

Sleep Disorder in Children With Overactive Bladder

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Abstract

Background: Children with an overactive bladder typically exhibit urinary frequency, urgency and urge incontinence. The present investigation was conducted to evaluate the relationship between sleep disorders and hyperactive bladders in children.

Methods: Participants in the nested case-control study included 132 children referred to Amirkabir Pediatrics Clinic. Sixty-six children suffering from overactive bladders designated as cases and 66 children referred for other medical conditions designated as controls.

Results: The mean score of nine different sleep disorders was 0.38 ± 0.87 for control subjects and 2.24 ± 1.73 among case patients. Obtained data show significant differences between the two groups in terms of sleep disorders ($P = 0.001$).

Conclusions: The study demonstrates a significant difference between children with overactive bladders and without it in primary insomnia, hypersomnia disorder, circadian rhythm sleep disorder and sleep terror disorder.

Keywords: Children; Sleep disorders; Overactive bladder

Introduction

Children with an overactive bladder typically present the symptom complex of urinary frequency, urgency and urge incontinence [1]. Vincent's curtsy is often done when a female

child squats down on her feet trying to prevent urinary incontinence during an unstable bladder contraction. The bladder in these children is functionally, but not anatomically, smaller than normal and presents strong uninhibited contractions. Approximately 25% of children with nocturnal enuresis also have symptoms of an overactive bladder [2, 3]. Many children indicate they do not feel the need to urinate, even just before they are incontinent. In girls, a history of recurrent urinary tract infection (UTI) is common, but incontinence can persist long after infections are brought under control. It is not clear in these cases if the voiding dysfunction is a sequel of the UTIs or if the voiding dysfunction predisposes to recurrent UTIs. In girls, voiding cystourethrography often shows a dilated urethra and narrow bladder neck along with bladder wall hypertrophy [4, 5]. The urethral finding results from inadequate relaxation of the external urinary sphincter. Most sleep problems in children may be broadly conceptualized as resulting from either inadequate duration of sleep for age and sleep needs or disruption and fragmentation of sleep which result from frequent, repetitive and brief arousals during sleep. Less common causes of sleep disturbance in childhood involve inappropriate timing of the sleep period, or primary disorders of excessive day-time sleepiness [6, 7]. Insufficient sleep is usually the result of difficulty initiating and/or maintaining sleep, but, especially in older children and adolescents, may also represent a conscious lifestyle decision to sacrifice sleep in favor of competing priorities, such as homework and social activities [8, 9]. The underlying causes of sleep onset delay, prolonged night-time awakenings or sleep fragmentation may in turn be related to primary behavioral factors and/or medical causes [10].

It should be highlighted that certain pediatric populations are relatively more vulnerable to acute or chronic sleep problems. These include children with medical complications, including chronic illnesses, such as cystic fibrosis, asthma and rheumatoid arthritis, as well as acute illnesses, such as otitis media; children taking medications or ingesting substances with stimulant, sleep-disrupting, or day-time sedating properties, hospitalized children, and children with a variety of psychiatric disorders, including attention-deficit/hyperactivity disorder, depression, bipolar disorder and anxiety disorders. Children with neuro-developmental disorders may be more prone to nocturnal seizures, as well as other sleep disruptions, and children with blindness, mental retardation, some chromosomal syndromes and autism spectrum disorders are at

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increased risk of severe sleep-onset difficulty and night-time awakenings, as well as circadian rhythm disturbances [11].

Considering the fact that seldom studies were conducted regarding the association between sleep disturbances and daily urinary disorders both inside and outside Iran and also regarding cultural, climatic and geographic elements may play an important role in revealing it [12]. Additionally, taking into account that each of these problems can greatly influence each other, and delayed intensification treatment can cause irreparable damage to children's future education and career. Consequently, this study was performed to examine the relationship between sleep disturbances and daily urinary disorders and to present new strategies for its treatment [13].

Materials and Methods

Participants included all children aged over 5 years with urinary complaints who were referred to Amirkabir Pediatric Clinics. In this case-control study, 66 children suffering from sleep disorders and overactive bladders were selected as the case patients, and 66 children referred for other medical conditions were designated as the control group. All 132 children presented in Amirkabir Hospital of Arak University of Medical Sciences, Arak, Iran.

Our inclusion criteria included all individuals who corresponded with the definition of renal voiding dysfunction without mental retardation and other physical, mental or emotional problems. Our exclusion criteria included all people who refused to complete the BSN4 questionnaire. All persons were monitored by the executive analyst, and the questionnaire was completed under careful monitoring of the researchers.

Results

Overall 132 children (66 as the cases and 66 as controls) were selected for our study. The mean age of children in the control group was 8.89 ± 2.19 and in the case group was 9.24 ± 1.41 which does not show a significant difference ($P = 0.28$).

In this study, patients were evaluated for nine types of sleep disorders. The mean score of sleep disturbance was 0.38 ± 0.78 in the control group and 2.24 ± 1.73 in the case group revealing a significant difference amongst both groups ($P = 0.001$).

The first disorder examined in patients was primary sleep disorders. Twenty-two patients in the case group (33.3%) and four patients in the control group (6.1%) had primary sleep disorders. Statistical analysis indicates that the distribution of primary insomnia was not equal in the two groups and showed significant differences between them ($P = 0.001$).

The second disorder investigated was primary hypersomnia that 23 patients in the case group (34.8%) and one child in the control group suffered from this disorder. Statistical comparison indicated marked differences in the distribution of primary hypersomnia between the two groups ($P = 0.001$).

