

Prevalence of Nocturnal Enuresis among Primary School Students in Jeddah - Saudi Arabia

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Abstract

Background: Nocturnal enuresis is an involuntary voiding of urine during sleep in child who is enough to have developed control (beyond 5-year). It is common problem that can be troubling for children and their families.

Objectives: The study aimed to detect the prevalence of nocturnal enuresis among primary school students and to explore the relation between nocturnal enuresis with personal and family characteristics of studied children.

Methodology: A cross sectional study was conducted from November 2019 to April 2020 among primary school students. About 371 students were randomly selected and given a questionnaire to be filled by their parents. Data was checked and analyzed by using statistical package for social science software program. The results of the study showed that the frequency of nocturnal enuresis was 11.2%. Enuresis frequency was higher in female (6.8%) than male (4.4%). The majority (80%) of positive cases had the primary type. Family history (siblings and parents) of nocturnal enuresis and fearing of going alone to bathroom were the best predictors for nocturnal enuresis.

Results: The results of the study showed that the frequency of nocturnal enuresis was 11.2%. Enuresis frequency was higher in female (6.8%) than male (4.4%). The majority (80%) of positive cases had the primary type. Family history (siblings and parents) of nocturnal enuresis and fearing of going alone to bathroom were the best predictors for nocturnal enuresis.

Conclusion: In general the results of study showed that the nocturnal enuresis is a common problem among primary school students and mostly associated with family history and fearing of going alone to bathroom.

Keywords: Nocturnal Enuresis; Children; Family History

Introduction

Nocturnal enuresis (also known as night time incontinence or bed wetting) refers to involuntary voiding of urine during sleep beyond the age 5 at which the child is enough to have control [1,2]. Enuresis may be primary or secondary. Children who have no prior of sustained dryness are considered to have primary (persistent) nocturnal enuresis and the recurrence of nighttime wetting after 6 months or longer of dryness is referred to as secondary (regressive) nocturnal enuresis. Enuresis is an important public health problem that can cause considerable stress to children and their parents. Anecdotal accounts of bed witting tend to reflect a host of complex issues marked by comprehension, feeling of humiliation, guilt and shame, avoidance of social activities, a sense of difference from others, victimization and loss of self-esteem [3-5]. It profoundly affects the child's life socially, emotionally and behaviorally and also impacts on the everyday life of his/her family [6]. The frequency of enuresis changes with age and its prevalence range varies widely in various countries [7]. The risk factors are genetic predisposition, urinary tract problems or endocrine disorders. Psychological predisposition has an important role in developing a primary nocturnal enuresis including stressful life, domestic problems and sexual abuse. The maintaining factors include child, learned helplessness, low self-efficacy and beliefs that the situation cannot be changed by them. Physical and pathological problem or trauma to the bladder can affect the initiation and maintaining of the problem [1]. Nocturnal enuresis is a common problem with at least one episode of bed wetting per month in 15 - 30% of 6 year old children and 4 - 16% of 12 year old children [8,9].

Aim of the Study

The aim of this study was to determine the prevalence of nocturnal enuresis and the risk factors associated with it among primary school students in Jeddah city. We chose this group (primary school students) because most of the children would be expected to have control of their voiding at this age.

Methodology

Study design: A cross sectional study was carried out in Jeddah city from November 2019 to April 2020 among primary school students by eighteen medical school students off fourth level.

Study area and population: The study was conducted in Jeddah city. The study population were students who joined to primary school (from the first to sixth level) registered in education office in Jeddah during the study period.

Sample size: The sample size of the study was calculated by Epi-info program based in the following indicators. Study population is 34035 students (this number is obtained from ministry of education). Expected proportion is 7.7% (based on study conducted in Iran) [10]. Worst accepted is 3% with confidence interval of 95%. The number obtained by this program was 301 students. Assuming a non-response of 25%, so the sample size was increased to 376 students.

