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Prevalence of Nocturnal Enuresis and Related Factors in Children Aged 5-13 in Istanbul

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Abstract

Objective: Enuresis is a health problem frequently encountered in childhood. This study was carried out in two socio-demographically different districts of the province of Istanbul, for the purpose of determining the relationship between the prevalence of primary nocturnal enuresis and certain demographic characteristics.

Methods: The study design is a cross-sectional carried out on 420 children (5 to 13 yr old) through random sampling. The research was conducted at two health centers in two different districts in the province of Istanbul. Data was collected with a questionnaire created by the researchers. Diagnosis of enuresis considered nocturnal voiding twice a week for at least three consecutive months.

Findings: Enuresis was a complaint expressed by 16.2% of the cases in the study group; 8.3% reported intermittent bedwetting. The data collected in the two districts pointed to a significant difference in terms of the frequency of enuresis in favor of the district where socio-demographic features were inferior (P<0.005). When family histories were explored in cases of children with enuresis, it was found that the mothers of 76.2% had the problem of enuresis while 14.9% had enuretic fathers. Thus statistically, the presence of enuresis in the family history was seen to have had a markedly significant impact on the occurrence of enuresis in the child (P<0.001).

Conclusion: It was concluded that familial predisposition to the condition constituted a more significant risk factor for enuresis compared to socio-demographic or economic characteristics.

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Key Words: Nocturnal Enuresis; Bedwetting; Prevalence; Socioeconomic Factors; Genetic Predisposition

Introduction

Enuresis is a health problem that is frequently encountered in childhood [1-3]. The International Children's Continence Society recommends that the term "enuresis" be exclusively reserved for the act of bedwetting [4,5]. Enuresis is classified as primary or secondary according to the manner of its onset and its progress. Of all enuretics, 80-90% are identified as cases of primary enuresis that stem frequently from genetic predisposition and biological and developmental factors [6,7]. It has been asserted that the problem of secondary enuresis more frequently arises from psychological factors [8-10].

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Depending upon the limitations it places on the extent of a child's social activities, enuresis may create social issues. It may cause a child to be marginalized by family and friends, instigate anger, punishments and rejection in caregivers, culminating in a loss of the child's self-confidence [3,11]. Enuresis is frequently encountered where socio-economic risk factors such as low levels of income, lack of education in parents, expanded family structures, environments of inferior social status are prevalent. It is also common among institutionalized children [12-18].

Genetic predisposition is another important factor that is discussed in the etiology. The probability of a child's becoming enuretic in the event either one of the parents has the condition is 45%. If both parents are enuretic, this ratio of risk rises to 75%; in cases where there is no related family history, the percentage of risk falls to as low as 15% [8,18,19].

In extensive research that has been predominantly cross-sectional, it has been shown that 5-7 million children of age 7 and over are affected by enuresis and that prevalence increases in males[17] and in cases where there is related family history [8,20,21].

Prevalence of enuresis is relatively higher at the age interval of 5-7, the figures gradually decreasing beyond that age group. While most enuretic children recover from this condition by themselves with time, in a small percentage, enuresis continues during adolescence [13,22,23].

Research conducted in Turkey has established noticeably high prevalence rates in the range of 20-30% for enuresis among children aged 5-7 [13,24,25]. A study conducted in Scandinavia among 3206 7-year-old children reveals a percentage of 9.8% [26].

The objective of the present study was to explore the prevalence of enuresis in children, aged 5-13, living in two districts of the province of Istanbul thought to be different in terms of socio-economic characteristics (parents' educational levels, family income status, attitudes regarding educating children, etc.), and to determine the relationship between the prevalence of enuresis and these characteristics as well as to understand the correlation of the condition with familial predisposition .

Subjects and Methods

The research was designed as a descriptive and correlational study. Research data was obtained from mothers with children in the age group 5-13 who had applied for various reasons to health centers located in two districts of Istanbul thought to exhibit different socio-demographic features.

The size of the research sample was determined using the sample-size formula $[n=(t^2.p.q)/d^2]$ for the main cluster cut-off [27]. The average prevalence of enuresis (p) at a confidence level of 95% (alpha=0.05) and a deviation of d=0.05 was 10% (varying between 3-28%) [3,13,17,24]. Acceptable sample size was thus determined to be at least 384.

