



Original Article

Psychopathologic correlates of adult sleepwalking

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ABSTRACT

Objectives: Sleepwalking (SW) often has been associated with psychopathology, but the nature and magnitude of this relation remains unclear. The aim of our study was to investigate the presence of psychopathology in a large cohort of sleepwalkers and to determine if levels of psychopathology showed differential relations to specific characteristics of the disorder, including clinical history.

Methods: One-hundred and five sleepwalkers (39 men, 66 women; mean age, 32.4 ± 9.5 years) referred to our sleep disorders clinic for chronic SW underwent a comprehensive clinical investigation that included an overnight polysomnography (PSG) assessment in 90% of cases. All participants also completed a series of questionnaires, including the Beck Depression Inventory, Second Revision (BDI-II), the Beck Anxiety Inventory (BAI), and the Symptom Checklist 90-Revised (SCL-90-R).

Results: The proportion of sleepwalkers who scored above the minimal clinical threshold on the BDI-II, BAI, and SCL-90-R was 27%, 40%, and 28%, respectively. Only 15% of sleepwalkers showed moderate to severe symptoms on the BDI-II and 19% on the BAI. Taken as a whole, these profiles are similar to those observed in the general adult population. The presence of psychopathology in sleepwalkers was associated with a negative family history for SW, a higher frequency of nightmares, and with potentially injurious behaviors enacted during somnambulistic episodes.

Conclusions: A majority of adult sleepwalkers consulting for the disorder do not report clinically significant levels of depression or anxiety. Overall, sleepwalkers with and without psychopathology appear more similar than dissimilar.

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1. Introduction

Sleepwalking (SW), also known as somnambulism, is a nonrapid eye movement (NREM) sleep parasomnia involving behaviors of varying complexity usually initiated during arousals from slow-wave sleep (SWS) (deep sleep). Symptoms and manifestations of SW can be considered along a spectrum, but most episodes are typically characterized by misperception and relative unresponsiveness to external stimuli, mental confusion, perceived threat or agitation, and variable retrograde amnesia [1–3].

SW is common in childhood [4], but its prevalence decreases during adolescence [5,6] and reaches 2–4% in adulthood [4,7]. However, lifetime prevalence may be considerably higher (8.5%) in adult psychiatric populations [8]. Whereas the occurrence of SW in children is frequently viewed as a relatively benign event that will spontaneously resolve, the disorder often poses greater

problems in adults including social embarrassment and sleep-related injuries [9–14]. A strong genetic component for somnambulism has been documented in both children and adults [4,13,15,16], but the functional significance of these findings is not yet understood.

It is unclear as to why SW persists into adulthood in some adults but not others, and also why it may even develop de novo in adults. Although the pathophysiology of the disorder has been primarily explored through the study of various sleep parameters (for a review, see Ref. [17]), some research has focused on the psychopathologic profiles of sleepwalkers. Sleep laboratory investigations indicate that the overall sleep architecture and normal cycling of sleepwalkers across sleep stages is preserved. However, numerous studies converge in showing intrinsic abnormalities in the NREM sleep of sleepwalkers, indicative of an inability to sustain stable consolidated deep sleep [3,18–20]. By contrast, early psychoanalytically oriented authors viewed SW as a form of psychogenic dissociation resulting from unresolved mental conflicts [21,22], which could lead to the enactment of dream content including trauma-related dreaming [21,23,24]. The landmark work by Broughton [25] in 1968, which showed that SW was an NREM

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sleep parasomnia, attenuated the trauma and dream-enactment hypothesis but the idea that SW was nevertheless associated with psychopathology persisted. Consistent with this view, several subsequent studies reported the presence of severe and pervasive psychiatric disorders in adults presenting with SW or with a mixture of SW and sleep terrors (ST) [13,26,27].

Self-report epidemiologic investigations indicate that approximately 25% of adult sleepwalkers report a concurrent anxiety or mood disorder [7] and that SW is more frequent among individuals who consume psychotropic medications [28]. However, other studies indicate that a majority of adult sleepwalkers neither show elevated scores on questionnaire measures of psychopathology [29], nor meet criteria for psychiatric or personality disorders based on the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* [11,30]. Moreover, the successful treatment of patients' active psychiatric disorders usually do not impact SW frequency [11].