Sampling methods: Jeddah contains 52 schools (according to ministry of education), 19 areas and 10 villages (according to central statistical organization census 2019) and from each area only one school was selected (because of logistic, time and financial constraints) by simple random selection using (in areas that contain only one school this school was immediately chosen, while the areas that do not contain schools were immediately excluded from study) and the final number obtained after these procedures were 18 schools. The required number of students from each school was taken according to the proportion of students in selected schools to the total number of students in all selected schools [28]. At the level of each school all classes from each level were included in the study and the number of students from each level was proportional to the total number of students in the all levels (Annexes). At the level of each class the target students were chosen by simple random selection, where lists by the name of students in each class were obtained from the schools then

the required number from each class was chosen randomly. The data was obtained by using self-administered questionnaire which was filled by parents of students. The contents validity of the questionnaire was pretested by administering to 30 students from the sample population to ensure the stability of questionnaire for data collection relevant to study design and objectives. Changes were done accordingly on unclear questions or statements. Questionnaires were distributed and collected within sealed envelopes in order to prevent embarrassment of students. Parents were informed about the study by an information section included in the beginning of the questionnaire. The questionnaire contains 26 elements and consists of four sections; first section was on personal data, second section was on family characteristics, third one was on presence of nocturnal enuresis and fourth section was about history of nocturnal enuresis and its severity and possible associated symptoms, management and attitude of parents toward their children. All collected questionnaires were checked to ensure that all required questions were answered and completed. All completed questionnaires were given the appropriate ID number and compiled on file. The nocturnal enuresis divided into two types primary and secondary. The primary one means that urinary incontinence was present from birth and not ceased until now. The Secondary nocturnal enuresis means that urinary incontinence ceased for at least six months and the condition re-established again. The severity of nocturnal enuresis is assessed by frequency of urinary incontinence as following; mild where two time of urinary incontinence per week for at least three consecutive months, moderate are two times per week for at least three consecutive months and severe is every day for at least three consecutive months. The variables are father education, mother education and economic status were recoded to become a dichotomous variables to be used in Fisher's exact test when the expected frequency below 5. The recoded done as following Father and mother education: the levels illiterate and primary recoded as primary or less, whereas the levels secondary and university recoded as secondary or more Economic status: the level sufficient was used to include parents who said their economic level is sufficient or sufficient and more, the level not sufficient remained as it.

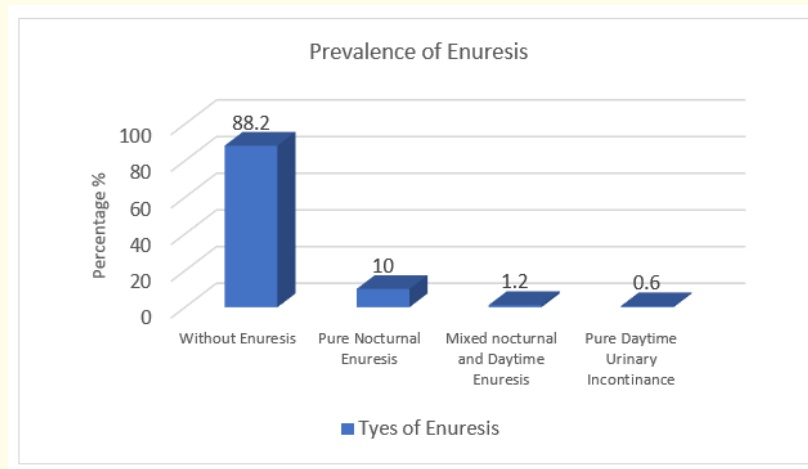
Data analysis: The data were calculated and analyzed by using Statistical Package for Social science (SPSS) version 16 software program. Descriptive statistics (mean, percentage and standard deviation) for continuous variables were calculated. Frequencies were determined for categorical variables. The differences in age and number of children in the family between two groups were tested by students t-test -If the data was ordinal (birth order) the difference was tested by Mann-Whitney-U test. Categorical variables were compared by Chi-square test or Fisher's exact test. P-value less than 0.05 was considered as statistically significant. Parameters with P-value < 0.05 univariate analysis were subjected to multivariable logistic regression analysis without any automatic elimination process.

Ethical consideration: Approval for the study was obtained from the college of medicine on March 31, 2020. Operational approval of the study was subsequently obtained from Ministry of education, branch of Makkah region and then from education office in Jeddah.

