

ORIGINAL ARTICLE



Prevalence of sleepwalking in an adult population

Celestine Okorome Mume*

Department of Mental Health, Faculty of Clinical Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria

Background: Sleepwalking consists of a series of behavioral activities that occur during sleep. These activities may be simple, complex or aggressive in nature. They include motor activities, confusion, and amnesia for the events. Sleepwalking is a disorder of arousal from non-rapid eye movement (NREM) sleep. In children, episodes of sleepwalking are rarely violent; in adults, however, sleepwalking might include violence, which could endanger the patient or others and might precipitate legal issues. There is inadequate information on the prevalence and demographic correlates of sleepwalking in Nigeria.

Objectives: One objective of this study was to determine the lifetime prevalence rate of sleepwalking in an adult population in Ile-Ife, in Southwestern Nigeria. Another objective was to determine the age and sex distribution of sleepwalking among those who have experienced it at least once in their lifetime.

Materials and Methods: A random sample of 228 healthy individuals aged 18–60 years was obtained and the members were asked to fill out a survey form about lifetime prevalence rate of sleepwalking.

Results: The overall lifetime prevalence rate of sleepwalking was 7% (16 of 228 participants). It was 10.4% in males and 3.5% in females, but the difference was not statistically significant ($p=0.07$).

Conclusion: This study has shown that sleepwalking is common in the population. In view of the psychological effects of sleepwalking and the potential physical and legal problems associated with it, adequate efforts should be made for early detection and prompt management of the condition.

Keywords: *sleepwalking; somnambulism; sleep disorder; parasomnia*

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Sleepwalking (somnambulism) is one of the sleep disorders known as the parasomnias, which are not disorders of the processes responsible for sleep but undesirable phenomena that occur predominantly during sleep. Sleepwalking consists of a series of complex behaviours that are initiated during slow-wave sleep and result in walking during sleep (1). It appears in the context of a non-rapid eye movement (NREM) sleep. Sleepwalking is called a “disorder of arousal” because it most often occurs following sudden arousal from deep sleep.

Episodes of sleepwalking vary in complexity and can range from simple activities such as sitting up in bed to walking and even to violent acts. The patient may be difficult to awaken and when awakened, is usually confused. The patient usually does not remember the events. Sleepwalking occurs during slow-wave sleep and so is most often evident during the first third of the night or during other times of increased slow-wave activity, such as after sleep deprivation (1, 2). Homicide or suicide during a sleepwalking episode has been reported (3). The

person attempting to awaken the patient may be physically attacked (1).

Sleepwalking and night terrors are considered manifestations of the same nosologic continuum. Both are thought to be due to sudden arousal from non-REM sleep (4). Prevalence rates of these conditions are based on self-reported data and, consequently, are likely to be underestimated (5).

The causes of sleepwalking are incompletely understood. Genetic factors are said to be important in the aetiology of the disorder because the prevalence of sleepwalking in first-degree relatives of an affected individual is at least tenfold greater than in the general population (2). Family history is very important, because the prevalence in children increases to 45% if one of the parents is affected and to 60% if both parents are affected. Twin studies too provided support for a possible genetic origin of sleepwalking: the concordance rate in monozygotic twins is 55% compared with 35% in dizygotic twins (2).

Sleepwalking also occurs in Parkinson's disease (6), hyperthyroidism (7), migraine (8) and following the use of

quetiapine (9) or olanzapine (10). Diagnosing sleepwalking with objective instruments is difficult because episodes rarely occur in the laboratory. However, evidence suggests that sleepwalkers experience a substantial increase in the mean frequency of somnambulistic episodes following sleep deprivation (11). Certain studies suggested an association between adult sleepwalking and mental disorders, as well as between adult sleepwalking and psychotropic medications (12, 13).

The management of sleepwalking relies on safety precautions and drugs (14). Safety measures include ensuring that the patient lives on the ground floor of a house, dangerous materials are removed from the room, and glass windows are covered with thick drapes. Effective drugs include diazepam and other benzodiazepines, as well as the tricyclic antidepressants.

Although the prevalence of sleepwalking has been documented in certain parts of the world, there is not enough information on its prevalence and demographic correlates in Nigeria. This study was aimed at determining the lifetime prevalence and demographic correlates of sleepwalking in Ile-Ife, Nigeria.

