

Prevalence of Enuresis in Sample of Iraqi Children

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Abstract

- Background** Enuresis, which is frequently diagnosed amongst school age children, is an important psychosocial problem for both parents and children.
- Objective** In the present study we aimed to determine the prevalence and associated risk factors of enuresis in sample of Iraqi children and to identify common methods for its management.
- Methods** Across sectional epidemiological study was performed among primary school age children living in Tikrit and Beji cities during the period from the October 2008 to the June 2009. A self-administered questionnaire was prepared for this study and distributed to the parents of 1.150 school age children whom aged 6-12 years.
- Results** Of the 1.150 questionnaires distributed, 1000 (87%) were completed. The overall prevalence of nocturnal and diurnal enuresis were 22% (n = 220) and 1.9% (n =25) respectively. Although male gender, low age, history of enuresis among parents, low educational level of the parents, deep sleep, increased number of siblings, increased numbers of people sleeping in the child's room, history of enuresis among siblings, poor school performance and history of recurrent urinary tract infections (UTI) were significantly associated with enuresis, but not with the severe enuresis. The percentage of children with enuresis seen by physician for treatment was 17.2%. The most preferred treatment option for enuresis was medications (59.5%), whereas alarm treatment was the least preferred (2.4%).
- Conclusion** The results with enuresis prevalence and associated risk factors were comparable to other epidemiological studies from various countries, but it is higher in our country. Furthermore we demonstrated that families in the Tikrit do not pay sufficient attention to enuresis and most of enuretic children do not receive professional treatment.
- Key Words** Enuresis, family characteristics, prevalence

Introduction

Nocturnal enuresis (NE) also known as nighttime incontinence or bed-wetting refers to involuntary voiding only at night beyond the age at which most children have stopped ⁽¹⁾. Nocturnal enuresis is a very common clinical problem in children, especially in boys. Despite the fact that this condition is usually labeled benign, it often leads to considerable emotional distress and concern in affected children and their parents ⁽¹⁾. Approximately 15% a spontaneous resolution

rate of about 15% per year; therefore, by the age 15, only about 1% of adolescents have a problem with NE ⁽²⁾. The etiology of enuresis is not completely understood. This condition probably has a multifactorial etiology. Most studies have consistently found that the risk factors for enuresis are male gender, low age, and family history of enuresis, divorced parents and deep sleep ⁽³⁻⁷⁾.

The aim in this study was to determine the prevalence and associated risk factors of

enuresis in Tikrit children and to identify common methods of its management.

Methods

A prospective cross sectional epidemiological study was performed among primary school children living in Tikrit, Beji during the period from the October 2008 to the June 2009. A self-administered questionnaire was prepared for this study and distributed to the parents of 1.150 school age children whom aged 6-12 years. The study consisted of five schools selected randomly. To minimize any embarrassment to the children, parents were accessed directly to obtain the information.

The questionnaire consisted of two parts. The first part was designed to investigate associated risk factors of enuresis, and the second part was planned to determine type and prevalence of enuresis and to identify common methods of its management. The questions in the first part asked about sex, age, education level of parents, other enuretic children in the family, presence of other people sleeping in the child's room, sleeping habit, number of siblings, school performance, history of urinary tract infection (UTI) and upper respiratory tract infections (URTI).

The second part of the questionnaire was completed only by the parents of the enuretic children. The questionnaire in this part asked

about the frequency of bed-wetting at night and/or in daytime, wetting after a continuous dry period of 6 > months and any history medical treatment of enuresis.

Enuresis was defined as an episode of bed-wetting occurring at least once a month. Primary enuresis was defined as bed-wetting in subjects who have never been dry for an extended period. Furthermore secondary enuresis was defined as the onset of wetting after a continuous dry period of 6 > months and diurnal enuresis was defined as daytime wetting when the child awakes.

All the data was analyzed with SPSS software for windows (Chicago, IL, USA). Univariate Chi-square test and multivariate logistic regression test was used for the statistical analysis and P value < 0.05 was considered as statistically significant.

