

Bursa İli İlköğrenim Çocuklarında Nokturnal Enürezis Prevalansı

[Prevalence of Nocturnal Enuresis among Primary School Children in Bursa, Turkey]

ÖZET

AMAÇ: Bu çalışmanın amacı Bursa ili merkezinde yaşayan 6-14 yaş aralığındaki çocukların nokturnal enürezis prevalansını ve sosyodemografik faktörlerle ilişkisini belirlemektir. **YÖNTEM:** Bursa il merkezinde 125 843 ilkökul çocuğunda kesitsel epidemiyolojik araştırma gerçekleştirildi. Çalışmaya altı on dört yaş aralığında toplam 3270 çocuk katıldı (yanıt oranı %98,0). Anne babalar tarafından cevaplanan anket formları değerlendirilerek enürezis prevalansı ve sosyodemografik özellikler arasındaki ilişki incelendi.

BULGULAR: Tüm çocukların %23,5'inde enürezis nokturna tespit edildi. Erkek çocuklarda prevalans kız çocuklarından daha yüksek (%24,9 vs. %22,1) bulundu. Saptanan enürezis vakalarının %58,1'u primer, %41,9'u ise sekonder enürezis olup; cinsiyet, aile öyküsü, derin uyku ve kabızlık ile enürezis arasında anlamlı bağlantı bulundu.

SONUÇ: Nokturnal enürezis prevalansı Türkiye'de daha önce yapılan çalışmalardan daha yüksek bulunmuştur.

SUMMARY

AIM: The purpose of this study is to determine the prevalence of nocturnal enuresis and its association with sociodemographic factors in 6- to 14-year-old children in the central district of Bursa, located in western Turkey.

METHOD: A cross sectional epidemiological study was performed among the 125,843 primary schoolchildren. In total, 3270 students aged 6-14 years participated (response rate 98.0%). Data were collected via a questionnaire completed by parents. The relationships between the prevalence of enuresis and various sociodemographic variables were assessed.

RESULTS: The overall prevalence of nocturnal enuresis was 23.5%, and the prevalence of the condition was higher in males than in females (24.9% vs. 22.1%). Of the students positive for nocturnal enuresis, 58.1% had primary and 41.9% had secondary enuresis. Male gender, history of enuresis, deep sleep, and constipation were significantly associated with enuresis.

CONCLUSION: The prevalence of nocturnal enuresis may be higher than in previous studies in Turkey.

Ahmet Hikmet Şahin¹
Hatice Hatice²
Yasemin Ustündağ Budak³
Serpil Sancar⁴
Hüseyin Tatar⁵

¹Medical Park Bursa Hospital, Department of Pediatric Surgery, Osmangazi, Bursa.

²Ege University, Department of Public Health, İzmir.

³Sevket Yılmaz Education and Research Hospital, Department of Clinical Chemistry, Yildirim, Bursa.

⁴Sevket Yılmaz Education and Research Hospital, Department of Pediatric Surgery, Yildirim, Bursa.

⁵Medical Park Bursa Hospital, Department of Pediatrics, Osmangazi, Bursa.

Anahtar Kelimeler:
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Sorumlu yazar/

Corresponding author:
 Yasemin Ustündağ Budak
 Sevket Yılmaz Education and Research Hospital, Department of Clinical Chemistry, Yildirim, Bursa, Turkey.
 yaseminbudak2000@yahoo.com

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INTRODUCTION

Nocturnal enuresis (NE) is defined as the repeated, spontaneous voiding of urine during sleep in a child aged 5 years or older (1). NE is regarded as a group of conditions with different etiologies rather than a single entity, because only a multifactorial etiology can explain the wide range in outcomes and responses of patients to different therapies (2). Risk factors for NE include male gender, younger age, family history of enuresis, divorced parents and deep

sleep (3,4). NE is frequently diagnosed among schoolchildren and is an important psychosocial problem both for parents and children (5). The overall prevalence of NE, as well as its prevalence in different age groups, varies greatly by country, and has been reported to range from 2.3% to 28% (6-13). We have assessed the prevalence of NE in children aged 6 to 13 years in Bursa, Turkey, and the association of NE with various sociodemographic factors. We also compared our findings with those of

previous studies in Turkey to determine the national prevalence of NE.

