



RESEARCH ARTICLE

PREVALENCE OF NOCTURNAL ENURESIS AND ITS ASSOCIATED FACTORS IN PRIMARY SCHOOL CHILDREN OF FALLUJAH IN 2018.

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Manuscript Info

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Abstract

Background:Nocturnal enuresis refers to an inability to control urination during sleep.This aimed to determine the prevalence of nocturnal enuresis and its associated factors in children in the city of Fallujah.Materials and Methods.In this descriptive-analytic,cross-sectional study,490 male and female children were divided into two groups with equal numbers.The samples were selected from the schools of Fallujah using the stratified random sampling methods based on the diagnostic criteria of DSM-IV. Results. The results showed that 14.9% of children had nocturnal enuresis, including 10% of primary nocturnal enuresis and 4.9% of secondary nocturnal enuresis .

The prevalence of nocturnal enuresis in boys (18.8%) was higher compared with that in the girls (11%) ($P=0.038$).There were statistically significant relationships between nocturnal enuresis and maternal education ($P=0.0001$), Urinary tract infection ($P=0.0001$),deep sleep ($P=0.0001$),corporal punishment at school ($P=0.0001$),anal itching ($P=0.014$).

Conclusion:This study showed that the prevalence of nocturnal enuresis in boys was higher compared with that in the girls.

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Introduction:-

Nocturnal enuresis refers to an inability to control urination and involuntary urination during sleep, which is common among young children[1]. Based on the DSM-IV (diagnostic and statistical manual of mental disorders IV)criteria, enuresis refers to the urination of children over 5 years old in clothes or in bed that happens twice a week for three consecutive months can occur at night, during the day, or in combination of these two,and is also called nocturnal enuresis[2]. Enuresis is classified as primary enuresis (urinary incontinence in a child who has never been dry) and secondary enuresis (urinary incontinence in a child who has been dry for at least 6 months)[3].Nocturnal enuresis in children is the second most common disorder after allergic diseases [1]. Nocturnal enuresis can cause a variety of behavioral, psychological, and social problemsincluding embarrassment, blushing,lack of self-esteem, and aggression. Therefore ,identifying children at risk and performing therapeutic measures are necessary [1,3]. Based on the results of various investigations, enuresis has many causes including developmental differences, for example, differences in the growth of the urinary sphincters of a child, various diseases like diabetes, urinary tract infections, and so forth, emotional changes and conflicts such as the birth of new baby and scholastic or educational stressful conditions, and emotional crises such as parental separation and divorce, family conflicts, and so forth [3-6].

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Primary enuresis is often associated with a familial history of delayed urinary bladder control. Secondary enuresis may also be due to urologic and neurological problems, disorder of spinal cord, and recurrent urinary tract infection [6]. Ninety percent of enuresis cases are primary, and its prevalence usually changes with age [6].

Several studies have been conducted on nocturnal enuresis and its associated factors. The review of the relevant literature showed considerably different prevalence rates for enuresis [3,4], so that the prevalence rates in different regions and in children older than 5 years old have been reported to be 5-20% [1].

In a study by Unalacak et al. conducted in Turkey, the prevalence of nocturnal enuresis was 8.9%, out of which 7.75% was primary nocturnal enuresis [7]. Also, studies indicated the prevalence rates of 4.7% in China [8] and 18.2% in Australia in which 12.3%, 2.5%, and 3.6% of the children were reported to have mild, moderate, and severe nocturnal enuresis, respectively [9]. In the US, 5-10% of 7 years old children suffered from nocturnal enuresis while the rate was lower than 5% in children over than 10 years old [10]. The prevalence of nocturnal enuresis in Ethiopia has been reported to be 5% in small towns, 0.8% in most rural areas, and 9% in big cities [11].

Considering the importance and consequences of nocturnal enuresis and lack of a comprehensive study in this regard in the city of Falluja, this study aimed to investigate the prevalence of this disorder and its associated factors in 6-10 year old children.

Materials and Methods:-

In the city of Fallujah many schools were selected. The method used to select the samples was a stratified random sampling. The sample size needed to investigate the prevalence of enuresis was calculated to be 490 samples (245 boys and 245 girls). The tool applied in this study was a research made questionnaire that was prepared based on reviewing the literature and evaluation factors associated with enuresis. The questionnaire applied in the study consisted of two parts. The first part contained the demographic and socioeconomic data including age, gender, parental marital status, parental education, parental kinship, parental occupation, family size, birth order, and other variables such as sleep quality, child's corporal punishment at school. The second part consisted of various kinds of active enuresis (nocturnal enuresis, diurnal enuresis), primary and secondary enuresis, history of urinary tract infection and anal itching, hyper activity, breast feeding, and history of previous treatment for nocturnal enuresis, frequency per week. Primary nocturnal enuresis was considered as bed wetting in a child who had never been dried and secondary nocturnal enuresis was considered as experiencing dryness for more than 6 months.

