

Nocturnal Enuresis and its Relation to Child's Behavior in a Sample of Children from Baghdad, Iraq

Alaa A. Saleh¹ MBChB, Atheer J. Al-Saffar² MBChB, FICMS

¹Ministry of Health, ²Dept. of Family & Community Medicine, College of Medicine, AL-Nahrain University, Baghdad, Iraq.

Abstract

Background Nocturnal enuresis is one of common clinical problems in pediatric population that frequently diagnosed among school age children.

Objectives To determine the prevalence of nocturnal enuresis, to detect the socio-demographic factors that may correlates with nocturnal enuresis and to assess the emotional and behavioral disorder in children with enuresis.

Methods A cross sectional study was performed among children (5-15 years old) visited the general pediatric out patient in Al-Imamain Al-Kadhimain Medical City in the capital Baghdad during the period from the first of December 2013 to the first of April 2014, a special questionnaire was prepared for this study with assessment of Parents' Rutter Behavioral Questionnaire.

Results Out of 623 children studied the overall prevalence of nocturnal enuresis was 29.5% (n=184). Male gender (60.3% of enuretic children), young age (37% of enuretic children at age 5-6 years old), positive family history of nocturnal enuresis (founded in 71.7% of enuretic children), large family size and increased number of household children (half of enuretic children living in extended family and household children more than four), these were significantly associated with the prevalence of nocturnal enuresis. Among the enuretic children, about half of them (45.1%) had moderate school performance, 50.5% had positive history of recurrent urinary tract infection and 63% had behavioral disturbances, so these factors were significantly associated with the prevalence of nocturnal enuresis.

Conclusion Nocturnal enuresis is a common problem among school children, with four-fold risk among children with disturbed behavior. Most of the families do not have adequate attention about enuresis and most of the enuretic children don't receive professional treatment.

Key words Nocturnal enuresis, prevalence, behavioral disturbance, and Rutter Behavioral Questionnaire.

List of abbreviation: % = percentage with total column, C.I = confidence interval, DSM = diagnostic and statistical manual of mental disorders.

Introduction

According to the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-V); nocturnal enuresis (also called bedwetting) is the status that a child must meet four criteria in order to be diagnosed with clinical enuresis: (a) repeated voiding of urine into clothing or bedding (whether involuntary or

intentional); (b) the behavior is clinically significant as manifested by either a frequency of twice per week over the course of at least three months, or clinically significant impairment or distress in academic (occupational), social, or other important areas of functioning, (c) chronological age is at least 5 years of age, or have attained the equivalent developmental level, and (d) voiding behavior that is not exclusively due to the physiological effect of a substance (e.g. a diuretic or antipsychotic

medication) or another medical condition (e.g., spina bifida, diabetes, or a seizure disorder) ⁽¹⁾. Enuresis may be classified as primary in a child who has never established urinary continence for more than six months or secondary if resumption of enuresis occurs after at least six months of urinary continence. Alternatively, enuresis is said to be mono-symptomatic if it is uncomplicated or non-mono-symptomatic if concomitant lower urinary tract symptoms exist ⁽²⁾.

By the age of 3 years, nearly 75% of children attain nighttime dryness. Boys tend to be slower than girls in acquiring dryness. The prevalence of bedwetting decreases with increasing age. It is estimated that around 10-20% of 5-year-old children wet the bed at night. However, by adolescence only 1% continues to have this problem.

Genetic predisposition is the most frequently supported etiologic variable; the risk of nocturnal enuresis is 15% if neither parent was affected, 40-44% if one parent was affected and 75-77% ⁽³⁾.

Nocturnal enuresis was once thought to be a psychological condition; it now appears that psychological problems are the result of enuresis and not the cause ⁽⁴⁾. For most children, bedwetting is not an act of rebellion; on the other hand, stress is a cause of people who return to wetting the bed. Researchers find that moving to a new town, parent conflict or divorce, arrival of a new baby, or loss of a loved one or pet can cause insecurity and contributing to returning bedwetting ^(5,6).

Iraq has passed through several conflicts and Baghdad –the capital had never been secured since 10 years that contributed for abnormal behaviors among children, for which this study was conducted to determine the prevalence of nocturnal enuresis in a sample of children from Baghdad and to assess the emotional and behavioral disorders in children with enuresis.

