

The Prevalence of Enuresis and Its Association with Psychological Factors in Zahedan, a City of Iran

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Abstract

Introduction: Enuresis is a common problem with multiple causes in children. The aim of the present study was to establish the prevalence of enuresis among school population and its psychology and emotional associated factors.

Methods: Clustering sampling was used to collect 2000 schoolchildren from city Zahedan. A research made questionnaire was applied as a tool for data collection. All parents were informed about the aims of study and signed the consent form. Statistical analyses were performed using SPSS 19.0. Odds ratio and χ^2 tests were used with the level of significance as $P=0.05$. The power of the statistical analysis was 80 percent.

Results: The prevalence of enuresis is 17.18% for boys and 11.82% for girls, and the overall prevalence is 14%. parental divorce, parental death, Physical punishment, living with step parents (parental divorce, computer game, watching horror movie and stress and domestic violence had significant correlation with enuresis. psychological factors such as death of a brother or sister, new baby, smoking in the family, drinking coffee and tea were factors that didn't show any correlation with enuresis.

Conclusion: The differences in the prevalence rate reported by various countries can be attributed to criteria and age ranges, definition of enuresis, genetic predisposition, and traditional with cultural background. Primary health caregivers must be educated according to their society's condition to elicit a detailed history and explaining detrimental effects of enuresis and its association with body mass index to present true information about the medications and cares to the parents.

Keywords: prevalence, schoolchildren, enuresis, association, psychological factors

1. Introduction

Enuresis is an involuntary discharge of urine at any time of a day during sleep beyond age of five years (Ozden et al., 2007; Gumus et al., 1999). Day-time enuresis is referred to diurnal enuresis (DE) while night time enuresis is referred to nocturnal enuresis (NE). Combined day and night named nocturnal/diurnal enuresis (N/DE) (Neveus et al., 2006; Yeung et al., 2006). Nocturnal enuresis can be also defined as intermittent incontinence while a sleep and it occurs at least twice a week for 3 months (Ozden et al., 2007). Nocturnal enuresis is more common in boys, whereas diurnal enuresis in girls. The etiology of enuresis is not completely clear. Most studies have consistently found that the risk factors of enuresis are male, low age, family history, divorced parents and some socio-economic-demographic factors (Ozden et al., 2007; Wen et al., 1996; Lawless et al., 2001). Since enuresis is a common problem with multiple causes in children and their parents, it makes shame, stress, and discomfort children and parents. The most common acceptable etiologist of enuresis are genetic factors, behavioural disorders, delayed maturation of central nervous system, small size of bladder, abnormal sleeping patterns, sleep apnea, hormone imbalance, stress, gender and low age (Wan et al., 1997; Hjalmas et al., 1998). Neurotic children seem to have accompanying psychological problems such as stress and shame or maybe they are suffering from this disorder due to causes such as violence behaviours in household, life style, coming new baby and deaths of family members (Byrd, 1996).

It is necessary to investigate whether these problems are associated factors with enuresis or not. The aim of the present study was to establish the prevalence of enuresis among school population in Zahedan, city of Iran and determined psychology and emotional factors associated with this disorder.

1.1 Material & Methods

A cross-sectional study was applied on school age population to determine the prevalence of urinary incontinence and the probably psychological-emotional associated factors. Children's parents were asked to answer the questions related the age and gender, whether a child suffering from bed wetting and some psychological-emotional factors. Therefore, the questionnaires were distributed to the school children attached with a written letter explaining the goals of the study for parents. Those questionnaires that were not returned replaced with new one in the same conditions. The questions.

1.2 Sampling

Sample size was calculated according to the formula: $n = k^2(pq)/d^2$. Where: n is the sample size, k is the value for the selected alpha level, e.g. 1.96 for (0.25 in each tail) a 95 percent confidence level. p is the estimated proportion of an attribute that is present in the population and considered 0.2. q is 1-p. (pq) are the estimate of variance and d is the acceptable margin of error for proportion being considered 2%. Using these values for the parameters give us 1536 samples. To assume having more accurate added of 30%, the sample size (n) was increased to $1536 + 461 = 1997$ and finally we considered 2000 children for the study. Multi-stage random sampling carried out among all schools to collect 2000 schoolchildren aged 5-18 years from randomly selected schools, between December, 2013 and February, 2014 by permission of the Research and Ethics Committee of the Zahedan University of Medical Sciences after approving the study protocol. Fifty schools were selected randomly from north, south, west, east and center of the city, so that, ten schools from each area, five from boy and five from girl's schools. In each selected school, forty students according to the ratios of every class population to all school randomly sampled from student list by systematic random method. Ethical approval was obtained from the relevant local ethics committees (Zahedan University of Medical Sciences). All parents were informed about the aims of study and signed the consent form.