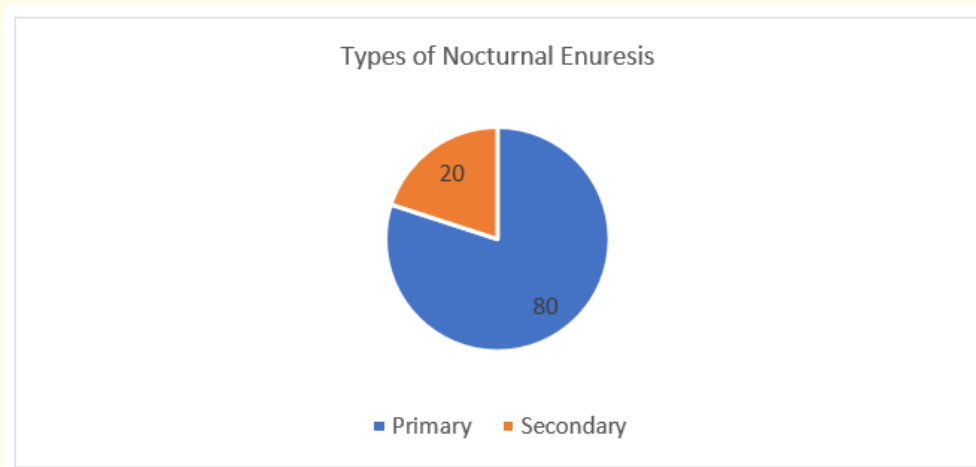
Result

The overall corrected response rate to the questionnaires was 85% (321 out of 376 questionnaires) while the remaining 55 questionnaires were excluded from analysis either due to non-response or missing data. Genders of students was distributed as follows, 173 (53.9%) of students were male and 148 (46.1%) were female. The students in public schools were 285 (89%), while those in private schools were 35 (10.9%) (Table 1). Out of the final sample 36 students (11.2%) were reported by their parents as suffering from nocturnal enuresis (Graph 1). The age of students ranged from 5 - 16 years, the mean age of students with nocturnal enuresis was 9.9 [standard deviation (SD) = 2.111] and the mean age of those students who are free from nocturnal enuresis was 10.0 (SD = 0.97) (Table 2). Most of the students in the study either with or without nocturnal enuresis had second birth order representing 25% and 26.3%, respectively (Table 3). The number of children in the families ranged from 1 - 14 children, the mean number of children in families having child with nocturnal enuresis was 4.71 (SD = 2.07) and the mean number of children in families having no child with nocturnal enuresis was 4.72 (SD = 1.80) (Table 4). The majority (80%) of students with nocturnal enuresis had the primary type while the remaining 20% had the secondary one (Graph 2). Regarding the severity of nocturnal enuresis the majority (52.9%) of students with nocturnal enuresis had the severe type while the remaining had the moderate or the mild one with a percentage of 39.0% and 17.1%, respectively (Graph 3). Urine frequency, burning micturition, haematuria, chronic constipation and involuntary defecation all these symptoms are seen in students with nocturnal enuresis with a percentage of 45.7%, 5.7%, 2.9%, 2.9% and 8.6%, respectively (Graph 4). Student t-test was used to inves-

