



NOCTURNAL ENURESIS AMONG PRIMARY SCHOOL CHILDREN IN THE SULTANATE OF OMAN: PREVALENCE AND ASSOCIATED FACTORS

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ABSTRACT

Objective: Nocturnal Enuresis (NE) is a common problem worldwide. The present study aimed to determine the prevalence and associated risk factors of NE in the Sultanate of Oman. **Methods:** This cross-sectional study was conducted between September 2018 and May 2019 at six primary schools in North Al-Batinah and Muscat. The target population included primary school children aged between 5–11 years. Sample stratification was used to select the study population. A previously validated four-part questionnaire was used to assess sociodemographic characteristics and the presence, frequency and timing of enuresis and associated risk factors. **Results:** Of the 1,100 questionnaires distributed, 849 were completed and included in the final analysis (response rate: 77.2%). The majority of the children were female (53.5%) and under 10 years of age (85.7%). The overall prevalence of nocturnal and daytime enuresis was 19.9% and 4.4%, respectively. There was a steady decrease in the frequency of NE with increasing age ($p < 0.001$). Moreover, NE was significantly associated with poor academic performance ($p = 0.040$) and a family history of NE among siblings and parents ($p \leq 0.001$). **Conclusions:** The study findings were comparable to other epidemiological studies from different countries. Overall, NE among primary school children is a relatively common problem in Oman that requires further attention.

KEYWORDS: Urination Incontinence; Nocturnal Enuresis; Children; Primary School; Oman.

INTRODUCTION

Nocturnal Enuresis (NE) is defined as the involuntary passage of urine during sleep beyond the age of anticipated night-time bladder control, generally accepted as five years old.^[1] Urinary tract infection, Constipation, deep sleep is associated with NE. The condition is divided into two types referred to as primary and secondary enuresis. Where Primary NE is considered in cases where the affected individual has never been continent over consecutive nights for longer than six months, while secondary NE refers to the sudden onset of bedwetting on consecutive nights following a six-month period of continence or longer.^[2] Primary NE more than the secondary, Low level of education of parents, low level of standard, family history are the main contributing NE factors between the children. While, the prevalence's of NE decreases by the increasing of age.^[3] Primary enuresis is often associated with a family history of delayed urinary bladder control, while secondary enuresis may be due to urological or neurological problems, such as disorders of the spinal cord and recurrent urinary tract infections (UTIs).^[4] Overall, 90% of NE cases are primary in nature, with prevalence rates declining with age from 10% in 6-year-olds to 5% in 10-year-olds and

0.5–1% in teenagers and young adults.^[4,5] However, epidemiological studies have reported varying frequencies of this disorder depending on the location and characteristics of the studied population and the definition used for diagnosis. The prevalence of NE was 15.4% in Egypt and 3.99% in China.^[6,7]

In Middle-East countries, a cross sectional descriptive study conducted in Saudi Arabia to find the prevalence of nocturnal enuresis in children, their risk factors and management modalities of enuresis among 3-12-year-old children in different cities in KSA. The study found 31.2% of children had suffered from NE.^[8] While a cross-sectional analytical study of Prevalence and factors associated with nocturnal enuresis among children conducted in Bahrain which found 11.1% of overall prevalence of NE in primary school children. The study concludes that the significant relationship between primary NE and the level of education of the father, number of siblings, and family history of NE.^[9] A prospective study was designed by primary health care centers in Qatar to collect information on Nocturnal Enuresis of children. The results indicated a 36.3% prevalence of Enuresis in children. This study evaluates

the different associations between NE and medical and psychological conditions, and to assess the impact of the condition in children and families.^[10] Vasopressin is a hormone which contributes to the maintenance of water homeostasis in the body.^[11] In children, a nocturnal peak in vasopressin secretion coupled with urine production which exceeds the functional bladder capacity can result in bedwetting.^[12] Various causative agents have been identified, including developmental differences in the growth of the urinary sphincter, diabetes and emotional crises such as the birth of a new baby, academic stress, parental separation or divorce and family conflict.^[13,14] Moreover, certain risk factors have been shown to increase the risk of NE, such as gender—with NE three times more common in boys than girls—and a family history of NE in one or more of the parents or siblings.^[15,16] Moreover, recurrent UTIs and constipation also play a role in the likelihood of enuresis.^[17] It is important to increase awareness of NE, identify children at risk and implement therapeutic measures when necessary. In Oman, the prevalence of NE is still unknown and, to the best of the author's knowledge, no study has yet sought to establish the frequency of the condition and its impact on family and children. Therefore, the aim of this study was to estimate the prevalence of NE in primary school children in Muscat and North Al-Batinah and to investigate associations with potential risk factors. It is hoped that these findings will help to promote awareness in the community and trigger better management and identification of the problem through the development of focused recommendations and guidelines.

