



Triggers and Diagnosis of Parasomnias in Children –A Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The occurrence of parasomnias, which are most common during childhood, is one probable early sign of psychosis vulnerability. 6–8 Frequent nightmares have long been thought to play a role in the development of psychosis. In the outpatient clinics, sleep problems are one of the most common presentations. In fact, maladaptive sleep patterns are linked to up to 50% of major

complaints in primary care settings. The etiology of parasomnias is unknown because no obvious cause has been identified; nonetheless, a variety of explanations have developed. The majority of childhood parasomnias (confessional arousals, sleepwalking, sleep terror, and nightmares) are harmless, and most children outgrow them. As a result, reassuring and educating the parents can be beneficial in those situations without the need for medical assistance. With that being said there's also several medical approaches that address such a disease. In this article we will be looking at the disease epidemiology, etiology, diagnosis and treatment.

Keywords: Epidemiology; etiology; diagnosis and treatment; parasomnias; children.

1. INTRODUCTION

The term "parasomnias" refers to a wide range of sleep-related behavioural issues. Both the person suffering from parasomnias and their bed partner may be distressed by the symptoms of these disorders. This activity demonstrates how parasomnias are diagnosed and managed, as well as the involvement of the healthcare team in diagnosing and treating individuals with this disease [1].

The brain alternates between wakefulness, nonrapid eye movement (NREM) sleep, and rapid eye movement (REM) sleep during sleep. Nonrapid eye movement sleep is divided into four stages: stage I, which is a transitional stage between wake and sleep; stage II, which comprises the majority of the sleep period; and stages III and IV, which occur in the first half of the night and require a more powerful stimulus to awaken the sleeper. When transitions between these stages are muddled (most typically between stages III/IV and the awake state), parasomnias develop, resulting in behaviours that lack the entire awareness and mentation associated with wakefulness [2].

The nosology of 'parasomnias' refers to disruptions in the sleep cycle, whether they occur during continuous sleep or during the transition from sleep to alertness. Henri Roger was the first to coin the term "parasomnias" in 1932. The prefix para (Greek) - 'alongside' - and the noun Somnus (Latin) - 'sleep' make up the derivation. Parasomnias are sleep disorders marked by abnormal behavioural, phenomenological, or physiological phenomena. 'REM sleep behaviour disorder,' 'NREM sleep arousal disorders,' and 'nightmare disorder' are the most common deviant sleep arousal patterns, and they are the ones of importance for this academic endeavour [1].

The occurrence of parasomnias, which are most common during childhood, is one probable early sign of psychosis vulnerability. 6–8 Frequent

nightmares have long been thought to play a role in the development of psychosis, owing to the parallels between dream states and daylight hallucinations. Adults have been linked to psychotic experiences and magical thinking when they have dreams [3,4-18].

2. METHODS AND MATERIALS

PubMed, Web of science, Google scholar and EBSCO Information Services will be chosen as the search databases for the publications used within the study, as they are high-quality sources. PubMed being one of the largest digital libraries on the internet developed by the National Center for Biotechnology Information (NCBI) which is a part of the United States National Library of Medicine. Topics concerning triggers and diagnosis of parasomnias in children, and other articles will be used in the making of the article. Restriction to the last 20 years and English language due to unavailable resources for translation will be used. The founded articles will be screened by titles, and reviewing the abstracts. Inclusion criteria: the articles will be selected based on the relevance to the project which should include one of the following topics; 'triggers, Parasomnias, Children, psychology'. Exclusion criteria: all other articles which did not have one of these topics as their primary end, or repeated studies, and reviews studies will be excluded.

2.1 Statistical Analysis

No software will be utilized to analyze the data. Data will be reviewed by the group members to determine the initial findings, and the modalities of screening. Double revision of each member's outcomes will be applied to ensure the validity and minimize the mistakes.

2.2 Epidemiology

In the outpatient clinics, sleep problems are one of the most common presentations. In fact, maladaptive sleep patterns are linked to up to

50% of major complaints in primary care settings. Rapid eye movement (REM) and non-REM sleep architecture make up normal sleep architecture (NREM). NREM can be broken down into four stages: stage 0, stage 1, stage 2, and stage 3. In a cycle that lasts around 120 minutes, NREM and REM alternate. The first 5-10 minutes of REM sleep are followed by increasingly longer and more frequent periods [1].