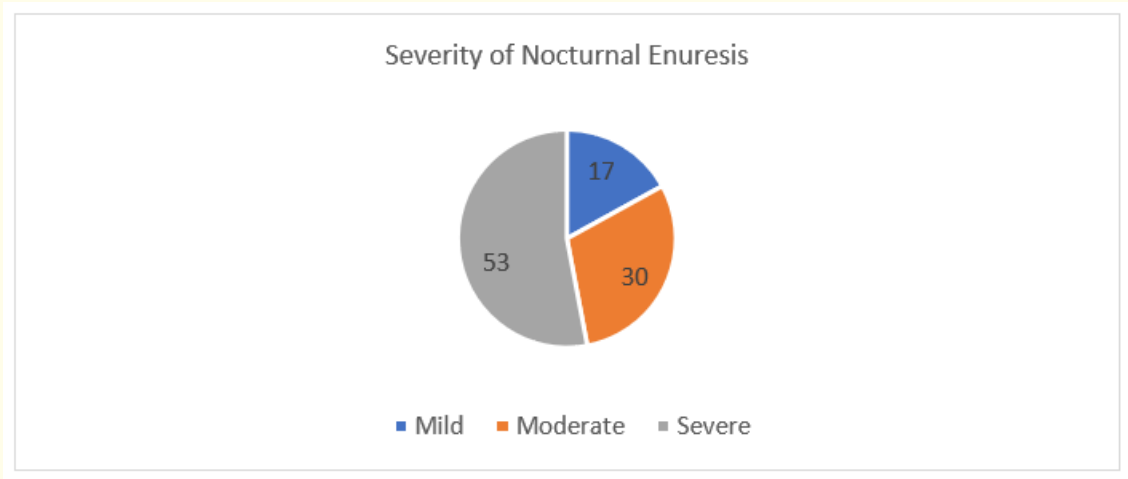
Investigate the difference between students with and without nocturnal enuresis based on their age and number of children in their families. It revealed that there were no statistically significant differences between students with and without nocturnal enuresis regarding to both their age and number of children in their families (P-value = 0.08) (Table 5). Mann-Whitney-U test was used to investigate the difference between students with and without nocturnal enuresis based on their birth order (ordinal variable). It revealed that there was no statistically significant difference between children with and without nocturnal enuresis regarding to their birth order (P-value = 0.7) (Table 6). Chi-square test or Fishers exact test (when the expected frequency is below 5) were used to investigate the difference for categorical variables. The test showed that the parental and siblings history of nocturnal enuresis, stressful events, fearing of going alone to bathroom and working mother all were statistically different on whether the child will have or have not nocturnal enuresis (P-value = 0.000 in all these variables) (Table 7). Multivariate logistic regression with nocturnal enuresis used as dependent variable. Parental and siblings history of nocturnal enuresis, stressful events, fearing of going alone to bathroom and working mother all were used as independent variables. The significant predictors for nocturnal enuresis were parental history (P-value = 0.01) sibling history (P-value = 0.001) and fearing of going alone to bathroom (P-value = 0.004) (Table 8). Regarding parental attitude toward their child who had nocturnal enuresis, the majority (57.1%) of parents counseling and learning their child who had nocturnal enuresis, while the others parents blaming or hitting their child with percentage of 24.6% and 14.3%, respectively (Graph 5). Leave the problem to resolve spontaneously, using medications, awaking for voiding and reduce water intake to child were the methods used by parents for the management of enuresis with a percentage of 42.9%, 20.0%, 20.0% and 17.1%, respectively (Table 9). Regarding the doctor’s consultation about nocturnal enuresis, 19.4% of parents were consulting doctors regarding their children while the remaining 86.6% were not (Graph 6).



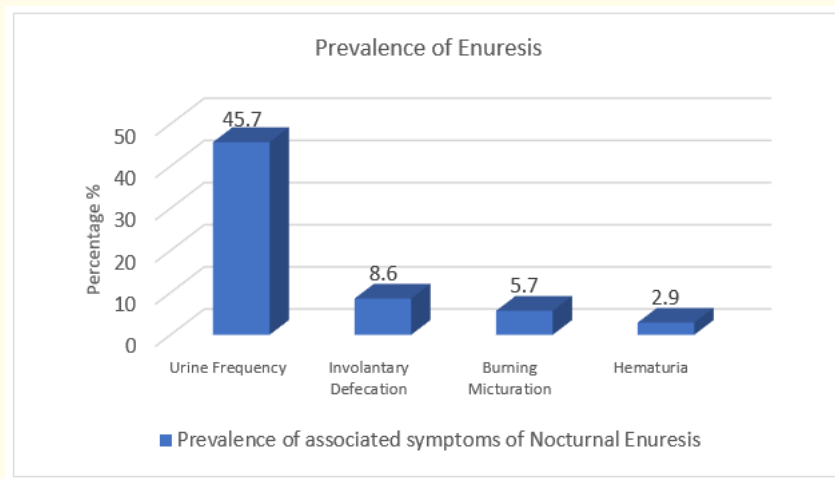
Graph 1: Prevalence of nocturnal and daytime enuresis in primary-school students in Jeddah.