Study data was collected on Thursdays and Fridays over the period October 2008 - May 2009. Children whose birthweight was under 2500 g or over 5000 g, premature births, children with chronic or congenital diseases were excluded from the study. A total of 475 mothers were queried. Forty-two children were excluded because they did not meet inclusion requirements; 13 mothers were left outside of the assessment because they did not wish to complete the questionnaire. The ultimate assessment was made on the basis of 420 cases.

A questionnaire developed by the researchers was used as a data collection tool. The questionnaire consisted of two sections. The first section contained questions on the demographic characteristics of the family and child and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) identification criteria for enuresis (Diagnosis of enuresis considered nocturnal voiding twice a week for at least three consecutive months) [10]. The second section consisted of questions posed to mothers with enuretic children (such as whether the children had received treatment for enuresis, whether they had any behavioral problems or issues with social communication).

The opinions of ten specialists were sought to determine the questionnaire's validity of scope. Adjustments were made in accordance with their recommendations. A pilot study was conducted with 20 mothers to test the comprehensibility of the questions. The final version of the

questionnaire consisted of a total of 47 open- and closed-ended questions. The questionnaire was filled out in an average of 10-15 minutes at face-to-face interviews with the mothers.

Ethics approval was granted by the University of Istanbul Ethics Committee, Istanbul, Turkey. The written permission of the administrations of the health centers were obtained prior to data collection and written informed consent forms were received from the mothers of the patients. The regions and health centers were encoded in data collection as A and B.

The collected data was analyzed through descriptive analysis and using the chi-square and t-tests. *P* value <0.05 was considered statistically significant.

The fact that data collection was restricted to Thursdays and Fridays was one of the limitations of the study in that on those days, families from lower- and middle-class socioeconomic groups were more likely to apply to the health centers. Another limitation was that data was restricted to the responses to the questions on the questionnaire.

The questions that were posed in the research were the following:

- Demographic characteristics of the two regions is different
- Demographic characteristics have effect on prevalence of enuresis
- Familial predisposition has effect on prevalence of enuresis
- Enuretic children have behavioral problems

Findings

The study collected information on the prevalence of enuresis in children, ages 5-13, living in two different districts of Istanbul and the characteristics that may have had an effect on the appearance of the condition. Out of the total number of enuretic children, 20.7% were 5 years old, 15.5% were 6, 10.5% were 7, 11.9% were 8, 8.8% were 9, 11.9% were 10, 10.0% were 11, 5.2% were 12 and 5.5% were 13 years of age. The mean age of the children was 8.07±2.5 years.

Comparison of families living in two sociodemographically different districts: A total of 420 mothers participated in the study. Out of the study group, 65.2% were mothers in District A, who had applied to "Health Center A" located in District A and 34.8% were mothers in District B, who had applied to "Health Center B" located in District B.

The applicants to the health centers were compared in terms of the child's age (χ^2=15.77, df=8, *P*=0.05), place of the child in the family birth order (χ^2=0.51, df=3, *P*=0.9), the number of children in the family (χ^2=4.94, df=3, *P*=0.2), the structural type (nuclear, expanded) of the family (χ^2=0.002, df=1, *P*=0.9); mothers' (t=3.68, *P*=0.7) and fathers' mean ages (t=3.98, *P*=0.6), genetic predisposition, the existence of enuresis in the father (χ^2=3.28, df=1, *P*=0.07), and siblings (χ^2=2.32, df=1, *P*=0.2). It was found that there was a higher prevalence of enuresis in fathers and siblings in District A but that the difference was not significant. Another comparison was made in terms of developmental characteristics of children, namely the ages when children learned to talk (t=0.13, *P*=0.3), to walk (t=0.23, *P*=0.06) and to start to be toilet-trained (t=0.22, *P*=0.9). No difference was seen between the districts in terms of these characteristics.

Table 1 shows the results of the comparison of the two groups from the two districts, in terms of the educational level of the parents, the existence of enuresis in the mother, the family's monthly income, the mother's attitude toward the child during toilet training, and whether the child was allowed to use the toilet in the process of toilet training. It was found that there was a significant difference between the two districts in terms of the characteristics explored (*P*<0.05).

