Journal of Sleep Disorders & Therapy
ISSN: 2167-0277

Shittu et al., J Sleep Disorders Ther 2014, 3:4
DOI: 10.4172/2167-0277.1000167

Research Article Open Access

Excessive Daytime Sleepiness in Patients with Depressive Symptoms in a Nigerian Family Practice Setting

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Abstract

Objectives: Clinically significant Excessive Daytime Sleepiness (EDS) is frequently encountered among patients with depressive symptoms, and a significant association was observed between depression, body mass index and EDS. Incidentally this sleep disorder is often overlooked. The aim of this study was to examine the association between excessive daytime sleepiness, depressive symptoms, body mass index and blood pressure in a Nigerian family practice setting.

Methods: This was a hospital based cross sectional study. Systematic sampling method was used in recruiting the patients. The PHQ-9 was administered to the respondents to screen for depressive symptoms. EDS was evaluated using the Epworth Sleepiness Scale (ESS). The international classification of BMI was used. Classification of hypertension was made according to (JNC 7).

Results: One hundred and seventy eight (44.5%) were found to have one form of depression or the other. There was female preponderance. Depression was prominent in the age group 51-60 years, more among the married than the single, as well as those with low socio economic status. There was strong statistical association between age, sex, marital status, level of education, occupation and monthly income (p-values 0.008, 0.000, 0.000, 0.003, 0.000 and 0.001 respectively). Forty five (25.3%) were hypertensive. Fifty nine (33.1%) scored 10 or more on the ESS which was clinically significant sleepiness. Forty seven (26.4%) were obese constituting (23.7%) of the poor sleepers. Ninety three (52.2%) were poor sleepers, sleeping less than the normal 7 hours.

Conclusion: In this study, significant EDS was found with patients with depressive disorders and higher body mass index. Therefore patients with a complaint of EDS should be thoroughly assessed for depression and obesity.

Keywords: Excessive daytime sleepiness; Depressive symptoms; Nigerian; Family practice setting

Introduction

The impact of sleep on psychomotor performance varies with the degree of sleepiness.

Mild sleepiness produces only minor disruptions of daily functions. Moderate sleepiness is associated with sleepy episodes occurring during activities. Severe sleepiness may impair function, causing a broad range of neuropsychological deficits like depression [1].

One major cause of sleepiness is insufficient sleep. Sleep deprivation and the resultant daytime sleepiness can result in depression, anger and confusion. Acute sleep deprivation also affects daytime alertness and mood [2].

Poor sleepers experience more problems with daytime functioning than good sleepers and highly depressed poor sleepers report greater impairment in function during the day. Examination of level of sleepiness among people with insomnia complaints and found that different levels of sleepiness were related to nocturnal sleep latencies.

Sleep debt secondary to sleep deprivation is one of the cardinal causes of EDS [3]. Other common causes include narcolepsy, idiopathic hypersomnia and obstructive sleep apnea and drugs that have sedative/hypnotic properties [4]. Medical aetiology of EDS includes head trauma, cerebrovascular disease and brain tumors [5]. EDS and depressive symptoms may also be familial or hereditary.

The symptoms of EDS range from drowsiness and reduced performance to episodes of involuntary sleep in spite of efforts to remain awake [6]. Individuals who have EDS also have increased risk of motor vehicle crashes, industrial disasters and occupational errors [7-10]. EDS occurs among depressed individuals and is a predictor of and a risk factor for depression [11-14].

EDS is one of the main symptoms of depressive disorder [13]. Epidemiological studies have indicated a strong association between EDS and depression [11-13]. This sleep disturbance and others play a significant role as predictors of depression. They are indeed important when screening for depression onset. EDS frequently leads depressed patients to seek medical assistance, yet it is commonly under evaluated [15]. Therefore, the understanding and proper management of this sleep disturbance is required for proper clinical evaluation and eventual management of the patients.