Results

Of the 1,150 questionnaires distributed, 1000 (87%) were returned from the parents. The main age of the children included in the study was 8.8 ±1.3 years. The overall prevalence of nocturnal and diurnal enuresis were 22% (n = 220) and 2.5% (n = 25), respectively. Nocturnal enuresis was primary in particularly more prevalent in boys than in girls, but diurnal enuresis did not reveal a gender bias (Table 1).

Table 1. Prevalence of enuresis

Type	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Nocturnal enuresis	120	24.6	100	9.5	220	22
Diurnal enuresis	13	2.6	12	2.3	25	2.5

N = Total number. % = percent

Furthermore the prevalence of enuresis decreased with age. Of the 6- year-old children 30.8% still wetted their beds, while none of those aged 12 years did so. The prevalence of enuresis in males and females according to age group are shown in (Table 2).

Several parental factors that are related to enuresis like history of enuresis and low educational level of the parents were significantly higher in children with enuresis when compared to non-enuretics (Table 3).

Table 2. The frequency of nocturnal enuresis in relation to age and gender

Age (years)	Boys		Girls		Total	
	n/N	% *	n/N	% *	n/N	% *
6	4/8	3.3	-/5	-	4/13	1.8
7	20/71	16.7	16/75	16	36/146	16.3
8	41/135	34.1	31/164	31	72/299	32.7
9	31/136	25.8	34/134	34	65/270	29.5
10	16/70	13.3	14/69	14	30/139	13.6
11	8/44	6.6	5/57	4.8	13/101	5.9
12	-/24	-	-/8	-	-/32	-
Total	120/488	24.6	100/512	19.5		

n = number of enuretic children; N = total number in each age group; * = percentage in enuretic children.

Table 3. Parental factors that were related to enuresis

Factors		Enuretics		Non-enuretics		p Value
		No.	%	No.	%	
Family work	Mother	26	11.8	174	15.7	NS
	Father	201	91.3	1001	93.7	NS
Parent Death	Mother	1	0.4	6	0.5	NS
	Father	-	-	2	0.2	NS
Mother Education Level	Primary school or less	194	88.1	755	68.3	< 0.001
	High school or more	39	17.7	350	31.7	
Father Education Level	Primary school or less	169	76.8	570	51.6	< 0.001
	High school or more	61	27.7	535	48.4	
Family history of enuresis	Mother or father enuretic	72	32.7	122	11	< 0.001
	Mother & father enuretic	33	15	30	2.7	
	Mother & father non-enuretic	129	58.6	871	87.1	

NS = not significant

The rate of male gender, low age, deep sleep (state of sleep from which it is difficult to a waken. It is represented by slower brain waves called delta activity on EEG. It is a type of NREM sleep and is called stage 3 on sleep studies also known as delta sleep, slow-wave sleep. Example; when my son is in deep sleep, he is nearly impossible to a waken, poor school performance, history of enuresis in siblings, increased number of siblings, increased room sharing with other siblings and recurrent UTI were significantly higher in enuretics when compared to non-enuretic children (Table 4). The severities of enuresis for four categories of frequency (every night, 4-6 times per week, 1-3

times per week and 1-2 times per month) were 33.3%, 10.7%, 25.6% and 30.3%, respectively. On the other hand the factors that were significantly related to enuresis were not related to severe enuresis (every night) ($p > 0.05$).

