Medical and Psychological Associations with Nocturnal Enuresis in Children in Qatar

Ahmed Mohamed Kahlout
Hayam Ali AlSada

PHCC, Doha
Qatar

Correspondence:
Dr. Ahmed Mohamed Kahlout
Doha
Qatar
Email: akahlout@phcc.gov.qa

Abstract

Nocturnal Enuresis is a common problem observed in Qatar. However, no Qatar-based study has examined enuresis in the primary health care setting, and thus this study will have particular relevance to this population. A prospective study was designed in primary health care centers in Qatar to collect information on Nocturnal Enuresis of children in Qatar.

Aim: The aim of this study is to determine the prevalence of Enuresis and its recovery rate among children in the Western Area of Doha, and evaluate the different associations between Nocturnal Enuresis (NE) and medical and psychological conditions, and to assess the impact of the condition in children and families.

Methods: Questionnaires about nocturnal enuresis were distributed to the parents of 399 children age 5 to 11 frequenting the Primary Health Care centers clinics in the Western Area of Doha. All cases received followed up evaluations at 6, 12, and 18 months.

Results: The results indicated a 36.3% prevalence of Enuresis in children. Significant associations of medical and psychological problems such as snoring, bronchial asthma and stressful events were found. Recovery rates of 26, 24, and 19% were observed after 3 times follow-up at 6, 12, and 18 months respectively.

Conclusions: This study confirms the prevalence of Nocturnal Enuresis among children frequenting the primary health care centers of the Western area of Doha, and the Medical and Psychological associations are similar to those of similar studies from various countries of the Arab countries area. Health education will encourage the parents to be aware, deal with this problem and find appropriate medical advice.

Key words: nocturnal enuresis,
Medical and psychological associations, Doha, Qatar

Introduction

Enuresis is a condition characterized by involuntary discharge of urine overnight, as per the ICCS definition (1). Commonly seen in young children, enuresis is considered problematic when it occurs in children 5 or older. Enuresis may be primary or secondary, where a child with primary enuresis has never had a dry period for at least 6 months, whereas a child with secondary enuresis has experienced a dry spell of at least this duration (1, 2, 3).

Various management strategies are available for nocturnal enuresis: for example, counseling of parents, medical treatment, or psychotherapy.

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The aim of this study is to determine the prevalence of Enuresis and its recovery rate among children in the Western Area of Doha, and evaluate the different associations between Nocturnal Enuresis (NE) and medical and psychological conditions, and to assess the impact of the condition in children and families.

Materials and Methods

Participants were children age 5 to 11 recruited while visiting the Primary Health Care clinics; children with known neurological and genetic syndromes were excluded.

The study was conducted by requesting that parents complete a questionnaire on their child's history with urinary and other behaviors. The questionnaire was purpose-built for this research by the author and was subsequently validated by the Hamad Medical Corporation (HMC) Research Committee. This study was approved by HMC ethics committee.

The questionnaire consisted of three parts where the first part included socio-demographic characteristics and toilet training of the sample. The second part was designed to enquire about the presence of nocturnal enuresis and its relevant characteristics. Children without NE were asked about the age of dryness. The third part of the questionnaire asked all participants about psychological and medical conditions such as constipation, snoring, and the experience of stressful events. Sleep disturbances are defined by the ICD-10 such as nightmares, sleep terrors, sleep walking, and sleep talking.

Constipation was defined as delay or difficulty in defecation, present for two or more weeks and sufficient to cause distress to the patient. (4,5)

The questionnaire was not based on the Screening Instrument for Psychological Problems because ADD and ADHD subjects were not part of the study. The questionnaires were not validated as the Vancouver or Toronto voiding questionnaires.

Statistical Analysis: Qualitative and quantitative data values were expressed as frequency along with percentage and mean±SD. Descriptive statistics were used to summarize demographic and all other clinical characteristics of the participants. The prevalence of nocturnal enuresis was estimated and presented along with 95% CI. Associations between two or more qualitative variables were assessed using chi-square test, chi-square test with continuity correction factor or Fisher exact test as appropriate. Quantitative variables data between two independent groups (nocturnal enuresis and nocturnal continence) were analyzed using unpaired 't' test. The results were presented with the associated 95% confidence interval. Univariate and multivariate logistic regression analysis was carried out to assess the association of various potential factors and predictors such as age at diurnal dryness, age at nocturnal dryness, age when child started toilet training, gender, family size, family history enuresis, nocturnal dryness, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems with outcome variable nocturnal enuresis. Logistic regression analysis results were presented in terms of odds ratio (OR) and associated 95% CI. A two-sided P value <0.05 was considered to be statistically significant. All Statistical analyses were done using statistical packages SPSS 22.0 (SPSS Inc. Chicago, IL).