MATERIAL and METHOD

A cross sectional epidemiological study was performed among 125,843 schoolchildren attending grades 1-5 of the 101 schools in the central district of Bursa, Turkey. We surveyed students in the years 1-5 of elementary school. Permission to perform the survey was obtained from the National Education Authority and the ethics committee of our institution. We selected 3,270 students stratified by to age and gender. The student population was stratified by schools and by year of course; in each stratum, classes were randomly selected and students in each class enrolled. The number of classes selected in each stratum was proportional to the size of stratum and sufficient to guarantee a sample size that ensures an estimate of NE prevalence of 12 % and a confidence level of 95% (6-13).

The questionnaire included 30 'closed ended' questions, divided into two sections (Table 1).

A pilot survey was administered to 50 students to ensure that questions that were not well understood were explained. Questionnaires were distributed to all students, who were instructed by their teachers to bring them home to their parents. A brief information leaflet was enclosed with the questionnaire informing the parents of the voluntary nature of the study. The students were instructed to help explain the questions to their parents. Questionnaires could be filled out by mothers or fathers. Questionnaires were collected within 2 weeks. Those not wishing to participate were recorded as "not responding". All statistical analyses were performed using SPSS 13.0 software. Data were analyzed by the chi square test and logistic regression analysis. We utilized 95% confidence intervals (CI) and $\alpha=0.005$

RESULTS

Of the 3270 questionnaires sent home, 3141 (98.01%) were returned. Mean student age was 8.96 ± 1.58 years (range, 6 - 14 years). The overall prevalence of NE, defined according to International Children Continence Society (ICCS) Terminology, was 23.5%. Of the 754 children with NE, 438 (58.1%) had primary and 316 (41.9%) had secondary NE. NE was more prevalent in boys than in girls (52.5% vs. 47.5%) (Table 2).

Part 1

1. Is your child? Male _____ Female _____
2. Child's age _____ years
3. Is your child a deep sleeper? Yes _____ No _____
4. How well does your child perform in school? Good _____ Moderate _____ Fail _____
5. Number of siblings. None _____ One _____ 2 or more _____
6. How many other people sleep in the child's room. None _____ 1 _____ 2 or more _____
7. History of recurrent urinary tract infection. Yes _____ No _____
8. History of upper respiratory tract infection. Yes _____ No _____
9. Age of the mother; _____ years.
10. Age of the father; _____ years.
11. Is the father living? Yes _____ No _____
12. Is the mother living? Yes _____ No _____
13. Working mother. Yes _____ No _____
14. Working father. Yes _____ No _____
15. Educational level of the mother. Primary school or less _____ Junior high school or more _____
16. Educational level of the father. Primary school or less _____ Junior high school or more _____
17. History of enuresis in siblings. Yes _____ No _____
18. Family history of enuresis. Mother or father enuretic _____ Mother and father enuretic _____ Mother and father non-enuretic _____
19. History of enuresis in relatives? Yes _____ No _____
20. Child's communication with other people? Good _____ Fair _____

Part 2

21. What is the frequency of daytime urination? _____ times/day
22. Does your child experience day-time wetting? Yes _____ No _____
23. Does your child experience a sudden urge to urinate during the daytime? Yes _____ No _____
24. Does your child wets his/her bed at night? Yes _____ No _____
25. How frequently does your child wet the bed at night? Every night _____ 4-6 times per week _____ 1-3 times per week _____ 1-2 times per month _____
26. Did your child have a continuous dry period for more than six months? Yes _____ No _____
27. Has your child been treated for bedwetting? Yes _____ No _____
28. Does your child seem bothered or upset by bedwetting? Yes _____ No _____
29. Are your child's issues with bedwetting a big deal for your family. Yes _____ No _____
30. Does your child experience nighttime terrors or nightmares, Yes _____ No _____
31. Bite his or her nails, Yes _____ No _____
32. Have tics Yes _____ No _____

Figure 1: Survey questionnaire.