There is paucity of data on EDS among depressed patients in Nigeria in particular and West Africa in general. The aim of this study

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Received April 11, 2014; **Accepted** June 11, 2014; **Published** June 17, 2014

Citation: Shittu RO, Issa BA, Olanrewaju GT, Odeigah LO, Sule AG, et al. (2014) Excessive Daytime Sleepiness in Patients with Depressive Symptoms in a Nigerian Family Practice Setting. J Sleep Disorders Ther 3: 167 doi:10.4172/2167-0277.1000167

was therefore to evaluate EDS in outpatients with depressive symptoms and to study its relationship with Body Mass Index (BMI). This will also create the awareness that is required by physicians in the family practice setting show that number of people with EDS who are mismanaged will be reduced.

Methodology

This study was carried out at the Family Medicine Department of the Kwara State Specialist Hospital, Sobi, Ilorin, Nigeria, from 30th October to 30th November, 2013. The Patients Health Questionnaire (PHQ-9) [16] (Appendix A) which is a brief, 9 item, patients self-report depression assessment tool that was derived from the interview-based PRIME-MD [17] was used. It was specifically developed for use, in primary care general medical settings. Many depression screening and severity tools have been used in primary care, with good results. The PHQ-9, however, offers several advantages, because it is easily understood and it has very high face validity for patients and clinicians in primary care. Many other instruments use a 1-week time frame, but the PHQ-9 uses a 2 week time frame, which conforms to DSM-4 criteria. It is the only tool that was specifically developed for use as a patient self-administered depression diagnostic tool, rather than as a severity or screening tool. It is the only short self-report tool that can reasonably be used both for diagnosis of DSM-4 major depression as well as for tracking of severity of major depression over time [18]. Psychometric evaluation of the PHQ-9 revealed a sensitivity ranging from 62%-92% and a specificity between 74%-88% [16-18]. All subjects were screened for depression using PHQ-9. Scoring and level of depression was assessed viz: (1-4) Minimal depression, (5-9) Mild depression, (10-14) Moderate depression, (15-19) moderately severe depression, and (20-27) severe depression. Some direct depression care, such as care support, coordination, case management, and treatment was embarked on. Using the systematic random sampling, the PHQ-9 was administered to all the respondents, to screen for depression, until the estimated sample size of 178 was obtained. Respondents who scored one and more were assessed clinically for depression. The severity of the depression was further classified as minimal, mild, moderate and severe [15-17].

EDS was evaluated in the patients using the English Language version of the Epworth Sleepiness Scale (ESS) (Appendix B). This is a self-administered, eight-item, well-validated [18] and widely used subjective sleepiness scale. The patients were asked to score the likelihood of falling asleep in eight different situations. Scores on the ESS range from 0 to 24, with higher scores indicating greater likelihood of sleepiness. This questionnaire measures the propensity of patients to sleep or doze during active and passive situations commonly encountered during the wake period. The metrics of the ESS ranges from 0 to 24. ESS scores <10 were considered as indicative of less severe sleepiness and scores > 10 were deemed clinically significant sleepiness [19].

Height and weight were measured according to standardized procedures. Body Mass Index (BMI) was calculated as weight in Kg divided by height in m^2 (kg/m^2). The international classification of BMI was used. The principal cut-off points were as follows: moderate thinness (16.00-16.99), mild thinness (17.00-18.49), normal (18.50-24.99), pre-obese (25.00-29.99), obese class I (30.00-34.99), obese class II (35.00-39.99), obese class III (>40.00) [20].

An Accosson Mercury sphygmomanometer was used to measure the resting blood pressure of the subjects. Blood pressure was measured 3 times in the sitting position by trained and certified technicians using a standard mercury sphygmomanometer. The onsets of the first-phase (systolic) and fifth-phase (diastolic) Korotkoff sounds were recorded. The mean of the second and third measurements were used in the analyses. Classification of hypertension was made according to the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of high blood pressure (JNC 7). The following classification of blood pressure for adults aged ≥18 years was used.

Normal	Systolic: <120 mm Hg	Diastolic: <80 mm Hg
Pre-hypertension	Systolic: 120-139 mm Hg	Diastolic: 80-89 mm Hg
Stage 1 hypertension	140-159 mm Hg	Diastolic: 90-99 mm Hg
Stage 2 hypertension	≥ 160 mm Hg	Diastolic: ≥ 100 mm Hg

Completed questionnaire and measurements were entered into a computer data base. The data were analyzed using the epidemiological information (Epi-info) 2005 software package of Center for Disease Control and Prevention (CDC). The 2 by 2 contingency tables were used to carry out Chi-square test and to find out the level of significance and values less than 0.05 were regarded as statistically significant.