Methods

This cross-sectional study was carried out from the first of December 2013 to the first of April

2014 at the pediatric out-patient in Al-Imamain Al- Kadhimain Medical City/ Baghdad-Iraq. The study involved all children aged 5-15 years taken consecutively during the study period. Children with cerebral palsy, spina bifida or diabetes mellitus were excluded from the sample.

The parents' or the care giver of the children were interviewed directly using a questionnaire specially prepared for this study that consisted of three parts:

The first part included socio-demographic characteristics of the sample.

The second part was designed to enquire about the presence of nocturnal enuresis and its relevant characteristics. Children without nocturnal enuresis were asked about the age of dryness.

The third part consisted of Rutter Behavioral Questionnaire ⁽⁷⁾ as reported by the parents (preferably the mother); that was translated to Arabic language by the researcher and approved by three psychiatrists.

Approval of Al-Nahrain College of Medicine Institution Review Board to conduct this study was obtained and a written informed consent from the parents to participate in this study before data collection was obtained also. Data collected were analyzed using SPSS-16 software for windows, chi-square test, t-test, ANOVA and multivariate logistic regression tests were used for the statistical analysis whatever applicable and *P* value of less than 0.05 was considered statistically significant.

Results

A total of 623 children with mean age of 8.00 ± 2.49 years (ranged 5-15 years) were included, of them 53.3% (n=332) were males.

According to DSM-V ⁽¹⁾, the overall prevalence of nocturnal enuresis was 29.5% (n=184), 84.8% (n=156) were of primary type and 15.2% (n=28) had secondary nocturnal enuresis. Enuresis was every night in frequency in 58.7% (n=108) of the children, 5.4% (n=10) had 4-6 times per week, and 35.9% (n=66) had 1-3 times enuresis per week. Males were significantly more enuretic than females (60.3% versus 39.7% and *P*= 0.02).

Nocturnal enuresis decreased very clearly with increasing age from 36.9% (n=68) in children aged 5-6 years old to 3.8% (n=7) in children \geq 13 years old, with significant association between the age and the sex of enuretic children (Table 1).

The results revealed that having extended families with more children and positive family history of nocturnal enuresis (including both parents side and siblings), were significantly higher among enuretic children compared to non-enuretic children. Also children with positive history of urinary tract infection and bad school performance (based on the final school report for the previous year) were significantly more among enuretic children (Table 2).

More than one third of the participated children 221 (35.5%) scored 13 or more by Rutter behavioral questionnaire indicating emotional and behavioral disturbances. A significant differences ($P = 0.000$) between the mean score for enuretic (13.712 ± 5.113 degrees) and non-enuretic children (9.751 ± 5.197 degrees) was found (Table 3).

Moreover, logistic regression design for nocturnal enuresis for almost all the studied contributors showed disturbed emotion and behavior among the studied children was the only responsible factor for having enuresis in this sample (Table 4).

Discussion

Enuresis is an important health problem both from medical and social perspective. It can be troublesome to normal family life and can generate stress between parents and children. Previous studies have shown varying prevalence rates of nocturnal enuresis in children, these variations may be attributed to differences in the objectives and definitions adopted by researchers. Worldwide, the prevalence of nocturnal enuresis among 5-15 year old children was reported as 4.6%–28.6%⁽⁸⁻¹⁵⁾. The prevalence found in this study was higher than that reported by most studies including other Iraqi studies that reported different prevalence of nocturnal enuresis ranged 6-24.7%⁽¹⁶⁻²¹⁾, the rate reported by a study in Niger was 23.2% of (6-12 years old children)⁽¹³⁾ and in Turkey 23.5% of (6-14 years old children)⁽¹⁴⁾, while comparable to a study in Yemen, Mukala, a prevalence of 28.5% for 6-15 years old children was reported⁽¹⁵⁾.

Possible reasons for such wide variation among countries and even those within Iraq might be due to socio-cultural variations between the countries and regions and the difference in study design starting from the definition of the study population, population based or health facility-based, and may be due to differences in selection criteria, including age ranges, definitions of enuresis, genetic predisposition, traditional and cultural background.