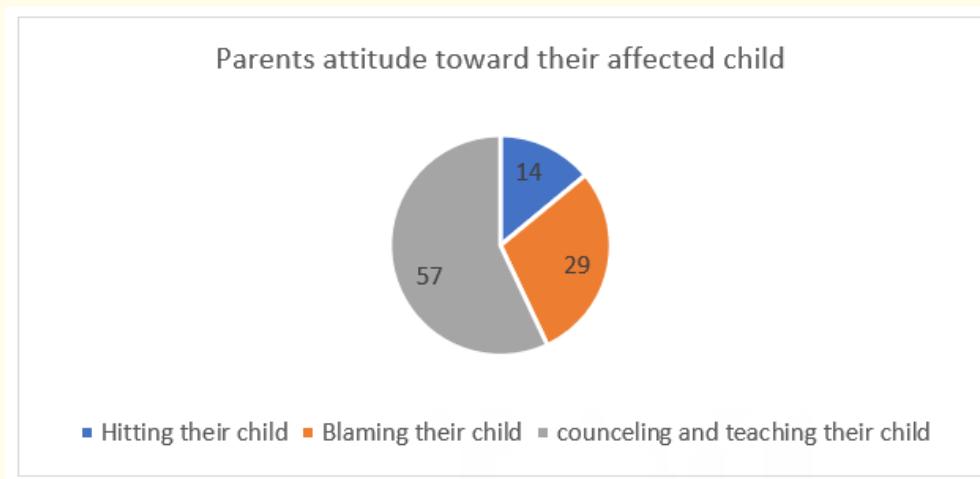
Graph 2: Distribution of nocturnal enuresis types among primary-school students.



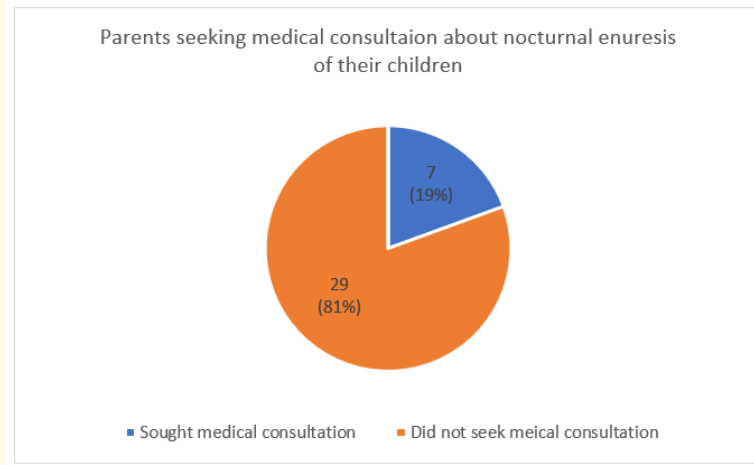
Graph 3: Distribution of nocturnal enuresis severity among primary-school students.



Graph 4: Prevalence of associated symptoms among affected students.



Graph 5: Attitude of parents toward their children with nocturnal enuresis.



Graph 6: Distribution of parents according to consulting doctors about nocturnal enuresis of their children's.

School's type	Sex				Total	
	Male		Female			
	Freq.	%	Freq.	%	Freq.	%
Public	147	45.8	139	43.3	285	89.1
Private	26	8.1	9	2.8	35	10.9
Total	173	53.9	148	46.1	321	100

Table 1: Distribution of students' gender according to school type.

Age	With nocturnal enuresis		Without nocturnal enuresis	
	Frequency	%	Frequency	%
5	3	8.3	1	0.4
6	3	8.3	5	1.8
7	5	13.9	26	9.1
8	6	16.7	47	16.5
9	6	16.7	37	13
10	3	8.3	46	16.1
11	2	5.6	47	16.5
12	8	22.2	46	16.1
13	0	0	19	6.7
14	0	0	8	2.8
15	0	0	1	0.4
16	0	0	2	0.7
Total	36	100	285	100
Mean +/- SD	9.9 + 2.11		10 + 1.97	

Table 2: Distribution of nocturnal enuresis according to age of the students.

Birth Order	With nocturnal enuresis		Without nocturnal enuresis	
	Frequency	%	Frequency	%
First	7	19.4	56	19.6
Second	9	25	75	26.3
Third	7	19.4	56	19.6
Fourth	6	16.7	55	19.3
Fifth	5	13.9	24	8.4
Sixth	1	2.8	9	3.2
Seventh	0	0.0	4	1.4
Eighth	0	0.0	4	1.4
Ninth	1	2.8	1	0.4
Tenth	0	0	0	0
Eleventh	0	0	1	0.4
Total	36	100	285	100

Table 3: Distribution of nocturnal enuresis according to birth order of the students.