METHODS

Study Design and Setting

This cross-sectional study was conducted between September 2018 and May 2019 at six primary schools in North Al-Batinah and Muscat. These two regions were selected as they were convenient, most populated and easily accessible.

Study Population and Sampling

The target population included Omani children aged 5–11 years who attended governmental schools in the selected regions. In total, there are 965 primary schools in Oman with a total of 32,186 students.^[18] Multistage cluster sampling was used to obtain a representative sample. Three *wilayat*'s (counties) from each region were selected randomly, with every *wilayat* considered a cluster. Subsequently, one mixed gender school was selected randomly from each cluster, resulting in a total of six schools. Systematic sampling was then performed to recruit every 10th student (i.e., everyone in 10 students) from these schools, with a proportional number of male and female students. The necessary sample size was calculated to be 850 students based on an estimated prevalence rate of 10%, marginal error of 2% and at a 95% confidence interval.^[19] As primary school children in Oman, especially in the Muscat region, have diverse cultural and socioeconomic backgrounds, this sample

was deemed representative of children in the whole country. Children with recurrent UTIs due to congenital anomalies of the urinary tract system, diabetes mellitus and neurological problems were excluded from the study.

Data Collection and Analysis

An already validated four-part Arabic questionnaire was used to collect data from the participants.^[20] The first section of the questionnaire was designed to determine the presence, frequency and timing of enuresis. The second part assessed the sociodemographic characteristics of the population, including age, gender, academic performance and history of UTIs, jaundice and breastfeeding practices. The third section incorporated questions inquiring about enuresis-related risk factors, such as maternal and paternal education level, parental marital status and family history of NE. The final part of the questionnaire evaluated the use of NE treatment modalities, if any. In addition, an extra question was incorporated and addressed to the parents to inquire about the impact of enuresis on them and their children. In order to account for missing responses, a total of 1,100 questionnaires were distributed. Statistical analyses of the data were performed using the Statistical Package for the Social Sciences (SPSS) version 22 (IBM Corp., Armonk, NY, USA). Results were reported as frequencies and percentages. Univariate and multivariate logistic regression analyses were performed using Chi-squared tests to determine significant predictive factors for NE. A *p* value of <0.05 was considered statistically significant. The research protocol for this study was approved by the Research Ethics Committee of the Ministry of Education. Written consent was obtained from the parents of all children who agreed to participate in the study after providing a full explanation of the study's aims and procedures.

RESULTS

Of the 1,100 questionnaires distributed, a total of 849 were included in the final analysis (response rate: 77.2%). Overall, there were 395 (46.5%) male and 454 (53.5%) female students. The majority of the children (85.7%) were under 10 years of age, with 27.7% and 35.8% being either 8 or 9 years old, respectively. Most children (73%) demonstrated excellent academic performance, with only 3.4% performing poorly. Over 90% of the children's parents were educated to the secondary school level or higher and 30.3% of the children had working mothers [Table 1].

[Insert Table 1]

The overall prevalence of nocturnal and daytime enuresis was 19.9% (95% CI: 17.4–22.7%) and 4.4% (95% CI: 3.18–5.95%), respectively. While there was a steady decrease in the frequency of NE with increasing age, there was no difference in the frequency of NE according to gender [Table 2].

[Insert Table 2]

With regards to personal risk factors, poor academic performance was significantly higher among enuretic children compared to non-enuretic children (5.3% versus 2.9%; $p = 0.040$). However, differences in other personal risk factors were not statistically significant, including a history of UTIs, breastfeeding practices, neonatal jaundice and febrile convulsions [Table 3].

