

# REM-Sleep Parasomnia: Nightmare Disorder

# 14

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## 14.1 Case

Jadon is a 4-year-old boy who has recently experienced frequent nightmares since he started kindergarten. His parents reported that Jadon only presented with occasional nightmare episodes which did not affect his sleep. However, he kept awake at night recently and ran into his parents' room and expressed his fears towards the nightmare content. He dared not to return to sleep and described that he was afraid that the zombies in his dream would come into his bedroom. The nightmares had consistently disturbed his sleep. Both Jadon and his parents denied any recent or past history of traumatic experience and the only significant stress might be the beginning of kindergarten.

## 14.2 Epidemiology

Occasional nightmare in children is very common as up to 75% of children could recall occasional nightmare experience [1]. Frequent nightmares occur in 5% to 20% of the children

[2–4]. The wide variation of the prevalence rate is possibly attributed to the different diagnostic criteria and measurement tools employed in the studies. For example, the prevalence of parent-reported nightmares was often lower than the child-reported data [5]. Different nightmare definitions, terminology (nightmare versus bad dreams), and time frame (once per month versus once per week) might also account for the discrepancy. Despite these considerable differences in the definition of a childhood nightmare, research consistently indicated that nightmare has typical onset at age 3–6 years old, peak between 6 and 10 years of age, and then subsequently decline with increasing age [6–8]. For example, previous evidence suggests that the prevalence of nightmares decreases from 28% in school-aged children to 10% in adolescents [9]. Nonetheless, about 30–40% of frequent nightmares (defined as often or sometimes) would persist into adulthood [10, 11]. Although most childhood nightmare is self-limiting, it is considered as a relatively stable trait in children as revealed by the longitudinal studies [8]. These children tend to be more anxious and have more behavioural difficulties [1].

Gender difference in nightmare prevalence is not evidenced during childhood [12] and the emergence of female predisposition occurs during adolescence. For example, a study conducted on 3433 colleges students found that females were more likely to have frequent

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nightmares than males (12% versus 8%) [13]. Interestingly, the female preponderance became less prominent in late adulthood and the elderly [14]. In a systematic review of more than 100 studies, females are 1.5 times more likely to have frequent nightmares during adolescence and young adults, while there was no gender difference in both young children and older adults [12].

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### 14.3 Aetiology

Dreaming during REM sleep serves important functions including memory consolidation, and fear extinction through a combination of both bad experiences with novel and dissociated contexts, which will offer emotional resolution [15, 16]. A recent review has summarised two core concepts in explaining the aetiology of nightmare: (1) increased hyperarousal and (2) impaired fear extinction [15]. Hyperarousal is a central element in explaining both posttraumatic stress disorder and insomnia, two disorders that are typically related to nightmares [17, 18]. The increased hyperarousal accumulated during daytime and nightmare might further enhance information processing during REM sleep and increased REM sleep instability [19, 20], leading to frequent awakening. In addition, normal sleep, particularly REM sleep which serves as the resolution of emotional and social conflicts, might be impaired in an individual with nightmare disorder. Since nightmares often occur during REM sleep, the occurrence of frequent nightmares might activate arousal memory fragments, which in turn lead to inability to extinct the fear memory [15]. Thus, the enhanced hyperarousal interacted with impaired fear extinction during REM sleep, compounded with the presence of precipitating traumatic events or stressors, resulting in a nightmare experience [15]. Other than traumatic and stressful experiences, trait susceptibility and maladaptive beliefs could disturb fear extinction and increase hyperarousal, further enhance the formation of a nightmare [15, 21]. However, these theories are primarily drawn

with reference to the adult population, thus, more evidence in children is needed.