The percentage of children with enuresis seen by physician for treatment was 17.2%. The treatment modalities offered to these children were medications (59.5%), waking to void (26.2%), wait for maturity (7.1%) (Maturation of urinary sphincter occurs in 75% of children by age 5 year, and 90% by age of 8 year without any treatment), fluid restriction (4.8%) and alarm treatment (2.4%). The enuresis

alarm is one of the best and most widely used (country).
therapies against bed wetting, (not in our

Table 4. The associated factors related to children for enuresis

Factors		Enuretics		Non-enuretics		p Value
		No.	%	No.	%	
Deep sleeper		134	60.9	343	31	<0.001
Number of siblings	None	17	7.7	154	13.9	0.003
	Single sibling	93	42.3	520	47.1	
	2 or more	105	47.7	431	39	
Room sharing	None	40	19.5	298	27	0.009
	1 person	120	54.5	556	50.3	
	2 person	60	27.2	251	22.7	
History of enuresis in the siblings		115	52.2	248	22.4	< 0.001
School performance	Good	80	36.3	550	49.8	< 0.001
	Moderate	95	43.1	445	40.3	
	Fail	50	22.7	110	10	
Recurrent UTI		40	18.1	143	12.9	0.037
Recurrent URTI		51	23.1	233	21.1	NS

UTI = urinary tract infection; URTI = upper respiratory tract infection; NS= not significant.

It consists of a detector placed in the child's underpants or under the sheets and a device that gives off a strong sound signal whenever there is urine on the detector. In this way the sleep of the child is gradually changed so that he or she notices when the bladder is about to be emptied. The alarm treatment is completely harmless and will - if it is used correctly - cure most, but not all, bed wetting children. Unfortunately this alarm was not available in our country but can be getting from out side (other countries), as in my research some family was getting it from other countries.

The explanation of these risk factors is in male some percent of enuresis even after 18 years, but in female extremely rare, in low age because of maturation of urinary sphincter, in poor school performance either due to behavioral disorder or due to neurological problems, in recurrent UTI may be due to increase of frequency, urgency or may be due to congenital anomalies of urinary tract.

Discussion

Enuresis is one of the common disorders in pediatric population. In most countries the prevalence of enuresis among 6-11 years old children is reported as 1.4-28%^(3-5,7). Likewise in the present study we obtained the prevalence of enuresis in children at 6-12 years of age as 22%. In previous studies reported from different Iraqi provinces, the prevalence of enuresis was reported as 5-11.7%, which was lower than our study's prevalence⁽⁶⁾.

Previous studies demonstrated that the prevalence of enuresis tended to decrease with increasing age, and it was more common in boys rather than girls. Similarly in the present study 30.8% of the children were wetting their beds at age 6 whereas none of them were wetting their beds at age 12. However a small number of children in the age group 6 and 12 (n = 13 and 32 respectively) was the limitation of our study. Furthermore the prevalence of enuresis in boys and girls were 24.6% and 19.5% respectively.

In another study which was conducted by Lee et al⁽⁴⁾ reported the prevalence of enuresis at age 7 as 20.4% and this rate decreased to 5.6% by age 12⁽⁴⁾. The parental factors that were significantly related to the prevalence of enuresis in our study were history of enuresis and the low educational level of the parents. In this study the rate of history of enuresis in the parents 32.7% in the enuretic children whereas this rate was only 11% in the non-enuretic children. Furthermore previous studies reported the prevalence of family history in the enuretic children as 22-48%^(3,7, 8). Twin studies also support a genetic basis for enuresis. The concordance rate is much higher in monozygotic twins (36%)⁽⁹⁾. Danish researchers were the first to report an unidentified enuresis gene (ENUR1) in chromosome region 13q⁽¹⁰⁾. Later studies have also shown linkage to chromosome 12q and chromosome 22^(11,12). Corresponding with previous studies, in our study the factors that are significantly related to enuresis were male gender, low age, deep sleep, poor school performance, history of enuresis in the siblings, increased number of siblings, room sharing and recurrent UTI. However URTI of the children were not related with enuresis. On the other hand further reported factors that significantly related to enuresis were divorced parents, low birth rate, growth retardation, constipation, bronchial asthma, allergy and liquid intake before go to sleep^(3,5,13,14).

We defined severe enuresis as bed wetting every night (33.3%) which did not related to any of factors stated above. However, Chang reported that deep sleep is significantly related with bed wetting more than three times a week⁽⁵⁾. Watanabe and Kawauchi showed that the arousal center was activated to turn deep sleep into light sleep when the bladder was distended⁽¹⁵⁾. They also found that a disturbance in this arousal system might result in sustained deep sleep and hence cause enuresis.