Sleepwalking, sleep terrors, and confusional arousals have all been observed to be gender-neutral. Nightmares, on the other hand, are said to be more common in women. Males are more likely to experience sexsomnia. Similarly, male patients over the age of 50 are more likely to have REM behaviour disorders (RBD). RBDs are also associated to alpha-synucleinopathies (Parkinson's disease, Lewy body dementia, and multiple system atrophy), which are neurodegenerative illnesses. Furthermore, mental diseases have a much higher prevalence rate of parasomnia, with nightmares accounting for 38.9%, sleep paralysis 22.3 percent, sleep-related eating disorders 9.9%, sleepwalking 8.5 percent, and RBD 3.8 percent [19,20-23].

NREM sleep abnormalities are more common in younger people, but REM sleep disturbances are more common in people who are older. Children are more likely than adults to sleepwalk. Experts predict that 15% of children will have at least one sleepwalking episode; however, by puberty, the majority of children will have outgrown the disorder, reducing the prevalence to only 2 to 4%. According to one study, sleepwalking was experienced by 47 percent of children with one parent who had a history of sleepwalking, and 61.5 percent of children with two sleepwalking parents. In the paediatric population, sleep terrors are far less common, with estimates as low as 3%. Up to 6% of the population suffers from nightmare disorder. Although REM sleep behaviour disorder affects only 1% of the population, at least 50% of people who have it also have associated neurodegenerative illnesses such as Parkinson's disease, dementia with Lewy bodies, and multiple system atrophy [1].

Over 80% of preschool-aged children experience parasomnia episodes. Sleep walking, sleep terrors, and confusional arousals may be caused by inconsistencies in the management of sleep continuity. Catathrenia, often known as nightly moaning, is a parasomnia that

can affect adults but often begins in childhood [24].

2.3 Etiology and Pathophysiology

The aetiology of parasomnias is unknown because no obvious cause has been identified; nonetheless, a variety of explanations have developed. Recent data reveals that interruptions of stage 3 slow-wave sleep can exacerbate one's diathesis when it comes to NREM sleep problems. Genetic susceptibility, restless leg syndrome, sleep deprivation, periodic limb movements, noise, sleep-related breathing issues, touch, alcohol, stress, drugs, and fever are all factors that might disrupt slow-wave sleep [1,25-28].

The transition from alertness to NREM sleep and REM sleep are all stages of the regular sleep cycle. Stage one (transitional stage), stage two, stage three, and stage four are all stages of NREM sleep that occur in the first half of the night. The inadequate transition or sleep-wake boundary dyscontrol between awake and stages of sleep is thought to be the cause of arousal disorders. NREM parasomnias are most common during slow-wave sleep (stage three), but they can also occur during stage two sleep. The majority of paediatric parasomnias are benign diseases caused by immature sleep-wake border management [19].

Sleep deprivation, sedating drugs, sleep fragmentation (pain, restless leg syndrome, periodic limb movement, and obstructive sleep apnea), febrile sickness, and alcohol are all thought to promote arousal disorders. Narcolepsy, rhombencephalitis, multiple sclerosis, brain tumours, spinocerebellar ataxia type three (Machado-joseph syndrome), psychiatric illnesses, substance misuse, and alcohol withdrawal can all cause the parasomnia overlap syndrome. Anti-IgLON5 illness is also associated with NREM and REM parasomnias. This neurological disease was found in 2014 and consists of a series of neurodegenerative, neuroimmune, sleep, and movement problem symptoms. REM parasomnia, NREM parasomnia, obstructive sleep apnea, and stridor are all sleep problems associated with anti-IgLON5 illness. The disorder is linked to the human leukocyte antigens (HLA)-DRB1*10:01 and HLA-DQB1*05:01, and is caused by antibodies to IgLON5 (neuronal cell adhesion protein) [19].

Another proposed explanation is childhood exposure to stressful events. Childhood exposure to sexual abuse or natural disasters has been connected to the development of nightmares. Such early negative experiences have also been linked to a higher risk of acquiring psychotic symptoms later in life. Given the link between nightmares and psychotic experiences in children as young as 12 years old discovered in a study, it's plausible that childhood exposure to such traumatic events could prompt the development of nightmares, which could subsequently lead to the appearance of psychotic episodes. This could happen as a result of dissociative or posttraumatic reactions to childhood trauma, both of which are explored in greater depth in the next paragraph in relation to nightmares and psychotic experiences. Early trauma may further muddle the link between parasomnias and psychotic experiences because of its link to both. These putative paths will need to be investigated further [3].

