

Original Article

Comparing the Frequency of Migraine Headaches in Children With and Without Enuresis



Hossein Pourhossein Miri^{1*}, Fakhreddin Shariatmadari¹, Manijeh Kahbazi¹, Parsa Yousefichaijan¹, Javad Javaheri²

1. Department of Pediatric Nephrology, Faculty of Medicine, Amirkabir Hospital, Arak University of Medical Sciences, Arak, Iran.

2. Department of Pediatric Nephrology, Faculty of Medicine, Arak University of Medical Sciences, Arak, Iran.



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Corresponding Author:

Hossein Pourhossein Miri, MD.

Address: Department of Pediatric Nephrology, Faculty of Medicine, Amirkabir Hospital, Arak University of Medical Sciences, Arak, Iran.

E-mail: hpm7722@gmail.com

ABSTRACT

Background and Aim: Nocturnal enuresis and migraine are common disorders among children, each having a major impact on the health and life status of the children and their families. In several children, these two disorders have also been observed together. Accordingly, this study evaluates the relationship between migraine and nocturnal enuresis by examining the frequency of migraine in children with nocturnal enuresis.

Methods: In this analytical cross-sectional study, the experimental group includes children with nocturnal enuresis, who were diagnosed by a pediatric nephrologist. The control group is comprised of children without nocturnal enuresis. In both groups, the frequency of migraine headaches diagnosed by pediatric neurologists was checked and finally, the frequency obtained in the two groups was compared. The sample size was 47 people for each group. Information analysis was done through analytical statistics, including tables and statistical charts and their analysis. Independent t-test, the chi-square test, the Fisher test, and if necessary, equations were used to analyze the non-parametric data.

Results: The distribution of frequency between gender and nocturnal enuresis was the same in two groups (57.4% male and 42.6% female). Also, the mean age in the patient category was 7.6 ± 2.3 years and in the healthy category was 8.3 ± 2.6 years. The frequency distribution between having migraine, migraine with aura, the number of times experiencing headache, and family history at the time of admission were the same in the two groups.

Conclusion: In conclusion the frequency of migraine, migraine with aura, the number of times experiencing headache, and family history of migraine were the same in the two groups

Keywords: Enuresis, Migraine, Migraine with aura, Migraine without aura, Children



Introduction

According to the criteria of the [International Children's Continence Society \(ICCS\)](#), enuresis [1] is described as the involuntary loss of urinary control at night in children above 5 years of age, including primary (primary nocturnal enuresis [PNE]) and secondary nocturnal enuresis [2]. Enuresis is a common problem in development with a total prevalence of 1.6% to 15% [3-5] and may continue during adolescence [6]. Bedwetting is more common in boys, while girls have a higher rate of incontinence during the day [7]. The prevalence of enuresis diminishes with age, asserting the traditional thought of delayed puberty in voiding control. Enuresis and migraine can be associated through cortical system arousal disorder, autonomic hyperactivity [8-10], changes in visual and motor coordination [11-13], and sleep disorders [14-16]. In addition, PNE and migraine can be interpreted as two family stressors [17, 18]. From this point of view, PNE can be identified as a type of periodic syndrome, such as motion sickness and others, which is similar to the aspects of migraine [19]. Meanwhile, their effects on children's abilities of learning are similar [20, 21]. Treatment should consider the causal role of sleep disorders and abnormal behavior [22], while remarking on natural approaches, such as sleep hygiene [23-25]. On the other hand, there is a growing interest in the sleep habits of children with PNE, derived from conflicting data in the clinical literature. For example, in 2008, Nevéus [26] identified a common parental report of deep sleep compared to a control group, despite the low efficacy observed in children's reported nighttime sleep quality.

Materials and Methods

In this analytical cross-sectional study, the patient group involved children with nocturnal enuresis who were diagnosed by a pediatric nephrologist. The control group included children without nocturnal enuresis. In both groups, the children also suffered from migraine headaches, which were diagnosed by a pediatric neurologist their frequency was checked and finally, the frequency obtained in the two groups was compared.

The inclusion criteria were the age range between 5 to 15 years, having enuresis (children without enuresis were also included in the study as the control group), and having migraine headaches. Meanwhile, the exclusion criteria were parents' unwillingness to cooperate, having mental disorders, and suffering from other urinary or kidney problems.

In this study, a researcher-made checklist was used to record and check gender, age, migraine, migraine with aura, the number of times experienced headache and family history. According to the article, titled "Migraine and enuresis in children: An unusual correlation?" by Carotenuto et al. [27], and considering the value of the first type α error of 5% ($Z=1.96$) and the β error of 80%, the sample volume 47 subjects was calculated for each group (94 people in total).

Analytical statistics, including statistical tables and graphs and their analysis and interpretation including Mean \pm SD and number and percentage along with a 95% confidence interval were used for data analysis. Also, the independent t-test, the chi-square test, the Fisher test, and their non-parametric equivalents were used, if necessary. All tests were performed at a significance level of 0.05 using the SPSS software, version 25.

Results

In this study, 47 people were assigned to the case group and 47 people to the control group in a simple random manner. To analyze the data, first, based on the Kolmogorov-Smirnov test, assuming a significance level of less than 0.05, it was determined that the data is normally distributed.