[Insert Table 3]

With regards to familial risk factors, a positive family history of NE on the part of both siblings (68.6% versus 5.9%; $p < 0.001$) and parents (16.6% versus 3.4%; $p < 0.001$) was significantly more frequent among enuretic

compared to non-enuretic children. In contrast, no significant differences were noted in terms of other family risk factors like parental education level, parent death, larger families and a history of maternal smoking during pregnancy [Table 4].

[Insert Table 4]

According to the multivariate analysis, age ($p < 0.001$), sibling history of NE ($p = 0.001$) and parental history of NE ($p < 0.001$) were the only significant predictors of NE among primary school children in Oman [Table 5].

[Insert Table 5]

Tables

Table 1: Demographic characteristics of primary school children in Oman (n = 849).

Characteristic	Category	n (%)
Gender	Female	454 (53.5)
	Male	395 (46.5)
Age (years)	5	8 (0.9)
	6	42 (4.9)
	7	139 (16.4)
	8	235 (27.7)
	9	304 (35.8)
	10	120 (14.2)
	11	1 (0.1)
Academic performance	Excellent	620 (73)
	Good	200 (23.6)
	Poor	29 (3.4)
Recurrent UTIs	Yes	45 (5.3)
	No	804 (94.7)
History of neonatal jaundice	Yes	240 (28.3)
	No	609 (71.7)
Breastfed for >1 year	Yes	554 (65.3)
	No	295 (34.8)
History of febrile convulsions	Yes	34 (4)
	No	815 (96)
Sibling history of NE	Yes	156 (18.4)
	No	693 (81.6)
Parental history of NE	Yes	52 (6.1)
	No	797 (93.9)
Maternal educational level	Primary school or lower	60 (7.1)
	Secondary school or higher	789 (92.9)
Paternal educational level	Primary school or lower	65 (7.7)
	Secondary school or higher	784 (92.3)
Working parent*	Father	749 (88.2)
	Mother	257 (30.3)
Deceased parent	Father	8 (0.9)
	Mother	4 (0.5)
History of maternal smoking during pregnancy	Yes	5 (0.6)
	No	849 (99.4)
Divorced parents	Yes	14 (1.6)
	No	835 (98.4)
Number of family members	<3	49 (5.8)
	4–5	366 (43.1)
	>5	434 (51.1)
Planned pregnancy	Yes	542 (63.8)
	No	307 (36.2)
Maternal smoking	Yes	5 (0.6)

	No	844 (99.4)
Treatment for NE	Yes	45 (5.3)
	No	804 (94.8)

UTIs: urinary tract infections; NE: nocturnal enuresis. *Percentages do not add up to 100% as some children had more than one working parent.

Table 2: Frequency of nocturnal enuresis in relation to age and gender among primary school children in Oman (n = 849).

Age (years)	n/N (%)		
	Boys	Girls	Total
5	6/6 (100)	1/2 (50)	7/8 (87.5)
6	6/16 (37.5)	14/26 (53.8)	20/42 (47.6)
7	21/83 (25.3)	10/56 (17.9)	31/139 (22.3)
8	19/99 (19.2)	19/136 (14)	38/235 (16.2)
9	31/140 (21.0)	23/163 (14.1)	54/304 (17.5)
10	7/49 (14.3)	11/71 (15.5)	18/120 (15)
11	1/1 (100)	0/0 (0)	1/1 (100)
Total	91/394(23.1)	78/454 (17.2)	169/849 (19.9)

N: total population.

Table 3: Personal factors related to nocturnal enuresis among primary school children in Oman (n = 849).

Factor	Category	n (%)		p value
		NE (n = 169)	No NE (n = 680)	
Academic performance	Excellent	111 (65.7)	509 (74.9)	0.040
	Good	49 (29.0)	151 (22.2)	
	Poor	9 (5.3)	20 (2.9)	
History of UTIs		12 (7.1)	33 (4.9)	0.164
History of neonatal jaundice		52 (30.8)	188 (27.6)	0.237
Breastfed for >1 year		118 (69.8)	436 (64.1)	0.095
History of febrile convulsions		7 (4.1)	27 (4.0)	0.530

NE: nocturnal enuresis; UTIs: urinary tract infections.