In the present study only 17.2% of the children were seen by a physician and previous series

reported as 11-34%^(4,6,7). These low rates demonstrate that most of the children with enuresis were not treated. On the contrary in the present study most of the children (61.9%) were treated with professional methods provided by physicians. While the use of alarm treatment was significantly lower when compared to medications (2.4% vs. 59.5%). However at present the use of alarm for enuresis treatment is the preferred treatment modality because of high success rate and low relapses⁽¹⁶⁾.

Conclusions

The results with enuresis prevalence and significant risk factors were male gender, low age, history of enuresis among parents, low educational level of the parents, deep sleep, poor school performance and history of recurrent UTI, and were comparable to other epidemiological studies from various countries. We documented that most of the children with enuresis were not treated and the families in Tikrit do not have adequate attention about enuresis and most of the enuretic children do not receive professional treatment.

References

1. Boris NW, Richard D. Vegetative Disorder. In: Behrman RE, Kliegman RM, Jenson HB, Stanton BF(ed). Nelson Textbook of Pediatrics. 18th ed. Philadelphia; Saunders. 2007; p. 113-4.
2. Lawless MR, McElderry DH. Nocturnal enuresis: current concepts. *Pediatr Rev* 2001; 22(12): 399-407.
3. Kalo BB, Bella H. Enuresis: prevalence and associated factors among primary school children in Saudi Arabia. *Acta Pediatr* 1996; 85: 1217-22.
4. Lee SD, Sohn DW, Lee JZ, et al. An epidemiological study of enuresis in Korean children. *BJU Int* 2000; 85: 869-73.
5. Chang P, Chen WJ, Tsai WY, et al. An epidemiological study of nocturnal enuresis in Taiwanese children. *BJU Int* 2001; 87: 678-81.
6. Ali ShH, AL-Roznamchi NA. Childhood enuresis. A clinical and epidemiological study. *Iraqi Postgrad Med J* 2003 Apr; 2(3): 284-288.
7. Bower WF, Moore KH, Shepherd RB, et al. The epidemiology of childhood enuresis in Australia. *Br J Urol* 1996; 78: 602-6.

8. Hogg RJ. Genetic factors as predictors for desmopressin treatment success. *Scand J Urol Nephrol* (Suppl.) 1997; 183: 37-9.
 9. Bakwin H. Enuresis in twins. *Am J Dis Child* 1991; 121: 222-5.
 10. Eiberg H, Berendt I, Mohr J. Assignment of dominant inherited nocturnal enuresis (ENURI) to chromosome 13q. *Nat Genet* 1995; 10: 354-6.
 11. Arnell H, Hjalmas K, Jagervall M, et al. The genetics of primary nocturnal enuresis: *inheritance* and suggestion of a second major gene on chromosome 12q. *J Med Genet* 1997; 34: 360-5.
 12. Eiberg H. Total genomes scan analysis in a single extended family for primary nocturnal enuresis: evidence for a new locus (ENUR3) for primary nocturnal enuresis on chromosome 22q11. *Eur Urol* 1998; 33 Suppl 3: 34-6.
 13. Rawashdeh YF, Hvistendahl GM, Kamperis K, et al. Demographics of enuresis patients attending a referral center. *Scand J Urol Nephrol* 2002; 36: 348-53.
 14. Cher TW, Lin GJ, Hsu KH. Prevalence of nocturnal enuresis and associated familial factors in primary school children in Taiwan. *J Urol* 2002; 168: 1142-6.
 15. Watanabe H, Kawauchi A. Locus coeruleus function in enuresis. *Scand J Urol Nephrol Suppl* 1999; 202: 14-7.
 16. Jensen N, Kristensen G. Frequency of nightly wetting and the efficiency of alarm treatment of nocturnal enuresis. *Scand J Urol Nephrol* 2001; 35: 357-63.
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