Results

There were 399 participants in the study; 145 (36.3%) were nocturnal enuresis, 254 (73.7%) participants were nocturnal continence. Mean age at diurnal dryness in the nocturnal enuresis group was significantly higher 30.7±7.8 years, compared to nocturnal continence group 27.9±7.4 years (P<0.001). Similarly, the mean age at nocturnal dryness (40.6±14.8 vs 34.4±10.1; P=0.004), age when child started toilet training (25.8±6.9 vs 23.8±6.9; P=0.006) in the nocturnal enuresis group was significantly higher compared to nocturnal continence group respectively.

Surprisingly, we found that 36.3% of children suffered from enuresis, while the remaining subjects didn't suffer from enuresis. This was based on analyzing data collected from 399 patients at Al Rayyan and Abu Baker primary health care centers, of which 84 (59%) were male (Table 2). Of all participants, the age when the child started toilet training was 24.6 months on average; diurnal dryness was achieved at age 28.9 months (±7.6), and nocturnal dryness was achieved at 35.5 months (±11.4) (Table 1).

The prevalence of nocturnal enuresis and their association with demographic, physiological, and other medical and clinical characteristics are shown in Table 2. The overall prevalence of nocturnal enuresis was 36.3% (95% CI: 31.6 to 41.1). The prevalence of nocturnal enuresis in the positive family history of enuresis was significantly higher 97/172; 56.4% compared with 48/227; 21.1% (P<0.001) in the nocturnal continence group. Significantly higher

in the nocturnal continence group. Significantly higher nocturnal enuresis prevalence occurred among children who presented with non-nocturnal dryness (87.6% vs 16.1%; P<0.001) compared to nocturnal dryness. Similarly children experiencing stressful events had significantly higher nocturnal enuresis compared with children with stressful events (56.3% vs 17.9%; P<0.00). Also, children with other medical problems showed a similar trend with significantly higher occurrences of nocturnal enuresis, P<0.001. Gender, age at diurnal dryness, family history, did not have any significant association with nocturnal enuresis as presented in Table 2.

The results of logistic regression analysis testing for each predictive variable and factors and their association with nocturnal enuresis are presented in Table 2. The results were presented with odds ratio (OR) and associated 95% confidence interval (CIs). Logistic regression analysis revealed that increasing age at nocturnal dryness, age when child started toilet training, family history enuresis, nocturnal dryness, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems were common risk factors and predictors significantly associated with an increased risk for nocturnal enuresis. Risk of nocturnal enuresis was 2.6 times likely to be higher among children having age at nocturnal dryness more than 40 months (unadjusted OR 2.6, 95% CI 1.37-4.94; P=0.003) compared to age group less or equal to forty months. Children who had positive family history of enuresis were nearly 4.8 times as likely to have more risk for nocturnal enuresis (unadjusted OR 4.82, 95% CI 3.11-7.48; P<0.001). Children who had nocturnal enuresis were nearly 1.7 times as likely to suffer from constipation (unadjusted OR 1.68, 95% CI 1.0-2.82; P=0.05), 3.1 times as likely to be positive for fecal incontinence (unadjusted OR 3.06, 95% CI 1.09-8.61; P=0.034), 5.9 times as likely to have stressful events (unadjusted OR 5.91, 95% CI 3.75-9.32; P<0.001), 4.2 times as likely to have sleep disturbance and 3.4 times more likely to have other medical problems, than those who had nocturnal continence. Children with enuresis were twice as likely to snore than children without enuresis (unadjusted OR 2.1, 95% CI 1.29-3.78; P=0.003).

Children with enuresis were almost 8 times more likely to have worms than children without enuresis (unadjusted OR 7.9, 95% CI 4.19-15.14; P<0.001).

Using multivariable logistic regression analysis controlling for all other potential predictors and factors such as age at diurnal dryness, age at nocturnal dryness, age when child started toilet training, gender, family size, family history enuresis, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems we found that the factors with the strongest and significant association with nocturnal enuresis are children having positive family history of enuresis, nocturnal dryness, stressful events and sleeping disturbance or snoring. No significant interactions were found between different potential factors and predictors considered above and including an interaction terms in the model, had no effect on the adjusted odds ratio as shown in Table 3.

