



COMPARISON OF NOCTURNAL ENURESIS RISK FACTORS IN PRIMARY SCHOOL AGE CHILDREN IN GAZA STRIP: A CROSS SECTIONAL STUDY

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ABSTRACT

Nocturnal enuresis is a common childhood problem. Although its prevalence is well recognized in many nations, the Gaza Strip lacks data. **Objective:** Enuresis is described as an intermittent wetting during sleep that occurs at least once a month after organic explanations have been ruled out, NE considered the second most common disorder affecting children 6-14 years of age after allergic disorders, its pathogenesis is complex and associated with many factors. The purpose of this study was to identify the risk factor of nocturnal enuresis (NE) among primary school students in Gaza strip. **Method:** A cross-sectional was carried out among 384 Palestinian children aged between 6-12 years from a different town in Gaza strip which represents different localities and cultures. There were three sections of the questionnaire. Family factors related to enuresis and Personal factors are examined in the first section. The questions in the second section ask about nocturnal enuresis-related characteristics among the studied cases. The final section examines Association of family history, and nature of the child's feeding and medical condition of nocturnal enuresis. The data was analyzed using Statistical Package for the Social Sciences program (SPSS). **Result:** the study was including 384 children age between 6-12 years, regarding risk factors of nocturnal enuresis among the studied children, our study found males higher percentage than females. Also, our study shown that majority of children had nocturnal enuresis just at night (78.4% in male and 84.6% in female), and the rest occurred at day and night (21.6% in male and 15.4 in female) and many of them shown improvement with decreasing fluid intake before sleep (69.8% in male and 64.8% in female). In our study we found a significant association between enuresis and history of urinary tract infections (UTI) P value less than .005 and irritability P value less than .005 between genders, but the other risk factors (include family history of enuresis, social factor like (recent change in living place, having a new babies birth in the family), low educational level of the parents, increased number of family members, DM type1) had no significant association with NE between genders in Gaza Strip. **Conclusion:** This study provides a quantitative estimate of the main risk factors for enuresis in Gaza children.

KEYWORDS: Nocturnal enuresis, Children, Risk Factors.

INTRODUCTION

While a person is asleep after the age at which a person should be able to control their bladder.^[1] For children who should have developed bladder control given their age, this disease is characterized by frequent and inadvertent passing of urine in the clothes or bed as well as involuntary passing of urine while sleeping.^[1]

Enuresis is the most prevalent urologic complaint in pediatric patients and is characterized as the involuntary leakage of urine during sleep that happens at least twice per week in children older than 5 years old (or the developmental equivalent) for at least 3 months.^[2]

Primary enuresis is when it arises in a child who has not been dry for at least 6 months, but secondary enuresis is the one that has an onset after a period of nocturnal dryness of at least 6 months.^[2] **Error! Bookmark not defined.**¹

There are two types of enuresis: monosymptomatic and non-monosymptomatic, the latter of which is associated with daytime incontinence or other symptoms of the lower urinary tract, such as urgency. Enuretic episodes are also regarded as frequent if they happen four or more times each week.^[2]

Enuresis is common condition and many studies reported that the incidence rate of NE is 10% for children under

7 years old, 3.1% for children aged 11–12 years and 0.5%–1.7% for children aged 16–17 years.^[2] In China, the prevalence of NE varies by region, ranging from 4.07%–10.3%^[3], and it occurs more frequently in boys^[4], the incidence of enuresis was shown to be 15%–25% in Saudi Arabia^[5], while in Egypt from about 18% among children 9 ± 2 years old.^[6]

Enuresis is considered a multifactorial entity, according to a population-based cohort study in 2018 in Taiwan, children with allergic rhinitis had a higher incidence and subsequently increased likelihood of getting NE. Boys, younger children, and those who sought medical attention for AR symptoms more frequently had a higher chance of developing NE.^[7] On study published in 2021 has showed that Constipation is not associated with the prevalence of mono symptomatic enuresis, but it is a significant risk factor for LUT dysfunction and Non monosymptomatic enuresis.^[8] Children with sickle cell anemia had more frequent and severe enuresis that persisted into late adolescence compared to age and sex-matched controls. These features point to a subset of enuresis that is challenging for the general public to treat. Young age and enuresis in a family member determines a subgroup of children with sudden cardiac arrest to be more likely to develop enuresis.^[9] Other study published in 2017 show that Enuresis was highly prevalent among children with SCD, and continues to be prevalent throughout early adulthood, being more common in males.^[10]

There are no studies about nocturnal enuresis and its prevalence and risk factors has been conducted in Palestine, so the aim of our study was to assess risk factor of nocturnal enuresis among children in Gaza Street.