Narcolepsy, another sleep disorder compared between the two groups, was indicated in 15 children of the cases (22.7%)

Table 1. Summary of Results

Description	Group	Yes	No
1. Prevalence of primary insomnia	Case	22	44
	Control	4	62
2. Prevalence of primary hypersomnia	Case	23	43
	Control	1	65
3. Prevalence of narcolepsy	Case	15	51
	Control	0	66
4. Prevalence of sleep-related breathing disorders	Case	7	59
	Control	1	65
5. Prevalence of circadian rhythm sleep disorders	Case	20	46
	Control	2	64
6. Prevalence of nightmare disorders	Case	22	44
	Control	12	54
7. Prevalence of sleep terror disorder	Case	29	37
	Control	2	64
8. Prevalence of somnambulism disorder	Case	10	56
	Control	3	63
9. Prevalence of uncertain insomnia	Case	0	66
	Control	0	66

and none of the controls which once again showed a great deal of difference between the cases and controls ($P = 0.001$).

Sleep-related breathing disorders were also evaluated, appearing in seven of the cases (10.6%) and one of the controls (1.5%). No statistically significant differences could be demonstrated for these disorders between the two groups; however, the P value was more in the case group than in the control group ($P = 0.062$).

Patients were also evaluated for circadian rhythm sleep disorders in which 20 cases (30.3%) and two controls (3%) suffered from this disorder showing a marked difference between the two groups ($P = 0.001$).

Comparison of nightmare disorders between the two groups revealed that 22 children in the case group (33.3%) and 12 children in the control group (18.2%) suffered from these disorders which indicates a higher distribution of nightmare disorders amongst the cases. Therefore, a significant difference was found between the two groups in terms of nightmare disorders ($P = 0.036$).

Regarding sleep terror disorders, 29 children in the case group (43.9%) and two children in the control group (3%) suffered from these disorders. Statistical comparison indicated that the distribution of sleep terror disorders was not the same in both groups, and there were significant differences found between them ($P = 0.001$).

Another variable examined in this study was the somnambulism disorder. Ten patients in the case group (15.2%) and three in the control group (4.5%) suffered from this disorder. Statistical analysis demonstrated that although the distribution of somnambulism disorder in case group was more than the control group, there was no significant difference between the

two groups ($P = 0.38$) (Table 1).

Eventually, the last variable studied in this research was uncertain insomnia which indicated that none of the children of both groups suffered from it.

Discussion

The present research investigated the prevalence of sleep disorders among children with overactive bladders. According to the results, significant difference was found between the case patients and control subjects in terms of primary sleep disorders, primary hypersomnia and sleep terror disorders. Moreover, there was no statistically significant difference in the case of sleep-related breathing disorders, circadian rhythm sleep disorders and somnambulism disorder between the two groups. In contrast, significant differences were demonstrated for narcolepsy and nightmare disorders amongst the cases and controls. No patient was observed with uncertain insomnia in the two groups.

According to the fact that no similar study has been conducted to find the association between sleep disorders and urinary incontinence in children, therefore, recent studies on sleep disorders in children with enuresis will be reviewed in this section. OAB patients reported psychological stress levels that were as high as IC/BPS patients, and significantly higher than healthy controls. There was a positive correlation between perceived stress levels and urinary incontinence symptoms, and its impacts on quality of life among OAB patients [4]. There is a considerable overlap of self-reported symptoms between interstitial cystitis/bladder pain syndrome and overactive bladder. This overlap raises the possibility that the two conditions represent a continuum of a bladder hypersensitivity syndrome [13].

The study done by Cohen Zrubavel in 2011 entitled "Sleep and Sleepiness in Children With Nocturnal Enuresis" concluded that in comparison to the sleep of control subjects, the natural sleep of children with nocturnal enuresis is remarkably more fragmented and ruptured leading them to experience increased levels of day-time sleepiness. This phenomenology is correlated with recurrent episodes of bedwetting and attempts to prevent their urination and to keep them dry during the night. These findings indicate that children with nocturnal enuresis suffer from frequent awakenings which may explain their higher threshold of stimulation. These findings are included to control clinical symptoms of urinary incontinence [14]. Hypersensitive bladder can be used for the condition with hypersensitive bladder symptoms, but no obvious disease explaining hypersensitive bladder symptoms identified. Interstitial cystitis is a typical disease causing hypersensitive bladder symptoms, most commonly with pain, but might be painless and indistinguishable from overactive bladder. Introducing hypersensitive bladder as a counter concept of overactive bladder into bladder dysfunction taxonomy will facilitate clinical practice and research progress, and attract considerable attention from the medical world [15].

In Chandra's (2004) study on the prevalence of urinary symptoms in sleep disturbances in children with enuresis stimulation, the researcher concluded: day-time urinary symp-

toms in two-thirds of patients are accompanied by enuresis, but may be missed in history taking. It seems that stimulators have a great role in primary enuresis and instability symptoms of UTIs in secondary enuresis. In patients suffering from nocturnal enuresis, a history of urinary frequency, nocturia, sleep irritation, urinary tract infection, fecal incontinence, learning disorders, psychosocial disorders or family history of UTI increases hesitation associated with urinary symptoms of voiding dysfunction [16].

International Classification of Sleep Disorders (ICSD-2) has been done in 2005 by the American Academy of Sleep Medicine (AASM) by applying eight different categories which are: insomnia, sleep-related breathing disorders, hypersomnia, boarding disorders, nightmares, sleep-related movement disorders, separated symptoms/normal variables, insoluble problems and other sleep disorders. Some sleep disorders, for example, obstructive sleep apnea has been observed to cause physical diseases, such as developmental problems. Therefore, early detection of problems for finding a differential diagnosis and appropriate therapy are necessary [17].

Conclusions

According to the results of the present study, significant differences were discovered between children with and without overactive bladders in terms of primary insomnia, hypersomnia disorders, circadian rhythm sleep disorders and sleep terror disorders.

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