In children, several risk factors are associated with nightmare severity and frequency. These factors include stress, traumatic events, sleep disturbance including insomnia, sleep-disordered breathing and circadian disruption, anxiety problems, and medications that could disrupt REM sleep [1–3, 5]. For example, a large-scale community study including 6359 children indicated that the frequency of nightmares in children is associated with sleep disturbance and family-related factors such as insomnia, sleep-disordered breathing, family economic status, and parental history [2]. Certain personality especially neuroticism trait is also found to be associated with increased nightmare frequency [22, 23]. In addition, children with psychiatric illnesses are more likely to have nightmares than those without. In particular, frequent nightmare is a prominent feature in anxiety disorders including generalized anxiety disorder, separation anxiety and over-anxious disorder symptoms in adolescents [1, 5, 24]. It is also a specific marker for post-traumatic stress disorders (PTSD). Recurrence of traumatic events in a form of a nightmare are cardinal features of PTSD. Not only the stressful life experience leads to the occurrence of nightmares, but the nightmare itself could also become a distressful experience. Young children might be conditioned the fearful nightmare images with bedtime behaviours, leading to physiological hyperarousal and sleep disturbance.

Genetic predisposition of frequent nightmares has been reported in a twin study [10]. Hublin and colleagues quantified the genetic influences affecting the liability to nightmares and found that approximately 44% of phenotypic variance in childhood nightmares was due to genetic effects [10]. A recent genome-wide association study including more than 28,000 individuals has identified the first individual genetic association in nightmares [25]. Li and colleagues also found that children with frequent nightmares were more likely to have parents who also reported frequent nightmares [2]. Nonetheless, shared environmen-

tal risk factors might also play significant roles in the familial aggregation of nightmares such as lower family income and familial stress [2]. Shared traumatic experiences and stress exposure also appear to influence the occurrence of nightmares.

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#### 14.4 Presentation and Diagnosis

Nightmares are disturbing mental experiences that resulting in awakening from sleep. Both Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) [26] and International Classification of Sleep Disorders, third edition (ICSD-3) [27] share similar diagnostic criteria for nightmare disorder. These criteria include (1) a recurrent episode of awakening from sleep and accompanied with intense feeling of fear, terror, or anxiety, but also anger, sadness, and disgust. (2) dreamers can recall the details of the nightmare content and the alertness is often fully returned after awakening. (3) difficult to return to sleep after the episode and the occurrence of episodes are in the second half of the night. In children, the descriptions of dreams usually include monsters or fantastical imagery and it becomes more detailed in older children. Although dreams can happen in other non-REM sleep stage, nightmares often occur during REM sleep, which explains the high frequency of nightmares in the early hours of the morning. In addition, physical movement is rare during an episode as the presence of REM-sleep-related atonia will normally inhibit the acting out of dreams. In case that the children reported acting out of dreams with frequent sleep shouting, movement, or even sleep-related injuries, one will need to suspect the occurrence of REM sleep behaviour disorder (RBD), which usually occurs in older adults and rarely occur at young age (which are usually secondary to narcolepsy, developmental disabilities and medication usage) [28]. The confirmation of RBD will require further video-polysomnographic investigation to document the REM sleep behavioural events and REM sleep without atonia [29].

Diagnosis of nightmare is relatively straightforward with a good clinician interview. For the occasional nightmare with limited repercussion, it usually does not require further evaluation. While for frequent persistent nightmares that cause significant distress and sleep disturbance to both children and parents, investigation and intervention are needed to alleviate the nightmare intensity and severity. The most common differential diagnosis for nightmares is sleep terrors [30, 31]. Sleep terror is a disorder of arousal from non-REM (NREM) sleep often accompanies with arousal, amnesia for the event, and a range of automatic behaviours [30, 32].

Other than the sleep assessment, it is equally important to evaluate children's emotional and physical illnesses which might increase the occurrence of nightmares. For example, children with psychiatric illnesses are more likely to have nightmares than those without [1, 5].

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#### 14.5 Management

An occasional nightmare is considered a benign disorder that requires no special intervention. However, it is important to reassure both parents and children about the benign nature of the occasional nightmare occurrence as it will progressively resolve when they grow up. They should be provided with adequate information and education so that they will not react inappropriately towards these common sleep awakenings. In particular, maintaining healthy sleep hygiene practice and avoidance of precipitating factors such as violence in TV or film content, or events that may trigger their emotion near bedtime are highly recommended to reduce the frequency of nightmares. The use of security objects such as a blanket or the presence of a doll might help to reduce children's bedtime fears. Moreover, identification and management of daily stressors associated with nightmare content are also recommended to reduce nightmare episodes.