Determining the effect of family sociodemographics on enuresis: In our research, no correlation was seen between the prevalence of enuresis and the parents' educational level, the number of children in the family, the gender of the child, the age the child learned to talk or to walk, the age or season toilet training was given, or the use of the toilet in the process of toilet training (*P*>0.05). Table 2 presents an assessment of the family characteristics in the two districts and the

Table 1: Comparison of sociodemographic characteristics of mothers living in two districts

Variable		Total (n)	District A n (%)	District B n (%)	χ^2	df	*P value*
Educational level of mother	Illiterate	34	33 (97.1)	1 (2.9)	39.71	4	<0.001
	Elementary school	252	175 (69.4)	77 (30.6)			
	Middle school	45	24 (53.3)	21 (46.7)			
	High school	68	36 (53.7)	31 (46.3)			
	University	21	5 (23.8)	16 (76.2)			
	Total	**420**	**273 (65.2)**	**146 (34.8)**			
Educational level of father	Illiterate	6	5 (1.8)	1 (0.7)	27.03	4	<0.001
	Elementary school	197	149 (75.6)	48 (24.4)			
	Middle school	64	43 (67.2)	21 (32.8)			
	High school	108	57 (52.8)	51 (47.2)			
	University	45	18 (42.9)	24 (57.1)			
	Total	**420**	**272 (65.2)**	**145 (34.8)**			
Level of income as expressed by family	MW*and lower	47	31 (66.0)	16 (34.0)	6.30	2	0.04
	MW – MSA**	304	207 (68.1)	97 (31.9)			
	Above MSA	69	36 (52.2)	33 (47.8)			
	Total	**420**	**274 (65.2)**	**146 (34.8)**			
Harsh attitude during toilet training	Yes	95	70 (25.5)	25 (17.1)	32.78	2	<0.001
	No	200	148 (54.0)	52 (35.6)			
	Sometimes	125	56 (20.5)	69 (47.3)			
	Total	**420**	**274 (100)**	**146 (34.8)**			
Using the toilet during toilet training	Yes	138	82 (59.4)	56 (40.6)	16.84	2	<0.001
	No	264	187 (70.8)	77 (29.2)			
	Sometimes	18	5 (27.8)	13 (72.2)			
	Total	**420**	**274 (65.2)**	**146 (34.8)**			
Presence of enuresis in mother	Present	21	18 (85.7)	3 (14.3)	4.09	1	0.04
	Absent	399	256 (64.2)	143 (35.8)			
	Total	**420**	**274 (65.2)**	**146 (34.8)**			

*Minimum Wage **Minimum Subsistence Allowance

situations that make a difference in terms of whether enuresis will appear.

Diagnosis of enuresis considered nocturnal voiding twice a week for at least three consecutive months. It was found that, 16.2% of the entire group had enuresis. In District A, 13.1% were established as enuretic and in District B, 3.1% were enuretic. Prevalence of enuresis was significantly different in the two districts from which the data was collected and higher in the district that exhibited disadvantaged socioeconomic characteristics (District A) (P<0.005).

According to the statements of the mothers, it was established that 14.9% of the children had fathers who had the condition, 76% had enuretic mothers and 16.1% had enuretic siblings. It was determined that the presence of enuresis in family members had a significant effect on the appearance of enuresis in the child (P<0.001). Moreover, a look into the association between the appearance of enuresis in the child and the harsh treatment of children by mothers and their anger toward the child in the event of an accident during toilet training pointed to a significant correlation in the group receiving the harsh treatment (P<0.001) (Table 2).

The income status of the families included in the study was examined in light of the highest and lowest salary income levels established by the Social Security Administration for 2009. At the time of the study, the exchange rate of the Turkish Lira (TL) against the US dollar ($) was TL 1 = $ 1.49. Income categories were identified as families earning minimum wages and below (TL 550 and below), those earning amounts between minimum wages and the minimum substinence allowance (between TL 550 – TL 1550) with the third category being middle-level income earners (TL 1551 – TL 4500). There was no family in either district that could be classified as being in the higher income bracket.

