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Prevalence and Impact Associated Factors with Enuresis Among Children in Zahedan City of Iran

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ABSTRACT

Background: Enuresis which is known as bedwetting is the undesirable discharging of urine during sleep into clothes or beds for age over five years. The purpose of this study was to determine the prevalence of enuresis and study the associated of enuresis with some factors. Methods: The study was a cross-sectional survey to determine the prevalence of enuresis conducted on the schoolchildren in Zahedan, Iran, in the September–December 2010. A random, multistage sample of 2000 students was taken from fifty schools in five districts. Data were obtained by using questionnaire, which was completed by parents. Results: The mean age of the sample in study was 10.80 ±3.38 years. The overall prevalence of enuresis is declined when age is increasing. Observed statistical significant in gender of enuresis prevalence(X^2=107.36, P<0.001). The average age, weight and height of children with enuresis (8.36±2.78, 24.36±10.47 and 123±15.67) was lower than that of the non-affected ones (11.20±3.30, 33.67±12.73and 136±17.05) respectively. Children with enuresis were in average lower in BMI (24.36±10.47 versus 33.63 ±12.75) in compared to those without enuresis. Same trends established for Birth order, Family size and birth weight. Conclusion: The enuresis prevalence of schoolchildren in Zahedan and the associated factors are almost comparable with those reported in epidemiological studies from various countries. Our findings suggest that Nocturnal enuresis is the most common type of enuresis and overall enuresis was more frequent among children with low weight, short height, and low family size. More studies needed to determine socio-economic-demographic and behavioral factors in the city of Zahedan, Iran to establish advices for the parents.

KEYWORDS Enuresis prevalence, associated factors-Children, Zahedan-Iran.

Introduction

Enuresis is known as bed-wetting is the involuntary and undesirable repeated discharge of urine during sleep into clothes or beds beyond the age of anticipated bladder control-usually after five years(1-2). Discharging urine may happen in different times. Day-time bed-wetting is referred to as Diurnal Enuresis (DE) while Night-time-bed-wetting is referred to as Nocturnal Enuresis (NE). Combined day and night time bed-wetting is referred to as Nocturnal/Diurnal Enuresis (3-4). Enuresis is involuntary voiding of urine, occurring at least twice a week for 3 months. Nocturnal enuresis can be defined as any intermittent incontinence while a sleep in a child being at least five years old. (1) Nocturnal enuresis is more common in boys, where diurnal enuresis is more widespread in girls. The etiology of enuresis is not completely understood. This condition probably has a multifactor etiology. Most studies have consistently found that the risk factors for enuresis are male gender, smaller age, and family history and divorced parents (1, 5-8) and many other factors.

The overall prevalence of nocturnal enuresis, as well as prevalence of nocturnal enuresis in different age groups, is significantly varied in different countries, ranging from 2.3% to 25% (5). Enuresis is frequently diagnosed among schoolchildren and is an important psychosocial problem both for parents and those children (2). Even though children with enuresis seem to have accompanying psychological disorders, it must be investigated whether these problems are the results of enuresis or aetiological factors. Few studies have clarified the pathophysiology of nocturnal enuresis. Several pathophysiological mechanisms have been proposed, abnormal nyctohemeral vasopressin levels, nocturnal polyuria, including bladder dysfunction, abnormal sleep patterns and a small functional bladder capacity (9, 10). Our hypotheses were defined as enuresis being more common in boy's population and population with lower age. It is associated with weight, height, higher family size, birth order, and weight on birth. The purpose of this study was to determine the prevalence of enuresis and study the association of enuresis with some factors in 5 to 18 years old schoolchildren in Zahedan city of Sistan va Baluchetsan province in Iran.

Material & Methods

The cross-sectional study was applied to determine the prevalence of urinary incontinence in day time, night time and combined in Zahedan, Sistan va Baluchestan province in Iran which is the largest province and with the lowest level in health conditions, socioeconomic and demographic aspects in the Southeast of Iran.

Children's parents were asked to answer the questions had been written on a form containing various factors that may play a role in enuresis. Therefore, they were distributed to the selected school children attached with a written letter explaining the goals of the study to the parents. Those refused by parents or guardians were replaced with new student ran-

domly in the same conditions. The questions were answered by the parents at home and returned to the researchers. The information obtained from the questions consisted of background data of the children such as age, gender, weight, height, and birth order, and family size, weight at birth and sleeping time at night. For the two measures; weight and height, after receiving filled out questionnaires the tools used to collect anthropometric data were a digital scale and a non-expanding measuring tape, which are the standard measuring tools. Weight was measured with bare feet and minimum clothing, height was measured in standing position with bare feet and a nonexpanding measuring tape against the wall as the buttocks, back of shoulders and heels were touching the wall with head forward.