However, when nightmare becomes frequent and starts to affect sleep quality and causes day-

time distress, or it becomes persistent even after modification of lifestyle practice, it should be carefully evaluated as frequent nightmares often come with psychopathology. There have been several psychotherapies that have been widely used for treating nightmares. These include relaxation strategies, exposure, positive reinforcement, and systematic desensitisation to reduce nightmare fears, and imagery rehearsal therapy (IRT) to replace children's frightening dreams. Among these strategies, IRT is a cognitive behavioural therapy that has received increasing attention in treating nightmares. In IRT, nightmare content is replaced with less alarming and modified content. It is believed that nightmares are learned behaviours so individuals could learn alternative content to replace it [33]. After rescripting the nightmare content, children are instructed to practice the new dreams by imagery. It is expected that the new script will be more cognitively dominant than the nightmare and eventually replacing the disturbing dream content. However, research into IRT is predominantly conducted in adults. Among a few studies in children and adolescents, Krakow et al., have provided empirical support of IRT on adolescents with comorbid psychiatric illness and traumatic experience [34]. In particular, specific adaptations should be made when conducting IRT in children, especially for those young children. A young child might not be able to describe the dream content in detail. Drawing of nightmares should be added to provide young children an age-appropriate method to express their dreams [35].

For nightmares that are occurring together with other psychiatric illnesses such as anxiety and PTSD, additional treatment approach focusing on mental health issues should be provided. A pharmacological approach might be needed in combination with psychotherapies to maximize the treatment gains. However, pharmacological treatment in children is problematic as there is often no consensus or official approval (such as FDA) regarding the medication use in paediatric population (off-label use) and there is a dearth of data on drug treatment for chronic childhood nightmares. In adults, prazosin has been used in the treatment of nightmares with some empirical

efficacy. While in children, there is very limited evidence. A recent review included 9 published studies showed that prazosin may also be a promising drug in treating nightmare associated with PTSD in children. However, the majority of the studies were case reports without any large-scale randomised control trial that evaluated the safety and efficacy of prazosin in children [36]. Thus, caution is needed when prescribing prazosin treatment to paediatric patients. In addition,  $\alpha_2$  agonists such as clonidine which is used in treating attention deficit and hyperactive disorder [37] has also demonstrated some efficacy in reducing sleep disturbance and nightmare in children [38]. Nonetheless, the paediatrician should carefully evaluate a child's condition before drug prescription since there is very little evidence to support the use of these agents in childhood nightmare management.

#### 14.5.1 Summary of Key Take-home Messages and Research Gaps

- Nightmare is common at young age and mostly resolves with increasing age.
- About 30–40% of childhood nightmare may persist into adulthood and is associated with an elevated risk of psychopathology including depression, anxiety, and psychotic experience
- Both genetic and environmental risk factors contribute to the occurrence of a nightmare
- Occasional nightmare is considered a benign disorder and does not require specific attention. Parental reassurance and healthy sleep hygiene practice are often recommended to reduce nightmare frequency and severity
- Frequent nightmares that cause distress should be carefully evaluated and provided with adequate psychological (and if needed, together with pharmacological) intervention.

#### 14.5.2 Research Gaps

More research is needed to understand the associated risk factors that contribute to the persistence of nightmares and the comorbid nightmare with psychiatric, physical and sleep disorders.

Although initial evidence supports IRT in treating nightmares in children and adolescents, future studies should incorporate randomised controlled trials to further evaluate its effectiveness in paediatric population. There is also a need to evaluate pharmacological intervention in childhood nightmares.

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Summary of main features and characteristics of nightmare in children

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Age of onset	3–6 years
Peak age	6–10 years
Timing during sleep	Second half of sleep
Risk factors	Family history, stress, traumatic events, childhood adversity, neuroticism
Associated consequences	Behavioural problems, daytime impairment, mood problems, psychotic experiences
Management	Relaxation strategies, exposure, positive reinforcement, systematic desensitisation and imagery rehearsal therapy

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