A look into the economic status of the participating families showed that while 24.8% were earning a monthly income that was equivalent to the official minimum wage or below,

Table 2: Comparison of characteristics thought to have an effect on enuresis and involuntary urine release

Variables		Enuresis n (%)	No Enuresis n (%)	χ^2	*df*	*P value*
Groups	District A	55 (13.1)	219 (79.9)	8.75	1	0.003
	District B	13 (3.1)	133 (31.7)			
	Total	**68 (16.2)**	**352 (83.8)**			
Harsh attitude during toilet training	Yes	33 (48.5)	62 (17.6)	58.65	1	<0.001
	No	18 (26.5)	182 (91.0)			
	Sometimes	17 (25.0)	108 (86.4)			
	Total	**68 (16.2)**	**352 (83.8)**			
Presence of enuresis in mother	Present	16 (76.2)	5 (1.2)	72.18	2	<0.001
	Absent	52 (12.4)	347 (82.6)			
	Total	**68 (16.2)**	**352 (83.8)**			
Presence of enuresis in father	Present	10 (2.4)	1 (0.2)	-	2	<0.001*
	Absent	58 (13.8)	351 (83.6)			
	Total	**68 (16.0)**	**352 (83.8)**			
Presence of enuresis in sibling	Present	12 (2.9)	18 (4.3)	13.60	1	<0.001
	Absent	56 (13.3)	330 (79.5)			
	Total	**68 (16.2)**	**348 (83.8)**			

* Fisher exact test

the monthly income of 58.0% of the families stood at a level that was between the minium wage and the official minimum substinence allowance. Another 16.4% were classified as being at the middle-income level. It was established that there was no significant association between the level of family income and the incidence of enuresis (P>0.05).

Behavioral problems and adjustment problems of enuretic children: The responses of mothers with enuretic children to queries about whether their child had adjustment problems at school, at home or with peers (aggressiveness, introversion, restlessness, etc.) or behavioral issues (nail-biting, thumb-sucking, stuttering, etc.) were evaluated. It was found that in both districts, the responses of mothers of enuretic children showed no difference in terms of adjustment issues (χ^2=0.57, df=1, P=0.5) or behavioral problems (χ^2=0.51, df=1, P=0.5).

Discussion

The etiopathogenesis of enuresis, a condition that has been known to exist for centuries, has not been completely uncovered. Although some studies in the literature indicate that low socioeconomic status and expansive family structures play a role in the etiology [3,13,14], there is no single cause that has been set forth that will shed light on the etiology of this condition. It has however been shown that many factors may be responsible for the development of the ailment [10,18,29].

Comparison of the characteristics of the families living in the two different districts: Istanbul is not only among the biggest cities in Turkey but also one of the largest cities in the world. With a 2007 census figure of 13 million, Istanbul attracts a flow of internal migration from all parts of the country [30]. The other district from which data was collected for the study, District B, is connected to metropolitan Istanbul and appears to have developed into a satellite city in the 2000's [31].

The finding in the present study that there was a significantly higher prevalence of enuresis in the district where social-demographic characteristics such as parents' educational levels and families' income levels were lower and the incidence of mothers having the condition was higher is consistent with the literature [30,31].

The findings suggested that that the harsh attitude of mothers with enuretic children in District A and the significant difference in the rates of using the toilet in toilet training are similarly a result of the socio-economic differences between the two districts

Determining the effect of family characteristics on enuresis: The enuresis rate found in our study (16.2%) was above the average for Turkey (10%),

where prevalence of enuresis in the general population ranges between 3-28% [3,13,15,17,24]. We believe that this result may be due to the denser population in District A (65.2%) and the fact that more cases of enuresis were seen in this district (13.1%). It was established that in District B, an area of average socioeconomic development, prevalence of enuresis in children was 3.1%. A statistically significant difference was found between the districts in terms of the prevalence of enuresis in favor of District A (P<.005). It was however established that this difference could not be associated with the educational level of parents and the family income level, which are among the factors that represented the socioeconomic between the two groups. An association however could be made with the presence of enuresis in the child's mother, father or siblings. In addition, it was seen that the harsh behavior of mothers toward their children during toilet training was also a factor that influenced the appearance of enuresis (Table 2).

The literature indicates that socioeconomic status is one of the main factors that influence the prevalence of enuresis [12,13,17]. In our study as well, it was seen that socioeconomic development did not affect the prevalence of enuresis. It is possible that this outcome was the result of an unequal number of cases in the two groups studied and also because the families in the study were from low and middle-income levels and not in the higher income bracket. Another reason for the result attained might be that the families did not reveal their true income levels in their responses to the questionnaire.