2.4 Diagnosis

These are some of the steps that can aid in ruling out parasomnias:

Patient should not suffer from sleep deprivation, The Time spent in and out of bed, as well as overall sleep time, should be obtained through a one-week sleep diary, also Exclude any external factors that may be contributing to your lack of sleep, Make sure he's not suffering from intoxication or withdrawal symptoms, not using any substances or drugs that causes sleeping deprivation. Make sure the patient doesn't have any sleep disorders that are causing him to have trouble sleeping, Apnea (sleep deprivation), Periodic limb movement disorder (PLMD) is a type of limb movement problem, Restlessness leg syndrome as well as Narcolepsy.

Patient shouldn't have any medical conditions or therapies that could be causing sleep problems and check if there's a NREM parasomnias in other members of the family, Expand the screen to include other disorders, such as nocturnal seizures, if there isn't one observe the sequence of events such as The first third of the night which is dominated by NREM parasomnias, while the last third is dominated by REM parasomnias, Events' morphology.

- Ictal occurrences are more likely to be stereotypical and short.

- Sleep terrors are characterized by heightened autonomic arousal.
- NREM parasomnias are more prone to cause confusion upon awakening than REM parasomnias.
- NREM parasomnias have open eyes, whereas REM parasomnias have closed eyes.
- NREM parasomnias are characterized by amnesia of the occurrence, whereas REM parasomnias are characterized by the memory of dreams or dream fragments [2].

2.5 Other Tests for Sleep Problems Include

- A sleep study (polysomnogram) is a sleeping laboratory where you will be watched while sleeping. As you sleep, your brain waves, heart rate, eye movements, and breathing will be recorded. Your actions and conduct will be captured on video. While certain sleep studies can be done at home, if parasomnia is a problem, an in-lab study will be needed.
- These tests allow your healthcare provider to watch and record your brain activity during a brain event, such as a video electroencephogram (EEG) or a sleep electroencephogram (EEG).
- A neurologic exam, CT or MRI scan will be performed to look for brain degeneration or other neurologic reasons of your symptoms [29].

2.6 Management

Pharmacological therapies may be considered if NREM parasomnia behaviours persist despite the remission of aggravating conditions and the elimination of inducing substances. Benzodiazepines and antidepressant medicines are the most usually recommended medications. Efficacy is determined by the type of parasomnia being treated. Antidepressants show some value in the treatment of ST, but they may increase the symptoms of SW. implying that the illnesses are caused by different causes [30].

The majority of childhood parasomnias (confusional arousals, sleepwalking, sleep terror, and nightmares) are harmless, and most children outgrow them. As a result, reassuring and educating the parents can be beneficial in those situations without the need for medical assistance [19].

2.7 Benzodiazepines

The most widely reported pharmacological therapies for NREM parasomnias are intermediate and long acting benzodiazepine sedative hypnotics (BZD). BZD increases chloride conductance through binding to GABA-A receptors. Other sedative-hypnotics, such as benzodiazepine receptor agonists (BRA), can produce amnesic nocturnal behaviour, therefore the use of BZDs in the treatment of NREM parasomnias appears counterintuitive [30].

2.8 Antidepressants Drugs

Strong serotonergic agents, most frequently ST, are occasionally useful in the treatment of some NREM parasomnia patients (see serotonin hypothesis previously cited). Two patients with a history of ST and SW failed diazepam medication but reacted effectively to imipramine, according to one report (a tricyclic antidepressant) [30].

2.9 Treatment for Sleep-Related Eating Disorders

The first step in treating SRED is to stop using the drugs that are causing it and to cure any comorbid sleep disorders, including RLS. When inducing agents are stopped, the majority of individuals with drug-induced SRED perceive an improvement. Treatment of concomitant RLS can frequently completely eliminate dysfunctional nocturnal feeding. Continuous positive airway pressure may eradicate both the SDB and the nocturnal feeding in cases of SRED associated with obstructive sleep apnea [30].

2.10 Clonazepam

Clonazepam is the most commonly prescribed medication for RBD, with about 90% of patients initially responding effectively to low dosages (0.5-1.0 mg) given before bedtime. Clonazepam lowers phasic EMG activity while sleeping and has no effect on tonic muscle activity. The drug also appears to be effective in cases of Parkinson's disease and narcolepsy [30].

2.11 Melatonin and Other Medicinal Treatments

Alternative therapies, most notably high-dose melatonin (6–15 mg) in conjunction with clonazepam or as a stand-alone treatment, have been documented. Melatonin is a particularly

fascinating alternative in the context of neurodegenerative disease because it is only minimally sedating. Both phasic and tonic REM motor activity are suppressed by melatonin, and the impact lasts for weeks after the drug is stopped. Other agents with some limited success include: imipramine, carbamazepine, levodopa, pramipexole, donepezil, sodium oxybate, triazolam, zopiclone, quetiapine, and clozapine [30].