1.3 Data Analysis

Data were analyzed using the SPSS13 (SPSS Inc., Chicago, IL, USA). To evaluate the relationship between the presence of enuresis and the emotional and personal and family characteristics χ^2 test and odds ratio were used. Some proposed risk factors (e.g., education level of parents, family history, sleep pattern, tea/coffee consumption, etc.) were compared between the children with and without a history of enuresis. All statistical assessments were 2-tailed and the level of significance was set at $P=0.05$. The power of the statistical analysis is 80 percent.

2. Results

Two thousand parents of schoolchildren were asked to answer a few questions related to enuresis status and a few psychological and emotional factors. Sex ratio was 1:1. The mean age of the sample in the study was 10.80 ± 3.38 years. Girls 202 (20.0%) versus 121 (12%) more represented among the children in age of 15-18 years, and more boys 300 (30%) versus 263 (26%) among 12-14 years old. In details, the trend of prevalence of enuresis in our sample is increasing from age 5 (12%) to the age of 6 in the maximum point (18%) and approximately be constant for two 6 and 8 years of age. Sharp Continued falls occur to the age of 10 (5%). Then the fluctuations start with decreasing trend to the minimum level at age 16 and then felt till age 18. Overall, the prevalence of enuresis is decreased when age increasing (Table 1).

Table 1. Distribution of enuresis prevalence based on time of enuresis, age groups and gender for the population in study

Time of Enuresis	Age groups	M		F		Total	
		n/N	Prevalence %	n/N	Prevalence %	n	Prevalence %
Diurnal Enuresis	5-11	16/579	2.76	10/535	1.87	26/1114	2.33
	12-14	8/300	2.67	4/263	1.52	12/563	2.13
	15-18	2/121	1.65	1/202	0.50	3/323	0.93
	total	26/1000	2.6	15/1000	1.5	41/2000	2.05
Nocturnal Enuresis	5-11	105/579	18.13	61/535	11.40	166/1114	10.41
	12-14	12/300	4	9/263	3.42	21/563	3.73

	15-18	3/121	2.48	2/202	0.99	5/323	1.55
	total	120/1000	12	72/1000	7.2	192/2000	9.6
Diurnal /Nocturnal Enuresis	5-11	22/579	3.80	21/535	3.93	43/1114	3.86
	12-14	3/300	1	0/263	0	3/563	0.53
	15-18	1/121	0.008	0/202	0	1/323	0.31
	total	26/1000	2.6	21/1000	2.1	47/2000	2.35
Enuresis	5-11	143/579	24.70	92/535	17.20	235/1114	21.10
	12-14	23/300	7.67	13/263	4.95	36/563	6.39
	15-18	6/121	4.96	3/202	1.49	9/323	2.79
	total	172/1000	17.18	108/1000	11.82	280/2000	14

The prevalence of enuresis is 17.18% for boys and 11.82% for girls, and the overall prevalence is 14%. Accordance with table 2 this trend of prevalence distributed for different kind of enuresis based on age groups. In all kind of enuresis in each age group the prevalence of enuresis for girls is lower compared to boys. This low prevalence is significant for age group 5-11 for nocturnal enuresis and overall enuresis as well as for all age group combined. The prevalence of enuresis according to age group declined from 21.01% at 5-11 years to 2.79% at 15-18 years (Table 1).

Table 2. Potential impact of different variables on enuresis

variables	states	Enuresis		No Enuresis		Chi square	P Value	OR	95% CI For OR
		(Case)		(Control)					
		#	%	#	%				
Parental divorce	yes	12	6%	18	1%	27.762	0	5.906	2.025-8.884
	no	268	94%	1701	99%				
Death of parents	yes	9	4%	52	3%	0.03	0.863	1.065	0.519-2.187
	no	271	96%	1668	97%				
Death of a brother or sister	yes	8	5%	82	4%	2.045	0.153	1.588	0.281-1.228
	no	272	95%	1638	96%				
Physical punishment	yes	48	24%	159	9%	42.53	0	3.168	2.205-4.550
	no	156	76%	1637	91%				
Living with step parents	yes	10	5%	14	1%	26.26	0	6.561	2.876-14.970
	no	194	95%	1782	99%				
New baby	yes	4	2%	32	2%	0.033	0.855	1.103	0.386-3.150
	no	200	98%	1764	98%				
Computer game watching	yes	69	34%	355	20%	21.67	0	2.075	1.518-2.836
	no	135	66%	1441	80%				
Horror movie	yes	23	11%	107	6%	8.521	0.004	2.006	1.246-3.228
	no	181	89%	1689	94%				
Smoking in the family	yes	32	16%	258	14%	0.258	0.612	1.109	0.744-1.654
	no	172	84%	1538	86%				
Drinking tea after sunset	yes	93	46%	774	43%	0.463	0.496	1.106	0.827-1.480
	no	111	54%	1022	57%				
Drinking coffee after sunset	yes	4	2%	41	2%	0.086	0.769	0.756	0.303-2.415
	no	200	98%	1755	98%				
Stress and Domestic Violence	yes	111	54%	419	23%	90.865	0	3.922	2.916-5.276
	no	93	46%	1377	77%				