Most parents were assisting their children when they bed wet (64); 43 blamed the child and 6 spanked the child (Table 1). At the follow up evaluations at 6, 12, and 18 months where the number of children with enuresis reduced from 102 children to 97 and 75 respectively (Table 4).

Discussion and Conclusions

In our study, we found a high prevalence and an unexpectedly high percentage of nocturnal enuresis (36.3%) with equal distribution in both sexes. In similar studies carried out in Jordan and Yemen, the prevalence of Nocturnal Enuresis among 5 to 15 years old children was reported as 8.8% to 28.6% respectively (6, 7). The prevalence found in this study was higher than reported worldwide, at 8.3 - 12.3% (9). This difference could be explained due to the high number of 5 and 6-year old participants in our study which also explains the reduction in the numbers found also at the follow up evaluations at 6, 12, and 18 months where the number of children with enuresis reduced from 102 (25%) children to 97 (24%) and 75 (19%) respectively. At this age, the rate of resolution worldwide is usually reported at 15% per year (9).

Stressful events and sleep disturbances were significantly higher in the children with enuresis compared with those without enuresis - 74.5% vs. 33.1% , p < .0001, and 54.5 % vs22 % p <0001 respectively. Worldwide the overall rate of comorbidity in epidemiological and in clinical studies are approximately: 13.5%-40.1% of all wetting children have clinically relevant behavioral problems (9), emphasizing the importance of taking a thorough history of sleep disturbances such as nightmares, sleepwalking, sleep talking, and stressful events like mother deprivation, school failure, and siblings' rivalry. It is helpful to support the family and children in these cases with follow up even without excellent outcome of the treatment,; (10) when necessary, patients should be referred to the appropriate professionals for related conditions.

Medical problems (e.g., UTI, bronchial asthma) were found to be higher in the children with enuresis compared to the control group (unadjusted OR 3.37, 95% CI 2.18-5.21; P<0.001) while intestinal worms in children in enuresis were also found to be higher (unadjusted OR 7.9, 95% CI 4.19-15.14; P<0.001) These children may benefit from medical treatment. Of course, treatment of intestinal worms will reduce one of the child's sufferings but it is not known whether this contributes to the resolution of enuresis or not.

It was found that 34 children with enuresis also were snoring (unadjusted OR 2.1, 95% CI 1.29-3.78; P=0.003). On the other hand 31 children without enuresis were also snoring. We don't know whether future treatment of snoring will improve bedwetting as was found in another study where half of the children tonsillectomised had improvement of their enuresis (8).

During the 3 follow ups (6, 12, and 18 months), spontaneous recovery was observed. Recovery rates of 26, 24, and

Table 1: Baseline Demographic, Physiological and other Clinical Characteristics

Characteristics	Mean ± SD; N (%)
Age at diurnal dryness (months)	28.9 ± 7.6
Age at nocturnal dryness (months)	35.5 ± 11.4
Age when child started toilet training (months)	24.6 ± 7.0
Gender	
Male	233 (58.4%)
Female	166 (41.6%)
Nationality	
Qatari	293 (73.4%)
Non Qatari	106 (26.6%)
Family size	
≤ 4 person	152 (38.1%)
5-8 person	210 (52.6%)
≥ 9 person	37 (9.3%)
Family history of enuresis	
Yes	172 (43.1%)
No	227 (56.9%)
Nocturnal dryness	
Yes	254 (63.7%)
No	145 (36.3%)
Suffer from constipation	
Yes	71 (30.2%)
No	328 (69.8%)
Episode of fecal incontinence	
Yes	16 (4.0%)
No	383 (96%)
Child Stressful events	
Yes	192 (48.1%)
No	207 (51.9%)
Snoring	
Yes	65 (16.3%)
No	334 (83.7%)
Suffer from sleep disturbances (nightmares, sleeping walking, and sleep talking)	
Yes	135 (33.8%)
No	264 (66.2%)
Suffer from medical problems	
Yes	135 (33.6%)
No	265 (66.4%)
Worms	
Yes	60 (15%)
No	299 (85%)
Child presently wet the bed	
Yes	145 (36.3%)
No	254 (63.7%)
Frequency of bed wetting	
Nightly	35 (24.1%)
Weekly	57 (39.3%)
Monthly	53 (36.6%)

Table 2: Association of various predictors with nocturnal enuresis: Univariate Logistic regression analysis