3. DISCUSSION

In a study that looked at Childhood Parasomnias and Psychotic Experiences at Age 12 Years: Children who had frequent nightmares between the ages of 2.5 and 9 years old, according to their mothers, were more likely to report psychotic experiences at the age of 12, regardless of sex, familial difficulties, emotional or behavioural disorders, IQ, or potential neurological problems. When all confounders were taken into account, children who reported any of the parasomnias at the age of 12 had a greater rate of concurrent psychotic experiences than those who did not have such sleeping disorders. When confounders were taken into account, it was discovered that difficulty falling asleep and night waking were not linked to psychotic events in children aged 12 years [3].

Sleep initiation and maintenance problems affect children with neurodevelopmental impairments like autism for a variety of reasons, with some patients responding well to melatonin. Restless legs syndrome with beginning in childhood is frequently familial, linked to systemic iron insufficiency, and responds to iron supplements and gabapentin. Parasomnias are episodic episodes that occur at the sleep-wake transition or as a result of an intrusion into sleep. Confusional arousals and sleep walking are arousal parasomnias that might be mistaken for seizures. Arousal parasomnias are frequently precipitated by sleep apnea, restless legs syndrome, or acid reflux, therefore treatment for these conditions can often aid with remission. Clonazepam, given before bedtime in a modest dose, can also help with sleep walking and confusional arousals [31].

Parasomnia is a frequent paediatric sleep disorder that can be distressing for parents or caregivers when their children suffer from it. Parasomnias are categorised into two subgroups based on the International Classification of Sleep Disorders: non-rapid eye movement (NREM)

parasomnias and rapid eye movement (REM) parasomnias. Nightmares, REM behaviour disorder, and sleep paralysis are examples of REM sleep parasomnias, whereas NREM sleep parasomnias include arousal disorders such as confusional arousals, sleepwalking, sleep talking, night terrors, and sleep-related eating problem [32].

The links between parasomnias and psychotic experiences discovered here could be explained by a number of mechanisms. First, Mahowald and Schenck theorised that in some people, the borders between sleep and wakefulness are too fluid, resulting in brief slips into rapid eye movement (REM) sleep (during which nightmares occur) while they are awake, resulting in hallucinations throughout the day. Similarly, the occurrence of night terrors and sleepwalking may be explained by slipping into a waking state when in nonrapid eye movement (NREM) sleep. This would seem to imply that parasomnias are primarily linked to hypnagogic and hypnopompic hallucinations; yet, connections with psychotic episodes were found in the current investigation even when these phenomena were ruled out. Furthermore, whereas some studies have revealed impaired sleep/wake boundaries among individuals with psychotic symptoms, no evidence of REM sleep intrusions into waking states has been reported in patients with schizophrenia experiencing hallucinations [3].

About 2% of children suffer from obstructive sleep apnea. Predisposing variables include adeno-tonsillar hypertrophy, cranio-facial abnormalities, and obesity. A combination of nasal corticosteroids and a leukotriene antagonist can be used to treat mild obstructive sleep apnea. Adeno-tonsillectomy, positive airway pressure breathing devices, or weight loss may be used to treat moderate to severe obstructive sleep apnea. This paper gives a broad overview of the subject, with a focus on management steps. The level of evidence for treatment suggestions is stated where possible [31].

The link between parasomnias and psychotic experiences could be explained by dissociation (the separation of normally integrated mental activities). Dissociative symptoms (e.g., feeling detached from oneself or reality, inability to recollect information about oneself, etc.) have been associated to nightmares and have been proven to co-occur with psychotic experiences.

Children in a study reported two dissociative symptoms (depersonalization and derealization) at the age of 12 years, and correcting for these items did not significantly change the relationship between parasomnias and psychotic experiences [3].

4. CONCLUSION

Sleep problems are one of the most common presentations to the medical care, children commonly suffer from different parasomnia diseases, and such parasomnias can also be indicative of in future psychiatric disease, there's no clear reason of what causes parasomnias with more than one theory being considered, Sleep deprivation, sedating drugs, sleep fragmentation, stressful events. Childhood exposure to sexual abuse or natural disasters have been linked to the disease, pharmacological and non-pharmacological treatment can be used as an approach for management has been identified. However, for children such parasomnias are more likely to disappear with age.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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