pm SD and frequencies and percentages. For variables with normal distribution comparison between groups was performed using independent *t*-test. Relationship between categorical variables was assessed using chi-square test. A logistic regression model was constructed using OSA risk status as the dependent variable and variables that were significantly related to OSA risk on bivariate analysis as covariates. A 5% significance level ($p < 0.05$) was considered significant.

2.5. Ethical clearance

Ethical clearance was obtained from the Ethics and Research Committee of the Hospitals Management Board of the State of Osun.

3. Results

3.1. Demographic and clinical profiles of the subjects

Out of the 414 subjects who participated in the study, 349 (84.3%) were women. The ages of the subjects ranged from 65 to 102 years with a mean of 73.1 ± 7.5 years. Majority of the subjects (240, 59.4%) had no form of formal education. All were from the Yoruba tribe and resided in Ilesa town. Habitual use of kolanut, alcohol and tobacco was reported by 76 (18.8%), 62 (15.3%) and 28

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