Table 4: Family factors related to nocturnal enuresis among primary school children in Oman (n = 849).

Factor	Category	n (%)		p value
		NE (n = 169)	No NE (n = 680)	
Maternal educational level	Primary school or lower	15 (8.9)	45 (6.6)	0.193
	Secondary school or higher	154 (91.1)	635 (93.4)	
Paternal educational level	Primary school or lower	18 (10.7)	47 (6.9)	0.074
	Secondary school or higher	151 (89.3)	633 (93.1)	
Working parent*	Mother	58 (34.3)	197 (76.7)	0.118
	Father	151 (89.3)	598 (87.9)	0.361
Parental history of NE	Yes	28 (16.6)	24 (3.5)	0.000
	No	141 (83.4)	656 (96.5)	
Sibling history of NE	Yes	116 (68.6)	40 (5.9)	0.000
	No	53 (31.4)	640 (94.1)	
Divorced parents	Yes	4 (2.4)	10 (1.5)	0.298
Number of family members	<3	12 (7.1)	37 (5.4)	0.689
	4	21 (12.4)	98 (14.4)	
	5	46 (27.2)	201 (29.6)	
	>5	90 (53.3)	344 (50.6)	
Deceased parent	Mother	0 (0)	4 (0.6)	0.411
	Father	2 (1.2)	6 (0.9)	0.495
Planned pregnancy	Yes	111 (65.7)	431 (63.4)	0.322
History of maternal smoking during pregnancy	Yes	1 (0.6)	4 (0.6)	0.671

NE: nocturnal enuresis. *Percentages do not add up to 100% as some children had more than one working parent.

Table 5: Multivariate analysis to determine predictors of nocturnal enuresis among primary school children in Oman (n = 849)

Predictor	OR	95% CI	p value
Age	0.715	0.613–0.833	0.000
Gender	1.389	0.976–1.977	0.068
Sibling history of NE	2.034	1.340–3.087	0.001
Parental history of NE	4.545	2.469–8.366	0.000

OR: odds ratio; CI: confidence interval; NE: nocturnal enuresis.

DISCUSSION

This cross-sectional study was conducted in order to detect the prevalence of NE in the Sultanate of Oman. To the best of the author's knowledge, this is the first study on this topic in Oman, thereby providing important initial data which can be used as a baseline for further research. The overall prevalence of NE was 19.9%. In contrast, other studies have reported higher rates in Qatar (36.3%) and Saudi Arabia (31.2%), while lower prevalence rates have been observed in Bahrain (11.1%). In the majority of cases, NE is self-resolving with age, with the gradual decrease in bedwetting frequency thought to be due to spontaneous improvement over time.^[6] Indeed, as was to be expected, the present study noted a significant decrease in the prevalence of NE with increasing age. Similar findings in Saudi study also indicate that the prevalence of nocturnal enuresis in children is between 15 and 25% at five years of age, and it goes down as children grow.^[8] However, while NE was more common in boys compared to girls (22.9% versus 17.2%), this difference was not statistically significant. Contradictory findings with regards to gender have been reported in the existing literature, with some studies revealing a significant association between NE frequency and being male while others do not.^[21,22,23,24] It is as yet unclear why NE would be more common in boys compared to girls, but some researchers have suggested this may be linked to the increased heritability of nocturnal bladder control in females.^[25]

The current study found that school children with NE were at significant risk of poor academic performance compared to non-enuretic children. This may be due to the psychological, social and behavioural sequelae of bedwetting. Fergusson *et al.* revealed that older enuretic children (>10 years) demonstrated a greater number of behavioural and psychological problems such as conduct problems, attention deficit behaviours, anxiety and withdrawal compared to non-enuretic children who had ceased bedwetting much earlier, while their perceived competence decreased with age.^[26] Similarly, Butler *et al.* reported that children perceived bedwetting to be a source of social and emotional difficulties, particularly among boys and NE sufferers, which would potentially have an adverse impact on their school performance.^[27] However, further research is necessary to determine exactly how enuresis affects academic performance among school children in Oman. Apart from academic performance, other personal risk factors of NE such as a history of UTIs, breastfeeding practices and a history of jaundice and febrile convulsions were not significantly

associated with NE in the present study. In the study, most children (65.2%) were breastfed for a sufficient length of time; this may be why there was no association with enuresis frequency, as breastfeeding practices are strongly tied to prevalent sociocultural norms and may vary across different countries.