Materials and Methods

The study was carried out in the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, in Southwestern Nigeria. The study was approved by the Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospitals Complex. All participants gave written informed consent.

Ile-Ife is a rapidly growing city in which a federal university (Obafemi Awolowo University) and a teaching hospital (Obafemi Awolowo University Teaching Hospitals Complex; OAUTHC) are located. Thus, though the city is in the Yoruba-speaking part of Nigeria, it is home to people from different ethnic groups, many of whom were attracted by the educational, medical, commercial, farming and other activities.

The city of Ile-Ife is composed of two local government areas (LGA), each with ten smaller districts referred to as 'wards'. In each street or road within a district, one person was approached in every third building (house, shop or office). Some people refused to participate and some were excluded because they did not understand the questionnaire. Those under the age of 18 years or above the age of 60 years were also excluded. Some others were excluded because of ill health. People who had a history of seizure, loss of consciousness or stroke were excluded from the study. Twelve (and in some cases 13) participants were recruited from each district, giving a total of 250 people. All gave their consent.

Five assistants distributed the questionnaire, while the author coordinated and oversaw the whole exercise. Each of the assistants worked in two districts within each local government area. Copies of the questionnaires were

distributed in the first local government area on Saturday, 16th August 2008, and in the second area on Saturday, 23rd August 2008. Weekends were chosen for the distribution of the questionnaire because they were considered the most convenient periods for the respondents. The questionnaires were distributed between 08:00 and 16:00 hours, and the participants were allowed 24 hours to consult their spouses, bed partners and relatives, after which the completed forms were collected.

All participants were resident in Ile-Ife. They were of different ethnic groups and social classes and all were literate enough in English to be able to understand the description of sleepwalking. Due to the complex nature of the description of sleepwalking, the questionnaire was not translated into local languages.

The questionnaire elicited information on age, sex, marital status, level of education and the lifetime prevalence rate of sleepwalking. They were required to indicate whether they had ever experienced sleepwalking in their lifetime. Since people generally do not recall sleepwalking episodes, participants were urged to verify from their spouses or bed partners and other close family members with whom they may have lived. The questionnaire is reproduced in Annex 1.

The data were analysed statistically to obtain the socio-demographic characteristics of the subjects. The number and percentage of those who experienced sleepwalking were calculated. Significance of differences were evaluated with Chi-square test, specifying $p < 0.05$ as significant.

Results

Of the 250 participants, 18 did not return the questionnaire and four were not sure if they had experienced sleepwalking, which left 228 participants: 115 males and 113 females, overall ranging in age from 18 to 60 years with a mean of 46.3 years and standard deviation of 11.6 years. The information on marital status and educational level are shown in Table 1.

Sixteen of the 228 participants (7.0%) reported having experienced sleepwalking. Twelve of the 115 males (10.4%) and four of the 113 females (3.5%) reported sleepwalking, but the difference was not statistically

Table 1. Socio-demographic characteristics of the participants.

	Number
Single	83
Married	143
Separated	2
Primary school	12
Secondary school	71
Post-secondary	145

significant ($X^2 = 3.163$, $df = 1$, $p = 0.07$). Twelve of the 16 individuals who had experienced sleepwalking (75%) were within the age range of 18–30 years. Five of the 16 (31.25%) were single while 11 (68.75%) were married ($X^2 = 0.041$, $df = 1$, $p = 0.84$). Two of them (12.5%) had primary education, six (37.5%) had secondary education and eight (50%) had post secondary education ($X^2 = 2.436$, $df = 2$, $p = 0.296$).

Discussion

The results show that sleepwalking is much commoner than was once thought, with 7% of the participants reporting having experienced sleepwalking. Previous studies have reported much lower prevalence rates ranging from 2% to 3.9% (6, 15, 16). However, the observations are consistent with the 1–15% range given by the American Academy of Sleep Medicine (1). The preponderance of males in this study (75%) is consistent with previous findings (17–20).

The importance of sleepwalking in clinical practice cannot be overemphasised. During sleepwalking, the individual is in a state of partial arousal from early non-REM sleep, during which some areas of the brain appear to be functioning as in a waking state while other areas appear to remain in a state of sleep. During an episode of sleepwalking, the individual is at risk of sustaining physical injuries. The fact that the individual does not retain the memory of the event makes the experience psychologically very disturbing. This makes sleepwalking not just a sleep disorder but also a psychological challenge.