Table 1. Relation between the age and sex distribution of nocturnal enuretic children

Age (years)	Males		Females		Total		Significance
	No.	%	No.	%	No.	%	
5-6	33	29.7	35	47.9	68	36.9	$\chi^2 = 17.149$ $P = 0.002$
7-8	22	19.8	18	24.7	40	21.7	
9-10	24	21.6	16	21.9	40	21.7	
11-12	25	22.5	4	5.5	29	15.7	
\geq 13	7	6.3	0	0	7	3.8	
Total	111	100	73	100	184	100	

Table 2. The relation of nocturnal enuresis and some selected factors

Factors	Categories	Nocturnal enuresis				P Value
		No		Yes		
		No.	%	No.	%	
Mother education Level (n=617)	Primary school or less	255	58.8	104	56.8	0.658
	High school or more	179	41.2	79	43.2	
Father education level (n=595)	Primary school or less	179	42.6	77	44	0.757
	High school or more	241	57.4	98	56	
Mother occupation (n=617)	Housewife mother	415	95.6	177	96.7	0.527
	Working	19	4.4	6	3.3	
Father occupation (n=595)	Unemployed	12	2.9	7	4	0.705
	Employed	277	66	111	63.4	
	Self-employed	131	31.2	57	32.6	
Dead parent (n=623)	No	415	94.5	174	94.6	0.987
	Yes	24	5.5	10	5.4	
Family composition (n=623)	Nuclear	254	57.9	85	46.2	0.008
	Extended	185	42.1	99	53.8	
Number of children (n=623)	≤ 4	205	46.7	57	31	0.001
	5-8	175	39.9	97	52.7	
	≥ 9	59	13.4	30	16.3	
Family history of nocturnal enuresis (n=623)	No	372	84.7	52	28.3	0.000
	Yes	67	15.3	132	71.7	
Polygamy (n=623)	One wife	414	94.3	168	91.3	0.168
	More	25	5.7	16	8.7	
Consanguinity (n=623)	Yes	177	40.3	85	46.2	0.175
	No	262	59.7	99	53.8	
History of Recurrent UTI (n=623)	Yes	119	27.1	93	50.5	0.000
	No	320	72.9	91	49.5	
School Performance (n=440)	Good	163	53.1	55	41.4	0.002
	Moderate	129	42	60	45.1	
	Fail	15	4.9	18	13.5	
Emotional and behavioral disturbance (n=623)	Yes (score ≥ 13)	105	23.9	116	63	0.000
	No (score < 13)	334	76.1	68	37	

Table 3. Rutter score distribution according to nocturnal enuresis

Nocturnal enuresis	Rutter score Mean ± SD	Total	t-test	P Value
Yes	13.712 ± 5.113	184	8.719	0.000
No	9.751 ± 5.197	439		
Total	10.92±5.47	623		

Table 4. Multivariate analysis of the risk factors for nocturnal enuresis

Factors		Coefficient	Hazard ratio	95% CI	P value
Age (years)		0.006	1.006	0.930-1.088	0.885
Sex	Female Male	0.160	1.173	0.789-1.745	0.429
Mother education Level	Primary school or less High school or more	0.030	0.970	0.646-1.458	0.884
Father education level	Primary school or less High school or more	0.036	0.965	0.646-1.440	0.860
Mother occupation	Housewife Working	0.135	1.144	0.408-3.207	0.798
Father occupation	Unemployed Employed	0.074	1.077	0.374-3.099	0.891
Dead parent	No Yes	20.942	1.245E9	0.000	1.000
Family Composition	Nuclear Extended	0.232	1.261	0.812-1.960	0.302
Number of children		0.022	1.023	0.960-1.090	0.487
Polygamy	One wife More than one	0.268	1.307	0.608-2.808	0.492
Consanguinity	No Yes	0.280	1.323	0.886-1.974	0.171
Behavioral disturbance	No Yes	1.664	5.279	3.562-7.822	0.000

Most of enuretic children in the present study were of primary type 84.8% and 15.2% had secondary enuresis, this was comparable with most of previous studies^(9,11,13,18,20). While the severities of enuresis happened every night in more than half of the children, this was comparable to studies in Basra, Iraq⁽²⁰⁾, Nassiryiah city, Iraq⁽¹⁸⁾, and in Yemen, Aden⁽¹¹⁾. While a study in Jordan⁽⁸⁾ reported only 27.5% had every night bed wetting.

Many studies demonstrated that the prevalence of nocturnal enuresis tended to decrease with increasing age^(10,13,17) as nocturnal enuresis is mostly expected to improve spontaneously⁽²²⁾, and this was comparable with a study in Nassiryiah city, Iraq which reported the prevalence of nocturnal enuresis decline from 40.6% at 5-6 years old to 5.4% at 13-15 years old⁽¹⁸⁾, and with a study in Baghdad⁽²¹⁾ that

reported most of enuretic children (64.5%) were observed at 8-9 years of age and 23.5% at age 10-12 years while only 12% occurred at age 6-7 years.