In terms of familial risk factors, significant associations were observed between NE and a family history of enuresis, both on the part of the siblings and parents of affected children. Hereditary risk factors for NE have been frequently reported in the existing literature.^[28, 29] However, other studied familial risk factors showed an insignificant association with NE, such as the educational level of the child's parents, larger families and the occurrence of potential emotional stressors or family conflict, such as a deceased parent or divorced parents. Several studies have reported a link between low educational level on the part of the parents and the occurrence of enuresis in their children.^[30] In addition, a single-parent familial dynamic—as a result of either divorce or the death of one partner—has also been related to nocturnal bedwetting.^[24] On the other hand, it is possible that these factors were not associated with enuresis in the current study due to the very low prevalence of both divorce (1.6%) and parental death (0.5–0.8%), with the majority of children living in traditional nuclear family units.

Conclusion and Implications

NE is a very common disorder among primary school children in Oman belonging to all classes of family which needs to be treated as it can lead to socio-physiological problems and low performance at school. In particular, significant associations were noted between NE and poor academic performance and a family history of NE among siblings and parents. To address this problem, the primary health care staff and health educators should be educated enough so as not to miss the diagnosis of NE while eliciting detailed history and explaining the harmful effects of NE and showing true information about the medications that are important and convincing the parents for treatment.

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Ethics approval

The study was approved by the Ethics Committee of

Sultan Qaboos University Hospital.

Consent to Participate

A written consent form was signed by all the study participants.