MATERIAL AND METHODS

A descriptive Cross-sectional study design was used to detect the risk factors related to nocturnal enuresis in school age children by using closed answers questionnaire among 4 school, google form and 3 hospitals, the study was carried during 2022-2023. A focus group of discussion with experts at the college was done to assess the understandability and applicability of the questionnaire and the recommended modification were adopted.

Our target population of the was children in Gaza Strip aged between 6 and 12 years Palestinian children which represent different localities and cultures was selected randomly by the help of the General Directorate of Health, sample size based upon the assumption the children from selected schools with nocturnal enuresis were 1250, 50% ± 5% (45 – 55%) of the target children. Assuming 95% confidence interval (alpha (α) = 0.05), we calculated sample size 384. We increased the number to 5 % to account for the design effect.

We Excluded Children with severe mental illnesses and hearing problems and children below 6 years and children above 12

Data were collected by using a redesigned online/papers questionnaire distributed to parents/caregivers and it was including questions designed to fulfill the study objectives.

Verbal consent was taken from each caregiver to participate in our research, they were told that this research will completely ensure their privacy and those who did not approve to participate were excluded.

A subjective questionnaire, in a language best understood by participants was used to collect data, the questionnaire consists of three sections, family factors related to enuresis and Personal Factors are examined in the first section, the questions in the second section ask about nocturnal enuresis-related characteristics among the studied cases, the final section examines Association of family history, and nature of the child's feeding and medical condition to nocturnal enuresis.

The data was analyzed using Statistical Package for the Social Sciences program (SPSS). A Chi-squared test was used to compare the distribution of categorical variables, a *P*-value < 0.05 was considered to be statistically significant.

RESULTS

The total number of participants was 384 male was 57.8% and female was 42.2% the overall prevalence of nocturnal enuresis “only at night” and “day and night” time was 81% and 19% respectively, 78% of participants don't know the causes of nocturnal enuresis while 27.3 known the causes of nocturnal enuresis.

42.2% of participants try to treat their children while 57.8% didn't try to treat their children. Participants also reported different practices in terms of modalities of treatment provided where behavioral modification was the most commonly used modality by (39.6%) followed by pharmacological treatment (23%), bedwetting alarm (19.8%), exercises to strengthen the bladder muscles (15.8%) and surgery reported by 1.9% only, we found that improvement of nocturnal enuresis on different types of treatment occurred in 47.5% of cases.

Table 1: Nocturnal enuresis-related characteristics among the studied cases.

Nocturnal enuresis-related characteristics		Gender		P value
		Male	Female	
		n % Within gender	n % Within gender	
Time of enuresis	Only at night	174 78.4%	137 84.6%	0.127
	Day and night	48 21.6%	25 15.4%	
Improvement of decreasing fluids intake before sleeping?	Yes	155 69.8%	105 64.8%	0.300
	No	67 30.2%	57 35.2%	
Frequency per week?	1-2	104 46.8%	69 42.6%	0.612
	3-4	59 26.6%	43 26.5%	
	5-7	59 26.6%	50 30.9%	
Seeking medical advice	Yes	98 44.1%	64 39.5%	0.363
	No	124 55.9%	98 60.5%	
receiving treatment	Yes	57 25.7%	44 27.2%	0.744
	No	165 74.3%	118 72.8%	
Type of provided treatment	surgery	1 1.7%	1 2.3%	0.196
	Exercises to strengthen the bladder muscles	11 19.0%	5 11.4%	
	Bedwetting alarm	14 24.1%	6 13.6%	
	Behavioral modification	23 39.7%	17 38.6%	
	medical	9 15.5%	15 34.1%	
Improvement of nocturnal enuresis on different types of treatment [§]	Yes	26 44.8%	22 50.0%	0.604
	No	32 55.2%	22 50.0%	

Chi-squared test (X^2) is used to measure the difference between males and females regarding each item of the table.