Cases of violence carried out during sleepwalking have been reported in the forensic literature (3, 21, 22). During the trial of such cases, the idea that it is possible to engage in dangerous behaviour while sleepwalking may be met with a great deal of scepticism.

Sleepwalking can have grave physical, psychological and forensic consequences. Clinicians evaluating cases of seizure disorders should be encouraged to include questions concerning behavioural arousal from the first hours of sleep without awareness or recall of the events. There should be a standard procedure to exclude the differential diagnoses of sleepwalking, such as complex partial seizures, toxic encephalopathy and other causes of delirium, and also from REM sleep behaviour disorder (RBD) (1). REM sleep behaviour disorder is a dream-enacting disorder with complex and aggressive behaviour emerging during REM sleep with loss of the usual muscle paralysis of REM sleep. Because sleepwalking has also been reported in Parkinson's disease (6), hyperthyroidism (7) and migraine (8), patients suffering from these conditions should be properly evaluated for possible occurrence of sleepwalking. These measures will facilitate early detection and prompt management of sleepwalking.

An obvious limitation of this study is the rather small sample size. Another limitation is that the questionnaire was not translated into local languages; thus only those who were literate in English took part. However, the idea was to ensure that the participants understand the instructions, and at present there are no validated translations of the complex descriptions of sleepwalking in the local languages.

In conclusion, this study provides preliminary data on sleepwalking in the studied population. The high prevalence of sleepwalking and its male preponderance are noteworthy. Further studies on a much larger scale are needed to provide more information. Such studies should be extended to identify the physical, psychological and legal consequences of sleepwalking.

References

1. American Academy of Sleep Medicine. International Classification of Sleep Disorders, Revised: Diagnostic and Coding Manual. Westchester, IL: American Academy of Sleep Medicine; 2001.
2. Lavie P, Pillar G, Malhotra A. Sleep Disorders. London, UK: Martin Dunitz Ltd; 2002, pp. 145–65.
3. Cartwright R. Sleepwalking Violence: A Sleep Disorder, a Legal Dilemma, and a Psychological Challenge. *Am J Psychiatry* 2004; 161: 1149–58.
4. Szelenberger W, Niemcewicz S, Dabrowska AJ. Sleepwalking and night terrors: Psychopathological and psychophysiological correlates. *Int Rev Psychiatry* 2005; 17: 263–70.
5. Ohayon MM, Guilleminault C, Priest RG. Night terrors, sleepwalking, and confusional arousals in the general population: Their frequency and relationship to other sleep and mental disorders. *Journal of Clinical Psychiatry* 1999; 60: 268–76.
6. Poryazova R, Waldvogel D, Bassetti CL. Sleepwalking in patients with Parkinson disease. *Arch Neurol*. 2007; 64: 1524–7.
7. Ailouni KM, Ahmad AT, El-Zaheri MM, et al. Sleepwalking associated with hyperthyroidism. *Endocr Pract*. 2005; 11: 5–10.
8. Casez O, Dananchet Y, Besson G. Migraine and somnambulism. *Neurology* 2005; 65: 1334–5.
9. Hafeez ZH, Kalinowski CM. Two cases of somnambulism induced by quetiapine. *Prim Care Companion J Clin Psychiatry* 2007; 9: 313.
10. Chiu YH, Chen CH, Shen WW. Somnambulism secondary to olanzapine treatment in one patient with bipolar disorder. *Prog Neuropsychopharmacol Biol Psychiatry* 2008; 32: 581–2.
11. Zadra A, Pilon M, Montplaisir J. Polysomnographic diagnosis of sleepwalking: effects of sleep deprivation. *Ann Neurol*. 2008; 63: 513–9.
12. Lam SP, Fong SYY, Ho CKW, et al. Parasomnia among psychiatric out-patients: A clinical epidemiology study. *J Clin Psychiatry* 2008; 69: 1374–82.
13. Lam SP, Fong SYY, Yu MWM, et al. Sleepwalking in psychiatric patients: a comparison of childhood and adult onset. *Australian and New Zealand Journal of Psychiatry* 2009; 43: 428–32.
14. Keefe SP, Guilleminault C. Sleep Terrors and Sleepwalking. In: Kryger M, Roth T, Dement W, editors. *Principles And Practice Of Sleep Medicine*. Philadelphia: W.B. Saunders; 1994, pp. 567–73.