To consider the association of enuresis with psychological factors, table 2 showed that parental divorce ($p < 0.001$, $OR = 5.91$ with 95% CI For $OR = (2.08-12.45)$), parental death ($p = 0.011$, $OR = 2.51$ with 95% CI For $OR = (1.21-5.22)$), Physical punishment ($p < 0.001$, $OR = 3.17$ with 95% CI For $OR = (2.21-4.55)$), living with step parents (parental divorce ($p < 0.001$, $OR = 6.56$ with 95% CI For $OR = (2.88-14.97)$), computer game ($p < 0.001$, $OR = 2.10$ with 95% CI For $OR = (1.52-2.84)$), watching horror movie ($p = 0.004$, $OR = 2$ with 95% CI For $OR = (1.58-3.23)$) and stress and domestic violence ($p < 0.001$, $OR = 3.92$ with 95% CI For $OR = (2.92-5.28)$) had significant correlation with enuresis. psychological factors such as death of a brother or sister, new baby, smoking in the family, drinking coffee and tea were factors that didn't show any correlation with enuresis.

3. Discussion

Enuresis is a common clinical problem in children (Ghahramani et al., 2008). To identify the prevalence of NE many studies have been conducted in different countries in various situations and resulted different prevalence's. These differences between countries may arise from factors such as cultural, racial, environmental, and socio-economic conditions. The present study was a population-based study, which aimed to detect prevalence and its psychological-emotional risk factors of EN in Zahedan, a city of Sistan & Baluchestan province, Iran.

In the present study the prevalence of enuresis for male, female and total population were 17.18%, 11.18% and 14.00% respectively. The results of the study also revealed that younger males and females had higher prevalence compared to their elder counterparts. According to the results of the study the prevalence of enuresis was more common in males' population compared to females. And these results were compatible with many of studies. In most countries the prevalence of enuresis among 6-12 years old is reported as 1.4-28% (Ozden et al., 2007; Gumus et al., 1999; Neveus et al., 2006). In our study, the prevalence of DE, NE and combined for 5-18 years old children were 2.05%, 9.6% and 2.35% respectively and totally the prevalence for overall enuresis was 14 percent. By considering only NE in comparison, the prevalence is lower than the results have been reported from the other cities in Iran such as Gonabad (17.5%) and Urima (18.7%) (Ghahramani et al., 2008; Mahmoodzadeh et al., 2013) and other countries such as UK (18.9%) (Redsell et al., 2003), Turkey (17.2%) (Ozden et al., 2007), Zaria in Nigeria (22.2%) (Mbibu et al., 2005), Jamaican (52%) (Readett et al., 1991) and Amman in Jordan (23.8%) (Hazza et al., 2002), but is higher than the prevalence reported in Mumbai in India (7.61%) (Sousa et al., 2007), Malaysia and United Arab Emirates (8% in each) (KanaheSwari, 2003; Eapen & Mabrouk, 2003), in Chinese children (4.3%) (Wen et al., 2003) and Tafila in Jordan (8.8%) (KhM & Bataineh, 2007). The overall prevalence of enuresis was found to be 12.95% in children aged 5-16 years from France (Ouedraogo et al., 1997), which is lower than our results and 15% in children aged 6-11 years from Saudi Arabia which is higher than ours but with some variations in the age range (Kalo & Bella, 1996). The study finding showed that the prevalence of NE decreases with age and it is similar to the most reports (KanaheSwari et al., 2003; Eapen et al., 2003; Wen et al., 2003) and as well with reports from uremia and Gonabad cities in Iran (Ghahramani et al., 2008; Mahmoodzadeh et al., 2013). All these various reports in different countries show that, it varies with study population and geographical area and might be due to socio-cultural variations between regions. Nocturnal enuresis estimated in our study was more frequent in boys versus in girls. Our results in the case of sex gap is similar to Gonabad (Ghahramani et al., 2008) but versus to the Urima (Mahmoodzadeh et al., 2013) and in a city of Yemen (Yousef et al., 2011).