The results of this study showed the prevalence of nocturnal enuresis was significantly more among males than females but females were younger in age group while more than quarter of the enuretic males was older than 10 years old. This was comparable to findings of a study from Sudan, Niger, and Iraq^(10,13,19,20), while significant predominance among females was reported by a study done in Yemen, Mukala⁽¹⁵⁾ and a study in Baghdad⁽²¹⁾.

In this study, the results revealed that the education level, unemployed and death of parents played no role in the prevalence of nocturnal enuresis and this was in agreement with studies from Turkey⁽¹⁴⁾ Sudan⁽¹⁰⁾ and a

study in Baghdad⁽²¹⁾, but in contrast with results of studies done in Jordan⁽⁸⁾, Yemen, Aden⁽¹¹⁾, Niger⁽¹³⁾, and other Iraqi studies^(17,19) which stated that low education level of parents was significantly associated with the prevalence of nocturnal enuresis. And a study in Egypt, Menofia⁽⁹⁾ reported that working mothers were found to have less enuretic children than housewives and this was thought to be due to the higher educational level of working mothers. This study showed the prevalence of nocturnal enuresis was significantly associated with positive family history of nocturnal enuresis, large family size and increased number of household children, and this agreed with several studies^(15,17,19,20), probably because nocturnal enuresis is commonly a familial disorder, which often has strong genetic roots with higher frequency in parents and sibling of bed wetter than in general population. On the other side, a study in Yemen, Aden⁽¹¹⁾ did not agree with this result and reported there was no significant association between the prevalence of nocturnal enuresis and the number of household children or family composition.

In this study, the personal factors which included the school performance and history of urinary tract infection had a significant association with the prevalence of nocturnal enuresis, and this agreed with other studies in Iraq^(17,21).

The results of this study found three times higher rate of the behavioral disturbance among enuretic children (63%, n=116) than among non-enuretic children (23.9%, n=105) with a significant correlation between the presence of behavioral disturbance and nocturnal enuresis (P= 0.000), with four times increase risk of nocturnal enuresis among disturbed children.

Chang et al found that enuresis was associated with childhood behavioral problems, in particular attention problems, aggressive behavior, lower social competence and low school performance⁽²³⁾.

Comparable to our results a study in UAE⁽⁵⁾ found a significant association between the nocturnal enuresis and behavioral disturbance by using Rutter behavioral questionnaire, and a

study in Egypt, Menofia⁽⁹⁾ reported four times increase risk of nocturnal enuresis among children with emotional and behavioral disturbance. On the other hand, many studies reported that bedwetting had adverse impacts on children's mental health^(15,19,24,25) as children with nocturnal enuresis may experience social isolation, fear of detection, sense of immaturity, and loss of self-esteem, all of which act as a psychological stressors that may increase the risk for behavioral and emotional problems. Furthermore, nocturnal enuresis and behavioral problems may share the same biological, social, and psychological causes⁽²⁶⁾.

In conclusion, enuresis is a pediatric public health problem that associated with male gender, low age, familial factors, personal factors and emotional and behavioral disturbance. Most of the families don't have adequate attention about enuresis and most of the enuretic children don't receive professional treatment.

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Author contributions

Conception and design, data collection, analysis, interpretation, writing and revision of the manuscript were performed by both authors.