Table1: showed that there was no statically significant difference in time of enuresis, Improvement of decreasing fluids intake before sleeping, frequency per

week, seeking medical advice, receiving treatment, type of provided treatment, improvement of nocturnal enuresis on different types of treatment between genders.

Table 2: Family factors related to enuresis.

Factors:		Gender		P value
		male	female	
		n % Within gender	n % Within gender	
Parental marital status	married	209 94.1%	152 93.8%	0.370
	divorced	12 5.4%	7 4.3%	
	died	1 .5%	3 1.9%	
Education level for father	Primary school	33	33	0.330

		14.9%	20.4%	
	Secondary school	93 41.9%	60 37.0%	
	university	96 43.2%	69 42.6%	
Father work	work	154 69.4%	103 63.6%	0.234
	Doesn't work	68 30.6%	59 36.4%	
mother work	work	27 12.2%	22 13.6%	0.681
	Doesn't work	195 87.8%	140 86.4%	
No of children in family	Between1-4	131 59.0%	101 62.3%	0.330
	between5-8	83 37.4%	59 36.4%	
	>8	8 3.6%	2 1.2%	
News babies' birth in the family?	Yes	47 21.2%	32 19.8%	0.734
	No	175 78.8%	130 80.2%	
The recent change in living place [§]	Yes	46 20.7%	26 16.0%	0.247
	No	176 79.3%	136 84.0%	
Family history of NE	Don't Know	61 27.5%	41 25.3%	0.458
	Yes	79 35.6%	51 31.5%	
	No	82 36.9%	70 43.2%	

Chi-squared test (X^2) is used to measure the difference between males and females regarding each item of the table.

Table2: showed that there was no statically significant difference in parental marital status, education level for father, father work, mother work, number of children in

family, news babies' birth in the family, the recent change in living place, family history of NE between genders.

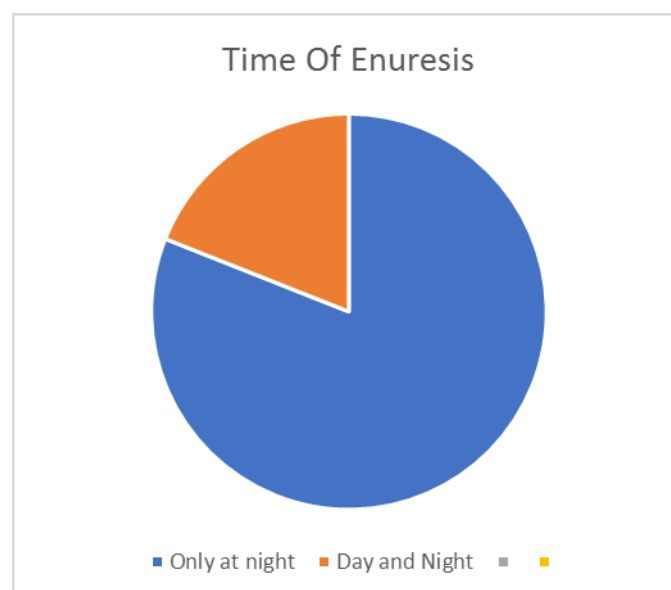
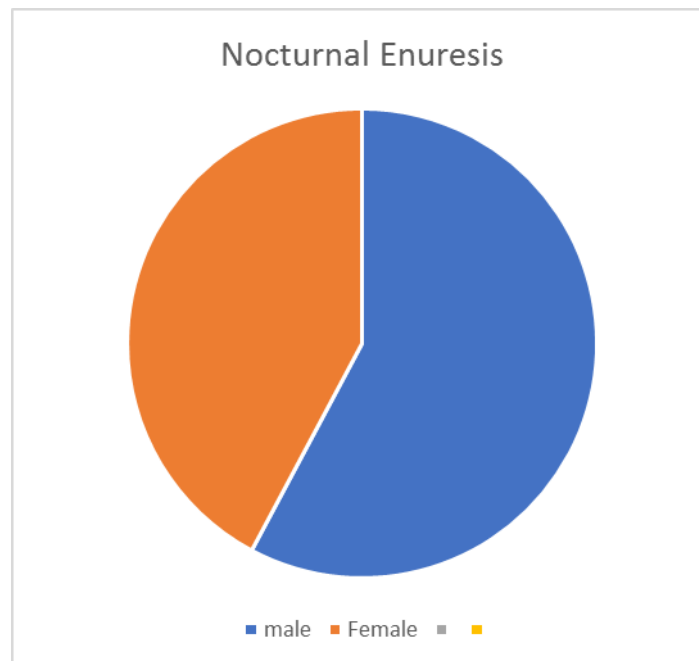
Table 3: Personal factors that were related to enuresis.