We also found the prevalence of DE was 2.35% for the population in study. That is lower but still comparable with findings in Finland and the UK which reported 1.6% and 3.3% of children having combined statuses of enuresis (NE and DE), and is much lower than in studies conducted in Sweden and Turkey, which reported 17.0% and 21.0% of children having combined respectively (Miskulin et al., 2010). Two of the factors discussed in the relevant references are the relationship between paternal divorce or parental death and enuresis. In our study, a significant relationship was found in these regards, being dissimilar with the result in Ozden (2007) and Unalacak (2004) studies on Turkish children and a study by Ismail (2013) on Primary School Children in Qena Governorate-Egypt, also Death of mother and father was non significant with enuresis in Kalo (1996) and Cher (2002) studies. Chang (2001) reported similar result related to divorce to our findings in which enuresis increasing among children who living with divorced parents. But similar with a results reported by Hashem Mahmoodzadeh (2013) from a city in Iran, Uremia. Jalkut (2001) and Fritz (2004) reported that, Punishing for wetting the bed can develop emotional problems. Some children may be very upset by their problem and even have feelings of personal failure. They may fear sleep-over and having friends find out about their problem. Sometimes, children who were dry at night after toilet training become budgeting because of stress such as a new baby in the family, or a family violence. Jalkut (2001) and Fritz (2004) results in some factors were similar with our results such as family violence and punishment and is contrary with some factors such as new baby. For more confirmation, Ozkan (2010) also reported that, the application of punishment can have adverse outcomes

for a child, so the prevalence of enuresis in the children who had been trained in urination and threatened by their parents in punishment using methods was 2.24 times higher than the rate in the children who had received encouragement. Tea or coffee consumption was another probably risk factor in the study. We found that consuming these two drinks after sunset, before sleeping had not relationship with enuresis. In a study by Aljefri (2013) in Al Mukalla City of Yemen reported that consuming tea and coffee have significant relationship with enuresis which is dissimilar with our finding, but William (2011) surprising said, it is unbelievable, caffeine consumption was not significantly associated with enuresis. Children who consumed caffeine were less likely to wet the bed than children who did not drink caffeine. The result of the William study is similar with our finding. Therefore removing caffeine and tea from children's diets after sunset is not necessary. Also, liquid intake before go to sleep was non significant with enuresis according to studies by Kalo (1996) and Cher (2002) studies. Some of stressful, psychological and social events introduced as risk factors in school children enuresis by various studies. NE was around two-times more prevalent if the child was facing some psychological or social disturbances. These findings were consistent with various studies (yousef et al., 2011; Eung et al., 2004). Enuretic children are frequently aware of the social and emotional consequences and, in particular, commonly fear being discovered by others. Systematic studies support the notion that enuresis is associated with emotional distress in both children and parents, which is reversible once the children become dry. Joinson (2007) found a higher rate of parent-reported externalizing and internalizing problems in enuretic children. Mahmoodzadeh (2013) Reported that single parent, divorced or widowed were significantly higher in children with enuresis in compared to their counterparts in which is same with our results. They also found that, mother smoking did not have any correlation with enuresis which comparable is consistent with our findings. One of the limitations of our study was cross-sectional design that cannot study the temporal trends in NE with child's increasing age. Therefore, further longitudinal studies are required to evaluate the causal associations between risk factors and NE. Other limitations are the lack of clinical confirmation of the condition, recall bias as the parents filled the questionnaire based on their recollection of the NE-related events and lack of confirmation of children's school performance directly from the school authorities as opposed to relying own self-reported performance for this study. These factors can result in variations in the estimation of the prevalence and the role of various factors.

4. Conclusion

Our findings suggest that enuresis is a problem among schoolchildren, especially in boys with smaller age. Enuresis is a public health problem and efforts at all levels should be made to understand the impact factors in cultural, demographical, social, psychological and economic aspects. We conclude that nocturnal enuresis was more common in males in the all age groups as well for overall enuresis. The differences in the prevalence rate reported by various countries can be attributed to the differences in criteria and ranges of age, definition of enuresis, genetic predisposition, and traditional with cultural background. Primary health caregivers must be educated according to their society's condition to elicit a detailed history and explaining detrimental effects of enuresis and its association with body mass index to present true information about the medications and cares to the parents.

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Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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