Conflict of interest

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References

1. American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders text revision

- (DSM-V-TR). American Psychiatric Association, Washington, DC; 2014.
2. Fritz G, Rockney R, Bernet W, et al. Practice parameter for the assessment and treatment of children and adolescents with enuresis. *J Am Acad Child Adolesc Psychiatr.* 2004; 43: 1540-50.
 3. Wang QW, Wen JG, Zhu QH, et al. The effect of familial aggregation on the children with primary nocturnal enuresis. *Neurourol Urodyn.* 2008; 14: 743-9.
 4. Ozkan KU, Garipardic M, Toktamis A, et al. Enuresis-prevalence and accompanying factors in school children: A questionnaire study from Southeast Anatolia. *Urol Int.* 2004; 73: 149-55.
 5. Eapen V, Mabrouk AM. Prevalence and correlates of nocturnal enuresis in the United Arab Emirates. *Saudi Med J.* 2003; 24(1): 49-51.
 6. Rutter M, Tizard J, Whitmore K. Education, health and behavior. London (UK): Longmans; 1970.
 7. Rutter M, Tizard J, Whitmore K. Education, health and behavior. London (UK): Longmans; (1970).
 8. Al-Rashed KH, Bataineh HA. Frequency of enuresis in (5-10) year old children in Taifila, Jordan. *Shiraz E-Med J.* 2007; 8(1): 1-9.
 9. Al-Kot M, Deeb M. Nocturnal Enuresis among School Children in Menofia Governorate; a Hidden Problem. *J Am Sci.* 2012; 8(1): 327-34.
 10. Salih KM, Ahmed FE, Omer YI, et al. Characteristics and etiological factors of nocturnal enuresis in Sudanese children. *Am J Med Dental Sci.* 2013; 1(2): 40-5.
 11. Yousef KA, Basaleem HO, bin Yahiya MT. Epidemiology of nocturnal enuresis in basic schoolchildren in Aden Governorate, Yemen. *Saudi J Kidney Dis Transplant.* 2011; 22(1): 167-73.
 12. Su MS, Li AM, So HK, et al. Nocturnal enuresis in children: prevalence, correlates, and relationship with obstructive sleep apnea. *Pediatric J.* 2011; 159(2): 238-42.
 13. Paul NI, Alikor EAD, Anochie IC. Factors associated with enuresis among primary school children in Port Harcourt. *Nigerian J Paediatr.* 2013; 40(4): 370-4.
 14. Sahin AH, Sahin H, Budak YU, et al. Prevalence of Nocturnal Enuresis among Primary School Children in Bursa, Turkey. *TAF Prevent Med Bulletin* 2012; 11(2): 139-44.
 15. Aljefri HM, Basurreh OA, Yunus F, et al. Nocturnal enuresis among primary school children. *Saudi J Kidney Dis Transplant.* 2013; 24(6): 1233-41.
 16. Al-Jawadi AA, Abdul-Rahman S. Prevalence of childhood and early adolescence mental disorders among children attending primary health care centers in Mosul, Iraq: a cross-sectional study. *BMC Public Health.* 2007; 7: 274-281.
 17. Ali AM. Prevalence of Enuresis in Sample of Iraqi Children. *Iraqi J Med Sci.* 2012; 10(1): 36-41.
 18. Abed AH, Habib OS, Majeed MN. Prevalence of enuresis in Nassiriyah city-Thi Qar Governorate. *Med J Basrah Univ (MJBUR).* 2009; 27(1): 42-5.
 19. Abdul-Rahman S, Hussain R, Abdul-Rahman S. Prevalence of Bedwetting for Children in Mosul City. *Jordanian Med J.* 2009; 43(1): 44-50.
 20. Abdul-Nabi H Sh, Habeeb SI. Frequency of Enuresis in Primary School Children in Basra and its Impact on Their Growth. *Asian J Pharm Nursing Med Sci.* 2013; 1(2): 45-50.
 21. Salih AA. Nocturnal enuresis: Prevalence and associated Factors. A sample of children in Baghdad. *Middle East J Fam Med.* 2012; 10(5): 29-32.
 22. Unalacak M, Söğüt A, Aktunç E, et al. Enuresis nocturnal prevalence and risk factors among school age children in northwest turkey. *Eur J General Med.* 2004; 1(3): 21-5.
 23. Chang SS, Ng CF, Wong SN. Hong Kong Childhood Enuresis Study Group. Behavioural problems in children and parenting stress associated with primary nocturnal enuresis in Hong Kong. *Acta Paediatr* 2002; 91: 475-9.
 24. Ismail A, Abdelbasser K, Abdel-moneim M. Prevalence and Risk Factors of Primary Nocturnal Enuresis in Primary School Children in Qena Governorate-Egypt. *Egyptian J Neurol Psychiat Neurosurg.* 2013; 50(2): 163-9.
 25. Srivastava S, Srivastava KL, Shingla S. Prevalence of monosymptomatic nocturnal enuresis and its correlates in school going children of Lucknow. *Indian J Pediatr.* 2013; 80(6): 488-91.
 26. Butler RJ. Annotation: Night wetting in children: Psychological aspects. *J Child Psychol Psychiatr.* 2000; 39: 453-63.

Correspondence to Dr. Alaa A. Saleh

E-mail: dr.alaaas81@yahoo.com

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