Results

Table 1 shows the association between socio-demographic variables and depression. Majority were females, depression was prominent in the age group 51-60 years, more among the married than the single as well as those with low socio economic status. There was strong statistical association between age, sex, marital status, level of education and occupation, (p-values 0.008, 0.000, 0.000, 0.003, and 0.000 respectively).

Table 2 displays the Epworth Sleeping Scale used to determine the level of Daytime Sleepiness and Depression. Fifty nine (33.1%) scored 10 and more which was considered clinically significant sleepiness.

Table 3 shows the association between Excessive Daytime Sleepiness and Duration of Sleep. Ninety three (52.2%) were poor sleepers with less than the normal 7 hours of sleep.

Table 4 displays the association between Excessive Daytime Sleepiness and Body Mass Index (BMI). Forty seven (26.4%) were obese. While 14 (23.7%) were poor sleepers.

Table 5 shows the association between Excessive Daytime Sleepiness and Blood Pressure. Forty five (25.3%) were hypertensive, out of which 16 (5.5%) were poor sleepers.

Discussion

Most of the patients were low-income middle-aged women. These results compare favorably with a previous work carried out in a major public hospital [21]. Women were reported to have depressive symptoms more frequently than men [22], as well as elderly and middle-aged adults in relation to youngsters [23]. This result differs considerably from the study of Eldevik where it was reported that men were affected to a greater extent than women [24].

The results showed that almost half of the patients with depressive symptoms in this study experienced clinically significant EDS. These findings are consistent with previous reports of a strong association between daytime sleepiness and depression [11,25].

Many of the patients (33.1%) had EDS defined as ESS score of ≥ 10. This was comparable to the work of Chellappa and colleagues [26] who reported 42.8% and to the (44.8%) reported by Mume et al. [27] but lower than 57.2% reported by Chellappa [26]. This result was higher

Variables	DEPRESSION				Total	P-value
	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression		
Age						
21-30	15	6	2	1	**24**	**0.008**
31-40	13	8	0	2	**23**	
41-50	36	11	0	0	**47**	
51-60	31	20	0	0	**51**	
≥ 61	24	9	0	0	**33**	
Total	**119**	**54**	**2**	**3**	**178**	
Sex						
Male	33	3	0	3	**39**	0.000
Female	86	51	2	0	**139**	
Total	**119**	**54**	**2**	**3**	**178**	
Ethnicity						
Hausa	116	51	2	3	**172**	**0.567**
Yoruba	3	1	0	0	**4**	
Igbo	0	2	0	0	**2**	
Others	0	2	0	0	**2**	
Total	**119**	**54**	**2**	**3**	**178**	
Religion						
Christianity	21	6	0	0	**27**	**0.541**
Islam	98	48	2	3	**151**	
Total	**119**	**54**	**2**	**3**	**178**	
Marital Status						
Married	73	27	2	0	**102**	**0.000**
Single	7	2	0	3	**12**	
Divorced	5	1	0	0	**6**	
Separated	6	6	0	0	**12**	
Widow	28	18	0	0	**46**	
Total	**119**	**54**	**2**	**3**	**178**	
Level of Education						
Non-formal	71	37	0	0	**108**	**0.003**
Primary	16	6	0	0	**22**	
Secondary	16	7	0	2	**25**	
Tertiary	16	4	2	1	**23**	
Total	**119**	**54**	**2**	**3**	**178**	
Occupation						
Trader	38	18	0	0	**56**	**0.000**
Civil servant	19	4	2	2	**27**	
Self employed	45	28	0	0	**73**	
Unemployed	15	4	0	0	**19**	
Student	2	0	0	1	**3**	
Total	**119**	**54**	**2**	**3**	**178**	

Table 1: Association between Socio-Demographic Variables and Depression.

EDS	Level of Depression				Total	p-value
	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression		
≤ 10	88	29	2	0	**119**	**0.003**
≥ 10	31	25	0	3	**59**	
Total	**119**	**54**	**2**	**3**	**178**	

Table 2: Association between Excessive Daytime Sleepiness and Depression.

than that obtained from analysis of the Geolong Osteoporosis Study, where 13% of the 844 women surveyed were found to have EDS, as measured by the Epworth Sleepiness Scale. Some other studies also found a significant association between EDS and depression [11]. Hayley et al. [28] reported that EDS patients had an increased likelihood of experiencing current and/or a lifetime history of depressive disorders compared to those without EDS. Overall, sleepiness may be attributed to depressive disorder [29].