Table1: Social background and some other characteristics of study subjects ($n = 3141$).

		%
Gender	Boys	49.4
	Girls	50.6
Siblings, mean$\pm$SD, y		2.32 $\pm$ 1.08
Age, mean$\pm$SD, y		8.96 $\pm$ 1.5
Daytime frequency		4.52$\pm$1.08
Parental educational level^a		
Mother	Low^a	10.6
	Primary	72.0
	>Primary^b	17.4
Father	Low^a	10.3
	Primary	62.9
	>Primary^b	26.8
Parental employment^a		
Mother	Employed	20.2
	Housewife	79.8
Father	Employed	90.9
	Unemployed	9.1
Family income	Low^c	72.2
	Middle	27.8

^aLess than primary school, ^bmore than eight years of primary education, ^cbase wage rate

NE was significantly associated with number of siblings ($p < 0.05$) and daytime urination frequency ($p < 0.05$) (Table 2), whereas mother's education level was not ($p = 0.71$).

NE was significantly associated with daytime urination frequency, enuresis in siblings, parental history of enuresis. Constipation (odds ratio (OR), 2.26; 95% CI, 1.60-3.20) spina bifida occulta (OR, 1.45; 95% CI, 1.04-2.03), tic, and deep sleep (OR, 2.88; 95% CI, 2.38-3.48) were significantly associated with NE ($P < 0.05$ each) (Table 3).

DISCUSSION

The prevalence of NE among 6- to 11-year-old children has been reported to range from 2.3% to 28%, depending on the country (6-13).

In Turkish children, the prevalence of enuresis has been reported to range from 9.0% to 25.5% (5,10, 11,12,14-22). We found that the prevalence of NE was 23.5%, which is higher than in most other

studies. Differences among countries, and even those within Turkey, may be due to differences in selection criteria, including age ranges, definitions of enuresis, genetic predisposition, and traditional and cultural background. Two risk factors may be involved in secondary enuresis. Children late to attain nocturnal bladder control had significantly greater incidence of secondary enuresis than those who attained early nocturnal bladder control. In addition, a child's level of exposure to adverse life events has been associated with the onset of secondary enuresis (23).

Of the children in our study, 40.9% had secondary NE, higher than the 25% previously reported, although others have reported that 37.2% of Turkish children with NE have secondary NE (1,10).

In agreement with previous findings, we found that NE was more prevalent in boys than in girls (5,10,11,15). Moreover, we found that 35.9% of children with NE had siblings with this condition, 43.1% had other family members with NE, and 50.9% had relatives with NE, in agreement with the 30.8-76.5% of children with NE previously reported to have a family history of this condition.

Table 2: Social background and some other characteristics of enuretic subjects ($n = 754$).

		%	p
Primary NE		58.1	
Secondary NE		41.9	
Prevalance	Boys	24.9	
	Girls	22.1	
Siblings, mean $\pm$ SD		2.5 $\pm$ 1.2	0.01
Age mean $\pm$ SD, y		8.64 $\pm$ 1.52	NS
Day time frequency		5.07 $\pm$ 2.26	0.01
Parental educational level^a			
Mother	Low^a	15.5	
	Primary	70.9	
	>Primary^b	13.6	
Father	Low^a	10.2	
	Primary	64.4	13.5NN
	>Primary^b	25.4	SNS
Family income	Low^c	78.6	
	Middle	21.4	0.05

^aLess than primary school, ^bmore than eight years of primary education, ^cbase wage rate

Table 3: Characteristics of all study subjects and those with nocturnal enuresis.