Genetic predisposition occupies an important place in the etiology of enuresis [16,18,32]. While the probability of the appearance of enuresis in a child is 44% when any one of the parents suffers from enuresis, this probability rises to 77% when both are affected by the condition. A range of 70-75% of all enuretics cited in the research has been identified as children of enuretics or of first-degree relatives who are enuretic [8]. In our study, too, and in keeping with the literature, 76.2% of children had mothers with enuresis, 14.7% had fathers and 16.2% had siblings with the condition, leading to the conclusion that the prevalence of enuresis was significantly affected by the presence of enuresis in first-degree relatives. We believe that this finding is associated with the high prevalence of marriages between relatives in Turkey. According to the 2006 data of the Family Structure Survey of the Turkish Institute of Statistics [33] the rate of adults of 18 and over in Turkey who marry close relatives is 20.9%. In Southeastern Turkey, this rate is 40.4%. Since regional differences were not evaluated in the present study, conducting wider and more regionally-based studies would be a useful project for the future.

The literature reports that early toilet training or the harsh attitude of mothers during the toilet training process stimulates fear, exasperation and anxiety in the child, possibly leading to stubbornness in later stages [34,35]. Extreme harshness may incite unwanted results [36]. Some children who are forced in their behavior in this area later become enuretics and some may experience adjustment and other behavioral problems [34,35].

The results attained in the present study are in line with the literature. The prevalence of enuresis in children whose mothers adopted a harsh attitude during the process of toilet training was significantly high. While enuresis was seen in 48.5% of the children whose mothers admitted to adopting a harsh attitude during the toilet training process, 26.5% of the children of mothers who said they had not been harsh had enuresis and 25% were the children of mothers who stated that they were sometimes harsh toward their children during toilet training. These results indicate that the attitudes of both mothers who were decidedly angry at every bedwetting episode and of mothers who showed no reaction at all are not preferred attitudes and that such behavior can in fact lead to the appearance of enuresis.

Behavioral problems and adjustment problems of enuretic children: An answer was sought for the research question of whether behavioral and adjustment problems were different in enuretic children who lived in two sociodemographically different districts. Enuresis is one of the five leading conditions that constitute reason for application to children's psychiatry polyclinics in Turkey [37]. While no psychiatric disorder is present in many enuretic children, it has been set forth that the probability of developing a psychiatric disorder and low academic performance is higher in enuretics compared to other children [3,11,38,39]. It is for this

reason that early treatment of enuresis is important.

To the question about whether families had applied to health centers for treatment of enuresis, the responses of 36.4% of the mothers living in District A and 44.4% of the mothers living in District B were affirmative. No statistically significant difference, however, was found between the districts in terms of this factor. It was moreover discovered that the majority of mothers were not thinking of obtaining treatment with medications for the condition because they believed that such drugs caused sterility and that the problem would eventually disappear at later ages. The findings concur with the literature [40].

In an assessment of mothers' responses to the question in the study referring to whether their children were experiencing adjustment problems at school, at home or among friends (aggressiveness, introversion, restlessness, etc.), it was found that 8.4% of the mothers of enuretic children in District A and 4.1% of the mothers with enuretic children in District B indicated that their children did have adjustment problems. When mothers were asked whether their children had behavioral problems like nail-biting, thumb-sucking, stuttering or the like, the responses from 77% of the mothers from District A and 6.2% of the mothers from District B confirmed that their children had at least one of these behavioral problems. However, no statistically significant difference could be seen between the two groups in terms of experiencing adjustment and behavioral problems.

When it is considered that today's maladjusted children may be tomorrow's emotionally disturbed adults, an important responsibility lies on the shoulders of nurses and midwives working in public and pediatric health in terms of contributing to the early diagnosis of enuresis in children and providing families with information so that the condition can be treated.

Conclusion

The research data led to the conclusion that genetic predisposition, parents' low level of education and the negative attitude of mothers toward their children during toilet training were factors that affected enuresis. It was observed that there was no significant correlation between enuresis and the family's economic status, the child's age, gender, birth order, the number of children in the family, the educational level of the parents, the age the mother started toilet training or whether or not the toilet was used in the training. It should not be forgotten that an early diagnosis of enuresis in children and the implementation of treatment can prevent the development of behavior and adjustment problems. Public Health midwives and nurses should work to inform families about this issue.

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