REFERENCES

- Mammen AA, Ferrer FA. Nocturnal enuresis: medical management. *Urol Clin North Am*, 2004; 31(3): 491-98.
- Nijman, R. J. M., W. Bower, U. Butler, P. Elsworth, S. Tekgul, and A. Von Gontard. "Diagnosis and management of urinary incontinence and encopresis in childhood." *Incontinence*, 2005; 2: 965-1058.
- Abu Salem ME, El Shazly HM, Badr S, Younis F, Derbala SM. Epidemiology of nocturnal enuresis among primary school children (6–12 years) in Gharbia Governorate. *Menoufia Med J*, 2020; 33: 50-4. Available from: <http://www.mmj.eg.net/text.asp?2020/33/1/50/281271>.
- Mota DM, Barros AJ, Matijasevich A, Santos IS. Prevalence of enuresis and urinary symptoms at age 7 years in the 2004 birth cohort from Pelotas, Brazil. *J Pediatr (Rio J)*, 2015; 91(1): 52-58.
- Tu ND, Baskin LS, Arnhyam AM. Nocturnal enuresis in children: etiology and evaluation. 2017 [cited 2020 October 16]. Available from: <https://www.uptodate.com/contents/nocturnal-enuresis-in-children-etiology-and-evaluation>.
- Abu Salem ME, El-Shazly HM, Hassan AZA. Nocturnal enuresis among primary school children in Zarka district, Damietta governorate, Egypt. *Menoufia Med J [serial online]* 2016 [cited 2021 Sep 16]; 29: 1025-32. Available from: <http://www.mmj.eg.net/text.asp?2016/29/4/1025/202516>.
- Huang, HM., Wei, J., Sharma, S. et al. Prevalence and risk factors of nocturnal enuresis among children ages 5–12 years in Xi'an, China: a cross-sectional study. *BMC Pediatr*, 2020; 20: 305 <https://doi.org/10.1186/s12887-020-02202-w>.
- Elham H Alhifthy, Lura Habib, Azahir Abu Al-Makarem, Maryam AlGhamdi, Doaa Alsultan, Fatemah Aldhamer, et al. Prevalence of Nocturnal Enuresis among Saudi Children Population. *Cureus*. 2020 Jan; 12(1): e6662. Published online 2020 Jan 15. doi: 10.7759/cureus.6662.
- Ahmed Awn M, Ali N, Al Saqer H, Al Laith D, Al Sayyad A. Prevalence and factors associated with nocturnal enuresis among children attending primary care in Bahrain, *JBMS*, 2018; 30 (1): 14-21. https://doi.org/10.26715/jbms.1_02022018.
- Kahlout AM, AlSada H. Medical and psychological associations with nocturnal enuresis in children in Qatar. *Middle East J Family Med*, 2017; 15(3): 32-38.
- Juul KV, Bichet DG, Nielsen S, Nørgaard JP. The physiological and pathophysiological functions of renal and extrarenal vasopressin V2 receptors. *Am J Physiol Renal Physiol*, 2014; 306(9).
- Nevés T, Läckgren G, Tuvemo T, Hetta J, Hjälmås K, Stenberg A. Enuresis--background and treatment. *Scand J Urol Nephrol Suppl*, 2000; 34(206): 1-44.
- Kliegman RM, Berhman RE, Jenson HB, Stanton BF. *Nelson Textbook of Pediatrics*. 18th Edition. Philadelphia, 2007. Saunders.
- Ghotbi N, Kheirabadi GH. Prevalence of nocturia and its associated factors in primary school children in Sanandaj in 2002. *J Kurdistan Univ Med Sci*, 2001; 5: 30-33.
- Graham KM, Levy JB. Enuresis. *Pediatr Rev*, 2009 May; 30(5): 165-73.
- Fockema MW, Candy GP, Kruger D, Haffeejee M. Enuresis in South African children: prevalence, associated factors and parental perception of treatment. *BJU Int*, 2012; 110.
- Chiozza ML, Bernardinelli L, Caione P, Del Gado R, Ferrara P, Giorgi PL, et al. An Italian epidemiological multicentre study of nocturnal enuresis. *Br J Urol*, 1998; 86-89.
- National Centre for Statistics & Information. Total number of students registered in stages of school education. 2019 [cited 2020 October 16]. Available from: www.ncsi.gov.om.
- Al-Naqeeb HN, Ahmed MK, Al-Othman GA, Bakaya SM, Helin I. Epidemiology and parental perception of nocturnal enuresis in Arab school children. *Ann Saudi Med*, 1990; 10(5): 544-48.
- Bower WF, Moore KH, Shepherd RB, Adams RD. The epidemiology of childhood enuresis in Australia. *Br J Urol*, 1996; 78(4): 602-6.
- Cher TW, Lin GJ, Hsu KH. Prevalence of nocturnal enuresis and associated familial factors in primary school children in Taiwan. *J Urol*, 2002; 168(3): 1142-46.
- Solanki AN, Desai SG. Prevalence and risk factors of nocturnal enuresis among school age children in rural areas. *Int J Res Med Sci*, 2014; 2(1): 202-5.
- Yousef KA, Basaleem HO, bin Yahya MT. Epidemiology of nocturnal enuresis in basic schoolchildren in Aden Governorate, Yemen. *Saudi J Kidney Dis Transpl*, 2011; 22(1): 167-73.
- Mithani S, Zaidi Z. Bed wetting in school children of Karachi. *J Pak Med Assoc*, 2005; 55(1): 2-5.
- Ozden C, Ozdal OL, Altinova S, Oguzulgen I, Urgancioglu G, Memis A. Prevalence and associated factors of enuresis in Turkish children. *Int Braz J Urol*, 2007; 33(2): 216-22.
- Butler RJ, Galsworthy MJ, Rijdsdijk F, Plomin R. Genetic and gender influences on nocturnal bladder control--a study of 2900 3-year-old twin pairs. *Scand J Urol Nephrol*, 2001; 35(3): 177-83.
- Fergusson DM, Horwood LJ. Nocturnal enuresis and behavioral problems in adolescence: a 15-year longitudinal study. *Pediatrics*, 1994; 94(5): 662-68.
- Butler R, Heron J. An exploration of children's views of bed-wetting at 9 years. *Child Care Health Dev*, 2008 Jan; 34(1): 65-70.
- Osungbade KO, Oshiname FO. Prevalence and

- perception of nocturnal enuresis in children of a rural community in southwest Nigeria. *Trop Doct*, 2003; 33(4): 234-36.
30. Chang P, Chen WJ, Tsai WY, Chiu YN. An epidemiological study of nocturnal enuresis in Taiwanese children. *BJU Int*, 2001; 87(7): 678-81.