The data was analyzed using the SPSS-25 (statistical packages for social sciences-version 25). Data were presented in simple measures of frequency and percentage. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test (χ^2 test) with application of Yates correction or Fisher Exact test whenever applicable. Odds ratio (OR) and its 95% confidence interval (95% CI) was calculated for the risk measurement of all different associated factors. Statistical significance was considered whenever the P value was equal or less than 0.05.

Results:-

Out of a total 490 samples, 245 were male and 245 were female. Moreover, 73 (14.9%) of the subjects had nocturnal enuresis, and the highest prevalence rate of nocturnal enuresis was found in the 6 year old age group (33.9%) and the lowest rate in the 8 year old age group (10.8%). So a significant relationship was found between the prevalence of nocturnal enuresis and age group ($P=0.0007$). The difference between the prevalence rates of nocturnal enuresis in the 6 and 10 year old age groups was significant ($P<0.05$) (Table 1). In relation to gender, the prevalence of nocturnal enuresis was 18.8% in the boys and 11.0% in girls, showing a clearly higher rate in boys ($P=0.038$) (Table 1).

Table 1:-Prevalence of nocturnal enuresis in primary school age children in Fallujah in terms of age and gender.

		Total (n=490) (%)	Nocturnal enuresis (n=73) (%)	P value	OR	CI 95%
Age (years)	6	56(11.4)	19(33.9)	0.0007*	-	-
	7	108(22.0)	16(14.8)			

	8	111(22.7)	12(10.8)			
	9	95(19.4)	13(13.7)			
	10	120(24.5)	13(10.8)			
Gender	Male	245(50.0)	46(18.8)	0.038*	1.7	1.03-2.83
	Female	245(50.0)	27(11.0)			

*Significant difference between proportions using pearson Chi-square test at 0.05

In addition ,concerning the relationship between the frequency of nocturnal enuresis and age, the frequency of nocturnal enuresis in the 6 and 9 year old age group was the highest (5%)(**Table 2**). Additionally, 10% and 4.9% of the children with nocturnal enuresis suffered from primary and secondary enuresis, respectively (based on being dry for 6 months).

Table 2:-Frequency(per week) of nocturnal enuresis in the children in terms of age group.

Age (years)	Frequency		P value
	4 & more/week (%)	1-3/ week (%)	
6	4 5%	15 20%	0.601
7	5 4%	11 8%	
8	4 3%	8 6%	
9	6 5%	7 6%	
10	3 2%	10 7%	
Total	22	51	

*Significant difference between proportions using pearson Chi-square test at 0.05

Moreover, the prevalence of nocturnal enuresis was higher in the children with maternal illiterate (P=0.0001). The result of chi-square test showed that a number of 75 children (15.3%) of the samples had urinary tract infection ,out of whom 25 children (33.3%) were enuretic, while 415(84.7%) of the samples had no history of urinary tract infection, out of whom 48 cases (11.6%) were enuretic (P=0.0001).

According to the reports provided by parents, 40 of the samples (8.2%) had deep sleep, out of whom 38 samples(95%) were enuretic (P=0.0001),while 35 children (7.8%) of the children with no deep sleep were enuretic.

Moreover, 26 children had been punished at school, 8 of whom (30.8%) had nocturnal enuresis (P=0.0001), while 65 children (14.0%) of the children who had not been punished at school had nocturnal enuresis, 69 children had anal itching , 17 of whom (23.2%) had nocturnal enuresis (P=0.014),while 56 children (13.3%) of children with no anal itching had nocturnal enuresis.

The investigation of the factors associated with nocturnal enuresis showed no significant relationships between nocturnal enuresis and factors including divorce, new baby birth, change in living place, child's birth order, family size, parental occupation, parental education, parental kinship,(P>0.05). However, significant relationship were found between nocturnal enuresis and factors including age, gender, maternal education, deep sleep, urinary tract infection, anal itching, punishment at school (P<0.05) (**Table 3**).

Maternal education, deep sleep, urinary tract infection, anal itching, punishment at school were associated with nocturnal enuresis in children, as detailed in Table 3.

Table 3:-Factors associated with nocturnal enuresis.

Variables		Total (n=490) (%)	Nocturnal enuresis (n=73) (%)	P value	OR	C1 95%
Maternal education	Educated	460(93.9)	57(12.4)	0.0001*	8.08	3.75-17.44
	Illiterate	30(6.1)	16(53.3)			
Deep sleep	Yes	40(8.2)	38(95.0)	0.0001*	225.3	52.2-973.2

	No	450(91.8)	35(7.8)			
Urinary tract infection	Yes	75(15.3)	25(33.3)	0.0001*	3.82	2.17-6.74
	No	415(84.7)	48(11.6)			
Anal itching	Yes	69(14.1)	17(23.2)	0.014*	2.13	1.15-3.94
	No	421(85.9)	56(13.3)			
Punishment at school	Yes	26(5.3)	8(30.8)	0.0001*	0.06	0.03-0.15
	No	464(94.7)	65(14.0)			

*Significant difference between proportions using pearson Chi-square test at 0.05

Discussion:-

Nocturnal enuresis is a common developmental problem among school-aged children [5]. This study considered the DSM-IV as the criterion of nocturnal enuresis. The prevalence of nocturnal enuresis in this study was 14.9% which is similar to the study conducted in Saudi Arabia [14], but it is higher than the studies conducted in Hong Kong, China, and Thailand [5,12,13], and lower than the study conducted in Australia [9].