Variable	Nocturnal Enuresis	Nocturnal Continence	Unadjusted OR	95% CI for OR	P-value
Age at diurnal dryness					
≤30 month†	93 (33.1%)	188 (66.9%)	1.0		
>30 month	48 (42.9%)	64 (57.1%)	1.52	0.97, 2.38	0.069
Age at nocturnal dryness					
≤40 month†	36 (15.5%)	197 (84.5%)	1.0		
>40 month	20 (32.3%)	42 (67.7%)	2.61	1.37, 4.94	0.003
Age when child started toilet training					
≤24 month†	96 (33.1%)	194 (66.9%)	1.0		
>24 month	49 (45.0%)	60 (55.0%)	1.65	1.05, 2.59	0.029
Gender					
Male†	84 (36.1%)	149 (63.9%)	1.0		
Female	61 (36.7%)	105 (63.3%)	1.03	0.68, 1.56	0.887
Family size					
≤4 people	65 (42.8%)	87 (57.2%)	1.77	0.81, 3.83	0.150
5-8 people	69 (32.9%)	141 (67.1%)	1.16	0.54, 2.48	0.708
≥9 people†	11 (29.7%)	26 (70.3%)	1.0		
Family history enuresis					
Yes	97 (56.4%)	75 (43.6 %)	4.82	3.11, 7.48	<0.001
No†	48 (21.1%)	179 (78.9%)	1.0		
Nocturnal dryness					
Yes†	0 (0%)	254 (100%)	NA	NA	<0.001
No	145 (100%)	0 (0%)			
Suffer constipation					
Yes	33 (46.5%)	38 (53.5%)	1.68	1.0, 2.82	0.05
No†	112 (34.1%)	216 (65.9%)	1.0		
Fecal Incontinence					
Yes	10 (62.5%)	6 (37.5%)	3.06	1.09, 8.61	0.034
No†	135 (35.2%)	248 (64.8%)	1.0		
Child Stressful events					
Yes	108 (56.3%)	84 (43.8%)	5.91	3.75, 9.32	<0.001
No†	37 (17.9%)	170 (82.1%)	1.0		
Suffer from sleep disturbances					
Yes	79 (58.5%)	56 (41.5%)	4.23	2.72, 6.58	<0.001
No†	66 (25.0%)	198 (75.0%)	1.0		
Snoring					
Yes	34 (52.3%)	31 (47.7%)	2.1	1.29, 3.78	0.003
No†	111 (33.2%)	223 (66.7%)	1.0		
Worms					
Yes	46 (76.7%)	14 (23.3%)	7.9	4.19, 15.14	<0.001
No†	99 (29.2%)	240 (70.8 %)	1.0		
Medical Problems					
Yes	74 (55.2%)	60 (44.8%)	3.37	2.18, 5.21	<0.001
No†	71 (26.8%)	194 (73.2%)	1.0		

CI: Confidence interval; OR: odds ratio; †Subjects in this category served as the reference group.

Table 3. Association of various predictors with nocturnal enuresis: Multivariate Logistic regression analysis

Variable	Nocturnal Enuresis	Nocturnal Continence	Adjusted Odds ratio (OR)	95% CI for OR	P-value
Family history enuresis					
Yes	97 (56.4%)	75 (43.6 %)	2.16	1.1, 4.2	0.026
No†	48 (21.1%)	179 (78.9%)	1.0		
Child Stressful events					
Yes	108 (56.3%)	84 (43.8%)	2.7	1.3, 5.4	0.006
No†	37 (17.9%)	170 (82.1%)	1.0		
Suffer from sleep disturbances					
Yes	79 (58.5%)	56 (41.5%)	3.9	2.0, 7.8	<0.001
No†	66 (25.0%)	198 (75.0%)	1.0		

CI: Confidence interval; †Subjects in this category served as the reference group.
The sum may not equal to n=399 for some variables due to some missing data.

Table 4: Follow-up outcome measures

Variable	Frequency	Percentage
6 months follow up		
Without Enuresis	297	74.4
With Enuresis	102	25.6
12 months follow up		
Without Enuresis	302	75.7
With Enuresis	97	24.3
18 months follow up		
Without Enuresis	324	81.2
With Enuresis	75	18.8

19% were observed after 3 times follow-up at 6, 12, and 18 months respectively. Interestingly, there were several new cases of children without enuresis starting to bed wet (likely from secondary enuresis), which should prompt a clinician to investigate and treat possible causes.

We recommend that clinicians obtain a thorough family, genetic, trauma, stressful events, and toilet-training history; conduct a physical examination; and perform urine and stool analysis and cultures, urine 24-hour osmolarity, and blood sugar tests. Abdominal and pelvic ultrasounds would be useful for suspected congenital malformation. Nocturnal enuresis is a benign condition, and its complications can often be resolved with special care and treatment.

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