No. of children in the family	With nocturnal enuresis		Without nocturnal enuresis	
	Freq.	%	Freq.	%
1	3	8.3	10	3.5
2	4	11.1	26	9.1
3	5	13.9	35	12.3
4	7	19.4	69	24.6
5	5	13.9	60	21.1
6	6	16.7	33	11.6
7	2	5.6	33	11.6
8	2	5.6	9	3.2
9	0	0.0	5	1.6
10	1	2.8	3	1.1
11	-	-	-	-
12	-	-	-	-
13	1	2.8	0	0.0
14	0	0.0	2	0.7
Total	36	100	285	100
Mean ± SD	4.71 ± 2.07		4.72 ± 1.88	

Table 4

Variable		Mean (SD)*	t	df**	p-value
Age	With nocturnal enuresis	8.83 (2.29)	1.2	319	0.05
	Without nocturnal enuresis	10.04 (2.05)			
No. of children in the family	With nocturnal enuresis	4.67 (2.56)	0.36	319	0.08
	Without nocturnal enuresis	4.72 (2.01)			

Table 5: Comparison of students with and without nocturnal enuresis according to their age and no number of children in the family using t-test.

*SD= standard deviation; **df= degree of freedom.

Variable		Mean rank	Sum of Rank	M-W* test	p-value
Birth order	With nocturnal enuresis	164.56	5927.50	4998.50	0.7
	Without nocturnal enuresis	160.54	45753.50		

Table 6: Comparison of students with and without nocturnal enuresis based on their birth order using Mann-Whitney U test.

*M-W= Mann-Whitney U test

Variables		With nocturnal enuresis	Without nocturnal enuresis	X ²	P-value
Type of school	Public	32	254	0.002	1.00
	Private	4	31		
Sex	Male	14	159	3.67	0.055
	Female	22	126		
Full-term delivery	Yes	36	277	1.04	1.0
	No	0	7		
Parenteral history	Yes	16	7	84.71	0.000*
	No	20	278		
Siblings history	Yes	30	28	116.6	0.000*
	No	6	257		
Stressful events	Yes	12	8	50.98	0.000*
	No	24	277		
Fearing to go alone to the bathroom	Yes	13	5	71.27	0.000*
	No	23	280		
Father’s Education	Primary or less	11	112	1.29	0.32
	Secondary or more	25	173		
Mother’s Education	Primary or less	14	189	0.03	0.8
	Secondary or more	22	96		
Working mother	Yes	12	34	11.92	0.002*
	No	24	251		
Economic status	Not enough	11	58	1.78	0.2
	Enough	25	221		

Table 7: Variables of nocturnal enuresis distributed among affected students.

*Statistical Significant, X² = Chi-square, P-value: estimated by Fisher’s exact test.

Independent Variables	OR	CI95%	P-value
Parenteral history	4.89	1.37 - 17.45	0.014*
Siblings history	21.65	7.15 - 65.56	0.001*
Fearing of going alone to bathroom	8.76	2.01 - 38.19	0.004*
Stressful events	2.68	0.58 - 7.33	0.256
Working mother	2.66	0.79 - 8.90	0.113

Table 8: Multivariate logistic regression analysis of risk factors associated with nocturnal enuresis.

*Statistical Significant, OR: Odd Ratio, CI: Confidence Interval 95%.

Ways of management	Frequency	Percentage %
Using Medications	7	20
Reduce water intake before sleep	6	17.1
Awake for voiding	7	20
Leave the problem to be solved spontaneously	16	42.9
	36	100