These differences could be attributed to the differences in sample size, sampling method, age range, and definition of nocturnal enuresis based on the DSM-IV or the ICD 10 (internal classification of diseases .10) criteria.

Studies conducted based on the ICD 10 criterion have reported higher rates [14,16]. In the present study, the prevalence of nocturnal enuresis decreases with age, and the difference between the prevalence rates at the ages of 6 and 10 was statistically significant. The prevalence of enuresis in this study was 33.9% at the age of 6 and 10.8% at the age of 10. This finding is higher than the results of various studies [2,19,20]. Ozkan et al. reported the prevalence of nocturnal enuresis in the age group of 5-6 years old to be 10.3% and at the age of 11 to be 5.6% [2]. Many studies have reported lower prevalence rates for nocturnal enuresis with age [2,18,21], and this difference can be attributed to different selection of age groups ,being 6-10 in our study, 5-12 and occasionally 5-16, in several studies [16,17,22]. The prevalence of nocturnal enuresis in the boys in our study was 1.7 times higher than that in the girls, being similar with the results obtained from various studies [23,25]. However, some studies, including in china and Thailand, have not reported major differences in this regard [12,22]. Some studies, including those conducted in Turkey and Sanandaj, have reported higher prevalence of nocturnal enuresis in girls than in boys [3,15]. The relationship between parental education and nocturnal education has been discussed in some references [26,27]. Several studies have reported lower paternal education level and higher maternal education level to be associated with higher prevalence of nocturnal enuresis [27]. In our study, the prevalence of nocturnal enuresis was lower in the children whose mothers had been educated, whereas in Safarinejads study the prevalence was higher in the children of the mothers with higher education levels [17]. Other studies have also indicated the relationship between lower parental education and the prevalence of nocturnal enuresis [26]. Some studies have mentioned the ureterovesical reflex due to the contraction of the proximal ureter and the pelvic floor muscles as the cause of urinary tract infection and its relationship with higher prevalence of enuresis [19,24,28]. In our study there was a significant relationship between urinary tract infection and nocturnal enuresis. One of the problems in children with enuresis is deep sleep and difficulty of waking up during the night [29]. This is one of the most important factors associated with the prevalence of enuresis [25]. In our study, there was a significant relationship between deep sleep and nocturnal enuresis. The results of many studies show that nocturnal enuresis is a developmental problem, while parental dealing with this problem may not be realistic [2,14,19,25]. Some mothers believe that their children are able to control urination during sleep and therefore may punish them. In ozkan et al. and Safarinejads study, 12.8% and 26% of the enuretic children had been punished [2,17]. In our study, 30.8% of the children with nocturnal enuresis had been punished at school, and there was a significant relationship between punishment at school and nocturnal enuresis. The application of punishment can have adverse outcomes for a child, as the study by Ozkan et al. reported that the prevalence of nocturnal enuresis in the children who had been trained in urination and threatened by their parents was 2.24 times higher than the rate in the children who had received encouragement [2]. In Norgaard et al's study, the prevalence of nocturnal enuresis in the children with in appropriate parental dealing with the problem was 1.74 times higher. Therefore, in appropriate training in urination can be a risk factor of enuresis [30]. In our study, 23.2% of the enuretic children had anal itching, Ghotbi and Kheirabadi in their study reported a significant relationship between anal itching and nocturnal enuresis, which may suggest an association between enuresis and oxyuriasis [3]. It has been of course, proved that oxyuriasis is not associated with enuresis, and

this may be due to recall bias [17]. The prevalence of nocturnal enuresis was relatively high in this study, so the prevalence of nocturnal enuresis and some of its associated factors in our study are different from those in the studies conducted in other countries. Further studies with large sample sizes, homogenous methods, and similar definitions of enuresis are needed to investigate the differences between the results.

Conclusion:-

The results of this study clearly indicated a higher prevalence rate of nocturnal enuresis in the boys than in the girls. Moreover, the frequency of nocturnal enuresis in 6years old children was higher than that in 10years old children. Also, maternal education, anal itching, urinary tract infection, deep sleep, and punishment of children at school were identified as the risk factors for nocturnal enuresis. Therefore, taking therapeutic measures and training parents in dealing with children are essential to control nocturnal enuresis.

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