There is thus ample evidence that EDS is a red flag of depression. EDS and depression have some genes in common and may be familial [5]. EDS has also been found to be strongly associated with suicidal ideation in depressed patients [30]. It is therefore clear that for complete clinical evaluation of depressive symptoms, evaluation of EDS is paramount. The clinician must therefore have a high index of suspicion of depressive disorder in patients who present with features of EDS. Incidentally, there are no facilities for objective and subjective evaluation of sleep complaints in Nigeria, making it difficult to make a cast iron diagnosis. It is therefore imperative for the authorities to

EDS	DURATION OF SLEEP				Total	p-value
	≥ 7	6.1-7hours	5-6hours	<5hours		
≤ 10	65	13	26	16	**119**	**0.023**
≥ 10	20	5	25	9	**59**	
Total	**85**	**17**	**51**	**25**	**178**	

Table 3: Association between Excessive Daytime Sleepiness and Duration of Sleep.

EDS	Body Mass Index		Total	p-value
	≤ 10	≥ 10		
Moderate thinness	0	3	**3**	**0.029**
Mild thinness	4	3	**7**	
Normal	46	21	**67**	
Pre-Obese	36	18	**54**	
Obese Class 1	23	4	**27**	
Obese Class 2	7	5	**12**	
Obese Class 3	3	5	**8**	
Total	**119**	**59**	**178**	

Table 4: Association between Excessive Daytime Sleepiness and Body Mass Index (Bmi).

EDS	BLOOD PRESSURE				Total	p-value
	Normal	Pre-HTN	Stage 1	Stage 2		
≤ 10	66	24	14	15	**119**	**0.776**
≥ 10	28	15	8	8	**59**	
Total	**94**	**39**	**22**	**23**	**178**	

Table 5: Association between Excessive Daytime Sleepiness and Blood Pressure.

provide enough facilities and personnel in the field of sleep medicine to assist in this regard. Clinicians should be aware of the magnitude of the problem of EDS, especially among depressed patients, and should adopt holistic approach to assist them.

The current study demonstrated a significant association between EDS and Body Mass Index. Previous researches have established that EDS in non-pathological populations is not necessarily attributable to BMI and/or obesity [31]. Hayley et al. [28] reported that EDS and depression were independent of BMI. Thus, despite the established link between EDS and depression [32] and BMI and depression, future research assessing the prevalence of EDS while controlling for BMI to assess the mechanisms of this relationship will deepen and broaden our knowledge in this field. It has further been suggested that EDS may be related to the weight gain which is from the use of both antidepressant medication and neuroleptic medications, or a combination of these [33]. There is new evidence that a preceding maladaptive lifestyle and health factors often associated with the development of depression, such as obesity [34] contribute to maintain negative lifestyle and health outcomes which are recognized to share pathology with EDS, such as sleep disturbances.

Forty five (25.3%) were hypertensive, out of which 16 (5.5%) were poor sleepers. No significant association was found between EDS and blood pressure, contrary to Cui et al. [35] where the prevalence of self-reported EDS and mean values of systolic and diastolic blood pressure levels were significant.

Conclusion

In the present study, clinically significant EDS was frequently encountered among patients with depressive symptoms, and a significant association was observed between depression and EDS. Thus, careful investigation of daytime sleepiness in depressed patients is advised during clinical evaluation.

Incidentally, there are no facilities in Nigeria for proper evaluation of sleep complaints. Concerted effort should be made by appropriate authorities to establish facilities for dealing with sleep complaints. Besides, enough personnel in the field of sleep medicine in the country should be encouraged. It is expected that with adequate and proper facilities in place, the number of personnel in this field will gradually increase. In the meantime, clinicians should be aware of the magnitude of the problem of EDS, particularly, among depressed patients and be proactive in its management so as to reduce the burden of depressive disorder in the developing countries.

Declaration of Interest

No conflict of interest.

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