Table 9

Discussion

Nocturnal enuresis is an old but still prevalent clinical problem in childhood and adolescence. It is found that the bed wetting is the most chronic problem in childhood next to allergic disorder [11]. The traditional view is that in the most cases bed wetting is due developmental immaturity of voiding control and the most enuretic children will ultimately acquire normal control with age. However, previous studies showed that, although spontaneous resolution can continue throughout the childhood and adolescence, enuretic problem may persist in 1 - 5% of adult population [12]. Differences are present in the prevalence of enuresis between countries which may reflect medical and psychological factors, particularly in setting of possible, socioeconomic, cultural and racial differences, the geographic area involved the composition of population studied. The results of our study showed that the overall prevalence of nocturnal enuresis was 11,2% which is higher than the prevalence of the enuresis reported in studies conducted in Iran (7.7%), India (8.6%) and UK (5.1%) [10,13-15]. In contrast, nearly equal to the prevalence of enuresis in Chinese (11.5%) And lower than the prevalence of enuresis in Saudi Arabia (15%) [7]. This differences in the prevalence may be related to different factors mentioned above. Our study showed that the prevalence of nocturnal enuresis was higher in female (6.8%) than male (4.4%) and these results are inconsistent with other studies conducted in Iran, India and Turkish [10,13,18] but there are some other studies demonstrated a female predominance [19]. In our study most of enuretic children (80%) had the primary type, and these results were nearly equal to other study conducted in Nigeria where the primary type enuresis represented (94%) [20]. The primary enuresis indicate a delay in maturation of somatic mechanisms responsible for bladder control. Regarding the degree of the severity of nocturnal enuresis, 52,9% of the affected children had the severe type while in other study conducted in UK the percentage of children with the severe enuresis was 28.7% [15]. In our study we found that urine frequency was the most associated symptoms (45,7%) with the nocturnal enuresis. Involuntary defecation also associated with nocturnal enuresis in about 6,6% of the children. This may be caused by same socio-economic conditions or other etiological factors resulting in nocturnal enuresis. It is reported that the prevalence of the nocturnal decreases with age, however in our study the age difference between children with or without nocturnal enuresis was not significant (p-value = 0.05). Also, our study revealed that the number of the children in the family and birth order of children have no significant role in the development of nocturnal enuresis (p value

= 0.08 and 0,7 respectively). The family history (siblings and parents) of nocturnal enuresis, stressful events, fearing of going alone to bathroom and working mother ash risk factors were demonstrated in our study when this variables tested by Chi-square test, but when this factors analyzed by multivariate logistic regression, the family history and fearing of going alone to bathroom were the most significant (p-value = 0.001, 0.014 and 0,004, respectively) and this is consistent with other studies [23-25]. An interesting development is that genetic aberrations leading to nocturnal enuresis are now becoming identified with molecular genetics methods and showed that foci on chromosome 13(12), 12(13), 8 and 22(14) [11]. In our study both father and mother education as well as low economic status were found to be with no relation with an increased prevalence of nocturnal enuresis (p value = 0.32, 0,80 and 0.20, respectively). Our study revealed that about half (57.1%) of parents have good attitude toward their children who had nocturnal enuresis. However only 19.4% parents were consulted doctors about this problem, in other study conducted in Pakistan (54%) of parents sought help for their children problem [26]. Regarding the management of nocturnal enuresis our study showed that the majority (42,9%) of parents preferred to wait for self-recovery and only 20% of cases used medications. This result, consistent with other study conducted In Turkish [27], but differs from others studies conducted in Iran [10] and Australia [28]. Differences in management of children in different studies may be related to racial, economic and educational factors.

Conclusion

The finding of this study showed that nocturnal enuresis is a common problem among primary school students in Jeddah with prevalence of 11.2%. The most common type of nocturnal enuresis was the primary type with percentage of 80% and the most common degree is the severe one with percentage of 52.9%. The family history (siblings and parents) of nocturnal enuresis and fearing of going alone to bathroom are the most significant predictors for this condition. Although the majority (57.1%) of parents have good attitude toward their children who had nocturnal enuresis yet, there is a negative attitude from others who hitting or blaming their child with percentage of 14.3% and 28.6% respectively.

Recommendations

Based on the results of this study, the following recommendations are made: Health education regarding nocturnal enuresis is highly recommended (for both families and community as whole). More effective and innovative methods regarding education activities should include use of mass media, schools, local clinics and primary health care centers. These activities can help identify and correct misconception and negative attitude toward nocturnal enuresis. Further surveys and studies regarding nocturnal enuresis should be carried out in other geographic locations in Saudi Arabia to have a better comprehensive understanding of nocturnal enuresis situation in our region.

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