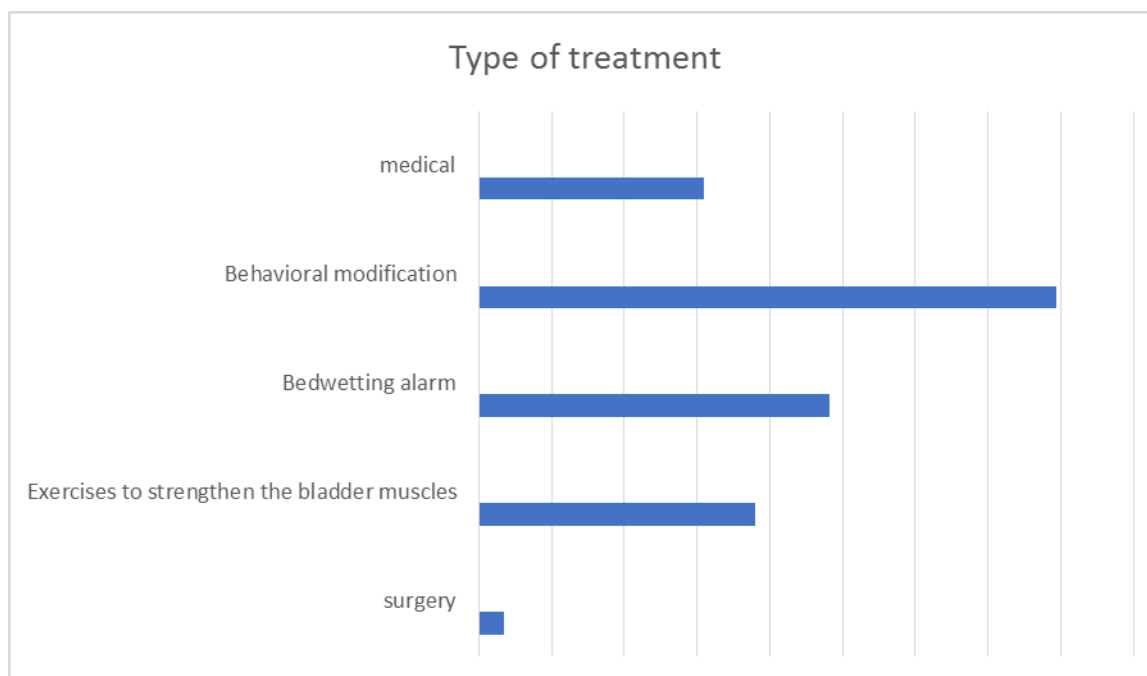
Factors		Gender		P value
		Male	Female	
		n % Within gender	n % Within gender	
Type of delivery	CS	44 19.8%	35 21.6%	0.669
	Vaginal	178 80.2%	127 78.4%	
Psychological problems	Yes	33 14.9%	26 16.0%	0.751
	No	189 85.1%	136 84.0%	
UTI	Yes	39 17.6%	56 34.6%	<0.001
	No	183 82.4%	106 65.4%	
Hereditary disease	Yes	38 17.1%	23 14.2%	0.440
	No	184	139	

		82.9%	85.8%	
Irritability	Yes	86 38.7%	81 50.0%	0.028
	No	136 61.3%	81 50.0%	
DM type1	Yes	4 1.8%	2 1.2%	0.658
	No	218 98.2%	160 98.8%	

Chi-squared test (X^2) is used to measure the difference between males and females regarding each item of the table.