The frequency distribution between genders is the same in both healthy and diseased groups. According to the chi-square test, there was no statistically significant difference ($P\geq 0.05$) (Table 1).

The mean age in the patient group was 7.6 ± 2.3 years and 8.3 ± 2.6 in the control group. According to the independent t-test, the average age in the studied groups does not have a statistical difference ($P=0.17$) (Table 2).

Meanwhile, the frequency distribution of having migraine, over, number of times, and family history on the night of admission is the same in the two groups. According to the chi-square test, there was no statistically significant difference ($P\geq 0.05$) (Table 3).

Discussion

Migraine can be considered similar to NE. Both disorders are common multifactorial pediatric disorders and have genetic, behavioral, and neurological aspects with a complex pathophysiology that is not yet well-understood [28]. Studies have reported that children with PNE and migraine may show dysfunction of the autonomic nervous system [29]. Specifically, several studies have ob-

Table 1. Gender information in two groups participating in the study

Gender	No. (%)		P
	Healthy Group	Patient Group	
Boy	27(57.4)	27(57.4)	0.99
Girl	20(42.6)	20(42.6)	

Table 2. Mean age in two groups participating in the study

Groups	Mean±SD	P
	Age (y)	
Patient group	7.6±2.3	0.17
Healthy group	8.3±2.6	

served sympathetic and parasympathetic nervous system hyperactivity in children with enuresis and migraine.

In addition, Yerdelen et al. [10] showed that the most common disorder in migraine is sympathetic dysfunction. According to anatomical aspects, neural structures can be related to the pathogenesis of migraine and NE. Montagna [30] showed that the periluminal gray matter, dorsal raphe nuclei, and locus coeruleus represent migraine generators.

In addition, the locus coeruleus has a critical role in the activation of arousal circuits and is also associated with the pathophysiology of NE [31, 32], possibly based on common pathophysiological substrates [19].

According to recent studies, there is a connection between migraine and bedwetting in children. This study was formed on the same basis to compare a control and an experimental group. Accordingly, there is no significant difference between the two groups and the distribution of the data was normal. What is significant is the statistics that we have about migraines in the control group. The mean age in the case group was 7.6 years compared to the control group which was 8.3 years. While the prevalence of migraine among the control group is 29%, the most recent review study [33] which examined the prevalence of migraine in 48 articles in this regard, reported the prevalence of migraine in children to be 11%; meanwhile, 8% of this prevalence belongs to children with migraine without aura and 3% of that statistics of migraine with aura in children. The aforementioned study considered children between 8-18 years old and acknowledged that studies have shown that

Table 3. Basic information in two groups participating in the study

Variables	No. (%)		P
	Healthy Group	Patient Group	
Migraine headache	With	33(70.2)	0.38
	Without	14(29.8)	
Migraine with aura	Yes	7(50)	0.42
	No	7(50)	
Family history	Positive	25(53.2)	0.99
	Negative	22(46.8)	
Number of times of migraine attack	<3 times a week	8(57.2)	0.34
	≥3 times a week	6(42.8)	

the percentage of migraine increases with age and entering adolescence. But concerning eight-year-old children, the lowest amount of migraine has been reported in this range.

To ensure the closeness of these data to the cultural background of Iran, the articles were reviewed; most of the articles reviewed in this research were related to Iran, Turkey, and the Middle East. This study showed that the prevalence of migraine ranges from 5% in 5-10-year-old children to 15% in teenagers. The statistics revealed by our study are worrying about the prevalence of migraine among children, and the absence of a significant difference between the two groups does not indicate that the prevalence of migraine among children with enuresis is not high but indicates the prevalence of migraine is high in the control group, which is much higher than the average reported in the aforementioned article.

In this regard, we examined the standard articles that investigated the prevalence of this condition in Iran. Rafiei et al. have conducted extensive research in 2022 in Iran [34]. In this study, the data was collected from 121 schools in Iran including 3244 students. Accordingly, on average, 28% of students have migraines. Children aged 6-11 years with 18.5% and children 12-17 years old with 34.5% of migraines have been reported. These data reveal a significant increase in migraine incidence among children compared to the past. According to the data obtained by Ayatollahi et al. study [35] in 2002 in Shiraz City, Iran, the prevalence of migraine among children was 6%.

Conclusion

The distribution of frequency between gender and night of urination is the same in two groups (57.4% male and 42.6% female). Also, the mean age in the case group was 7.6 years compared to the control group which was 8.3 years. The distribution of frequency between having migraine, migraine with aura, the number of times experiencing headache, and family history at the time of admission is the same in both groups. According to the chi-square test, they were statistically completely different ($P \geq 0.05$).

It is suggested that in future research, special attention should be paid to the prevalence of migraine among children and the causes and factors of the higher prevalence among Iranian children should be investigated to systematically prevent its adverse consequences on the quality of life and health care system.

Ethical Considerations

Compliance with ethical guidelines

Written informed consent was obtained from all patients or parents/guardians. This study was ethically approved by the Ethics Committee of the Vice-Chancellor of Research at [Arak University of Medical Sciences](#), Arak, Iran (Code: IR.ARAKMU.REC.1402.078).

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Authors' contributions

All authors equally contribute to preparing all parts of the research.

Conflict of interest

The authors declared no conflict of interest.

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