The methodology and main findings of studies that investigated the psychopathology in adult sleepwalkers are summarized in Table 1. As shown in Table 1, higher prevalence rates of psychopathology typically are reported in older studies of sleepwalkers than in more recent investigations. Several factors may account for this disparity. First, several early investigations [24,31,32] were conducted on military personnel, in whom SW could result in discharge and in whom sleep disorders may have developed in relation to trauma or combat-related experiences. Second, some early studies [13,33] relied on sleepwalkers recruited through media advertisements. In addition to diagnostic uncertainties, these individuals may differ from patients choosing to consult a health professional or those referred for clinical assessment by their treating physician. Third, studies reporting elevated levels of psychopathology typically relied on poorly defined criteria that focused more on clinical impressions, ill-defined personality dynamics, or vague character disorders [13,24,26]. Finally, few of the earlier studies included overnight polysomnography (PSG), which is essential to rule out the presence of other disorders with similar clinical presentations, including dissociative disorders, frontal lobe epilepsy, rapid eye movement sleep behavior disorder, and nocturnal panic attacks [17,34].

The main goal of our study was to help clarify the relationship between psychopathology and SW by focusing on the prevalence of depressive and anxious symptoms in a large cohort of carefully assessed sleepwalkers meeting the diagnostic criteria established by the *American Academy of Sleep Medicine International Classification of Sleep Disorders, Second Edition (ICSD-II)* [35]. We predicted that only a minority of sleepwalkers would show markedly elevated psychopathology. In addition, we investigated if sleepwalkers' levels of psychopathology showed differential relations to their clinical history, associated conditions, episode frequency and content.

2. Methods

2.1. Participants

Participants were obtained from a cohort of 162 patients (68 men, 94 women; mean age, 34.2 years [standard deviation, 12.0 years]) consecutively referred to the Sleep Disorders Clinic of the Hôpital du Sacré-Coeur by their treating physician between 2003 and 2012 for suspected SW. All patients underwent a comprehensive semistructured clinical interview and physical examination to determine specific sleep complaints and other psychiatric or physical symptoms. As part of our clinical investigation, over 90% of patients were prospectively evaluated with (1) at least one full night of continuous PSG in the sleep laboratory to screen for other sleep disorders; and (2) a 25-h sleep-deprivation

protocol, as this investigative tool has been shown to significantly increase actual behavioral episodes recorded in the laboratory during recovery sleep [3]. All patients were continuously videotaped during both sleep periods.

Subsequent to this clinical assessment, 28 patients were excluded from the study as they did not meet ICSD-II criteria for SW. These patients presented with atypical symptoms, other primary sleep disorders, or a questionable neurologic history. Twenty of these 28 patients (71%) showed evidence of significant psychopathology. Of the remaining 134 patients, 25 were excluded for not completing key questionnaires; three patients because they were younger than the age of 16 years; and one patient because he was undergoing legal procedures relative to his somnambulism. Thus our final sample was comprised of 105 participants including 39 men and 66 women. The clinical characteristics of the participants are presented in Table 2.

As shown in Table 2, seventeen of the 105 participants (16%) had an active psychiatric disorder already noted in their medical file at the time of their consultation. Ten participants had unipolar depression, four participants had anxiety disorders, two participants had schizoaffective disorder, and one participant had substance dependence; however, this clinical information must be interpreted with caution, as a psychiatric assessment was not systematically conducted for every patient prior to their referral to our sleep clinic and diagnostic criteria not always specified. Among the 17 patients with a psychiatric history noted in their file, two had adult-onset SW and only four reported a family history of SW.

Our study was conducted as part of a larger research project on the assessment and physiopathology of SW, which was approved by the hospital's ethics and scientific committee. Written informed consent was obtained from each participant.

2.2. Procedure

After their initial clinical interview, participants underwent two PSG assessments in the sleep laboratory. The first PSG was a whole-night sleep recording. Lights-off time was set between 10:00 pm and no later than 12:00 am, depending on each participant's habitual sleep schedule; wake time was between 6:00 and 8:00 am. Participants returned to the sleep laboratory in the evening for the sleep deprivation protocol and spent the remainder of the night under constant supervision. Recovery sleep was scheduled the next morning, 1 h after their previous wake time and after a total of 25 h of wakefulness (for details on the use of sleep deprivation in the assessment of SW, see Ref. [3]). Participants were instructed to refrain from taking naps and from consuming alcohol, caffeine, or other stimulating substances 1 day prior their visit and during all laboratory procedures. During their stay at the sleep laboratory, all participants completed several questionnaires assessing sleep habits, psychopathology, and various aspects of their somnambulism.

2.3. Materials

2.3.1. PSG recordings

PSG recordings were conducted on a 32-channel Grass polygraph (sensitivity at 7_V, bandpass at 0.3–100 Hz; Grass Instruments, Quincy, MA) and digitized at a sampling rate of 256 Hz. Electroencephalogram recordings and electrode placement were performed according the international 10–20 system with a linked-ear reference and included electrooculograms, submental electromyography, surface electromyography of the bilateral anterior tibialis, and an electrocardiogram. Respiration was monitored using an oronasal cannula and a thoracoabdominal plethysmograph, whereas oxygen saturation was recorded with a finger pulse oximeter. Twenty-second epochs of PSG were used to score sleep stages according to standard criteria.

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