Table 3: represents personal factors which show that there was statistically significant difference only in UTI and irritability between genders.





DISCUSSION

Childhood Nocturnal Enuresis is a typical disease its pathogenesis is intricate and linked to numerous variables.

Regarding risk factors of nocturnal enuresis among the studied children, our study found males higher percentage than females, this result coincide with many studies showing higher percent on males than females, this can be explained by the fact that boys mature more slowly than girls do hence, this can explain the higher prevalence in them.^[11]

Most reported enuresis cases in our study had it 81% Occurred at night and 19% occurred at day and night this result close to the results of other studies, Sherah et al. and Sarici et al. reported that daytime enuresis was seen in 14.29% and 18% respectively of cases of children of school-age.^[5,12]

Other study done among Saudi Children Population recorded higher percent of daytime and night enuresis in comparison to night enuresis.^[6]

78%of participants don't know the causes of nocturnal enuresis while 27.3 known the causes of nocturnal enuresis. 42.2%of participants try to treat their children while 57.8% didn't try to treat their children, participants also reported different practices in terms of modalities of treatment provided where behavioral modification was the most commonly used modality by (39.6%) followed by pharmacological treatment (23%), bedwetting alarm (19.8%), exercises to strengthen the bladder muscles (15.8%) and surgery reported by 1.9% only, we found that improvement of nocturnal enuresis on different types of treatment occurred in 47.5% of cases studied, in contrast to our results, Sherah et al. reported using

medical treatment in 76% of case and Al-Zahrani et al. reported the treatment methods used to be: enuresis alarm, water restriction, medication, and awaking for voiding in 56.9%, 14.7%, 5.7% and 5.7% of cases, respectively^[13], Schlomer et al. reported that parents used some behavioral modifications like voiding prior to sleep (77%), limiting fluid intake at night (71%), and using bedwetting alarm (6%).^[14]

According to analysis of family factors related to enuresis there was no significant relation between parental marital status, mother's education, whether parents were working or not, and the frequency of NE between gender, this may be due to small size sample compare to size of other studies which found significant relation between these factors and prevalence of nocturnal enuresis.^[15]

Family size, the child's birth order, the occurrence of stressful events like the birth of a new baby or a recent mov, and punishment of the child did not appear to be significantly correlated with NE, according to the analysis of the variables that may contribute to NE, these results similar to other study which done in Saudi Arabia^[13] findings, however, conflict with those of Iranian research that found that the majority of enuretic children have unemployed fathers, divorced parents, working mothers, and a crowded family.^[16]

In our study no significant relation between family history and nocturnal enuresis however, there are publications reporting an important relation between nocturnal enuresis and family history, and genetics.^[16,17] A Malaysian study found that, positive family history was determined in 53% of the enuretic children^[18], another study from Turkey records that 84.4% of the

children with nocturnal enuresis were found to have a positive family history.^[18]

We found association between enuresis and history of urinary tract infections (UTI) this result similar to an epidemiological study about Nocturnal enuresis and overactive bladder in children: found that children with a history of cystitis had a significantly greater prevalence of nighttime enuresis than kids without a history of it^[19], Ozden et al found that recurrent UTI were significantly higher in enuretic when compared to non-enuretic^[20], it's unclear why this is the case. However, it has been hypothesized that ureterovesical reflux of bacteria in the proximal urethra may result from the pelvic floor muscles' powerful contraction of the proximal urethra.^[21]

There's no significant relation between type of delivery and enuresis same as other studies^[22], other studies showing that there's significant relation between enuresis and type of delivery.^[6]

Number of studies has been demonstrated that enuretic children have higher rates of psychiatric disorders^[23], in our study there was 14.9% of enuretic males and 16% of enuretic female have psychological problems. There was significant relation between irritability and enuretic children.

There was no significant relation between DM type 1 and Nocturnal Enuresis. However, many studies found significant relation between DM and prevalence of nocturnal enuresis.^[6,24]

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