	All (n=3141)	NE (n=754)	Odds ratio
Daytime frequency	4.52±1.94	5.07 ± 2.26	
Wet nights/month		12.9±10.88	
Daytime urge	27.7%	52.0%	4.1 (3.46-4.86)*
Constipation	7.0%	14.0%	2.26 (1.60-3.20)*
Tic	20.9%	24.4%	1.5 (1.24-1.82)*
Spina bifida occulta	8.2%	12.6%	1.45 (1.04-2.03)*
Deep sleeper	40.9%	60.2%	2.88 (2.38-3.48)*
Parental enuresis history	17.0%	43.1%	6.93 (6.17-7.05)*
Enuresis history in siblings	16.7%	35.9%	4.66 (3.83-5.68)*
Enuresis history in relatives	27.4%	50.9%	4.12(3.46-4.90)*

*p < 0.05

Table 4: Previous findings on the prevalence of nocturnal enuresis.

Year	Author	City	Number	Prevalence(%)	Age
1997	Serel TA	Isparta	5754	11.5	7-12
1999	Gümüş	Manisa	1703	13.7	7-11
2001	Öge	Aydın	2300	11.6	4-12
2001	Cayan S	Mersin	5350	12.7	5-19
2003	Uğuralp S	Malatya	1377	9.5	5-9
2004	Gür E	İstanbul	1576	12.4	6-16
2004	Özkan KU	Kahramanmaraş	3527	12.9	6-11
2004	Unalacak	Zonguldak	1350	8.9	7-12
2007	Özden C	Ankara	1339	17.5	6-12
2008	Carman KB	İstanbul	3000	25.5-16	6-12
2008	Inan M	Edirne	2000	9.8	5-11
2009	Günes A	Urfa	562	14.9	6-16
2010	Özkan	Ankara	15150	9.0	6-15

Linkage studies have identified associated genetic loci on chromosomes 8q, 12q, 13q, and 22q11 (24). Other studies of Turkish children found that 63% and 84.4% of children with NE had a family history of NE (21,25). Although genetic factors undoubtedly have an important role in the etiology of NE, somatic and psychosocial factors may be major modulators.

NE has also been associated with other factors, including small functional bladder capacity, nocturnal polyuria, and, most commonly, arousal dysfunction. About 52% of the children with NE in our study had urgency, a frequency higher than in those without

NE. Many parents complain that it is difficult to fully awaken their bed-wetting children. When we compared NE with other children we found that 60.24% and 40.92%, respectively, were deep sleepers. Deep sleep has previously been shown to be significantly associated with enuresis in Turkish patients (10,21,22,26). Other studies have also reported significant differences in the proportion of deep sleepers between bedwetting and non-bed-wetting children, and a previous epidemiological study reported that most dry children were relatively easy to arouse from sleep (27,28). Arousal from sleep

is dependent on the reticular activating system, a diffuse neural network that translates sensory input into arousal stimuli via brain stem noradrenergic neurons. Arousal plays a pivotal role in the enuretic child. A comparison of the arousability of enuretic boys to age matched controls, by placing inserts into the ears of each child and sounding tones of 110 dB, found that, during the first third of the night, only 3% of the enuretic boys were arousable (29).

NE has also been found to be significantly associated with a history of constipation and soiling (19,16,20). The alimentary and urinary systems are closely related, both anatomically and functionally, such that a malfunctioning of one will affect the other. Children and adolescents with symptoms of urinary dysfunction have a higher rate of bowel disorders, including constipation (30). We observed a 14% rate of encopresis in NE patients, twice that of the entire group.

We observed no relationship between prevalence of NE and the educational level of the father or mother, in agreement with previous findings (31). Previous studies in Turkey, however, have reported that low educational level of parents was associated with NE (5,10). However, most of the parents in our study had low educational levels, with none being university educated.

Consistent with previous results, we found that low socio-economic status of the family was associated with NE (32). Low socioeconomic status is also a risk factor for psychopathology (33).

This study had several limitations. First, the diagnosis of NE was not validated by medical evaluation. As with most epidemiological studies, medical evaluation was not part of our diagnostic assessment. In addition, we did not include children in private schools, which enroll children from a higher socioeconomic group.

In summary, the prevalence rates of NE in Bursa, Turkey, were higher than in previous studies from Turkey and Western countries. Enuresis is a pediatric public health problem and preventive, etiological and curative efforts are needed to address it.

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