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. Therefore it was carried out among 2000 schoolchildren aged 5-18 years in 50 Schools selected by multi-stage random sampling, between September and December of the year 2010, by permission of the Research and Ethics Committee of the Zhaedan University of Medical Sciences after approving the study protocol. Fifty schools were selected randomly from north, south, west, east and centre as geographically areas 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 class registry notebook by systematic random method. Statistical analyses were carried out using the Statistical Package for Social Sciences. Chi-square test was used to determine the significant predictive factors. Detected differences at $p<0.05$ were considered to be significant. The power of 80% for the statistical analysis is considered.

Results

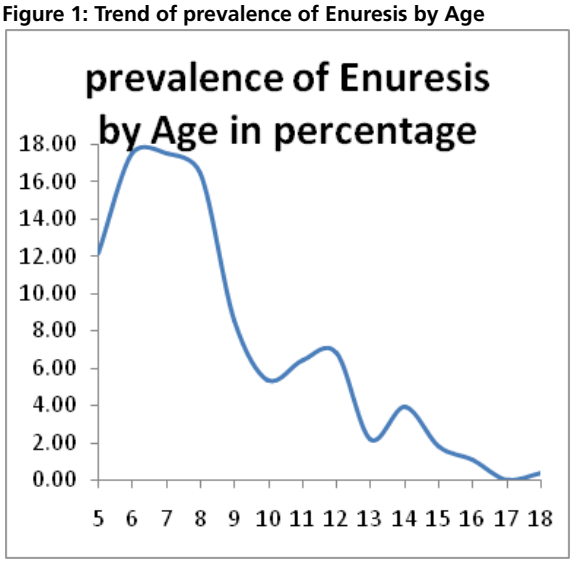
Two thousand questionnaires were given to the parents of schoolchildren selected from fifty schools in the city of Zahedan in the southeast of Iran. If one of the questionnaires didn't reply by students, it was replaced randomly with one another in the same circumstances. Sex ratio is 1:1. The mean age of the sample in study was 10.80 ±3.38 years. Girls 202(20.0%) versus 121(12%) were more represented among the 15-18 years old, and more boys 300 (30%) versus 263(26%) among 12-14 years old. Overall, the percent of 5-11 age group population was 1114(56%) and share two other age groups, 12-14 and 15-18, 28% and 16% respectively.

Table1: Age group and Sex distribution of the study population

age group	Gender		Population (%)
	Girls (%)	Boys (%)	
5-11	535(54%)	579(%58)	1114(56%)
12-14	263(26%)	300(%30)	563(28%)
15-18	202(20%)	121(%12)	323(16%)
All age groups	1000(%100)	1000(%100)	2000(100%)

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 ages. Continued decreasing sharply to the age of 10(5%). Then the fluctuations start with decreasing trend to the minimum level at age16 and then suddenly felted till age 18. Totally, the graph shows that the prevalence is decreased when age increasing.

Figure 1: Trend of prevalence of Enuresis by Age



The table 2 shows that the prevalence of enuresis is 17.18% for boys and 11.82% for girls, and the overall prevalence is 14%. This trend of prevalence distributed for different kind of enuresis in time based on age groups. In all kind of enuresis in specific 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.

Table2: Distribution of enuresis prevalence based on time of enuresis, age groups and gender for the population in study

Time of Enuresis	age groups	Male		Female		x^2 Sig	Total	
		n/N	Prevalence %	n/N	Prevalence %		n	Prevalence %
Diurnal Enuresis	5-11	16/579	2.76	10/535	1.87	0.975 0.32	26/1114	2.33
	12-14	8/300	2.67	4/263	1.52	0.882 0.348	12/563	2.13
	15-18	2/121	1.65	1/202	0.50	1.102 0.294	3/323	0.93
	total	26/1000	2.6	15/1000	1.5	3.013 0.083	41/2000	2.05
x^2-Sig		0.495 0.781		1.875 0.392			2.488 0.288	

Time of Enuresis	age groups	Male		Female		x^2 Sig	Total	
		n/N	Prevalence %	n/N	Prevalence %		n	Prevalence %
Nocturnal Enuresis	5-11	105/579	18.13	61/535	11.40	9.942 0.002	166/1114	10.41
	12-14	12/300	4	9/263	3.42	0.130 0.718	21/563	3.73
	15-18	3/121	2.48	2/202	0.99	1.101 0.294	5/323	1.55
	total	120/1000	12	72/1000	7.2	13.274 0.000	192/2000	9.6
x^2 -Sig		49.203 0.000		31.414 0.000			25.029 0.000	
Diurnal /Nocturnal Enuresis	5-11	22/579	3.80	21/535	3.93	0.012 0.913	43/1114	3.86
	12-14	3/300	1	0/263	0	2.644 0.104	3/563	0.53
	15-18	1/121	0.008	0/202	0	1.675 0.196	1/323	0.31
	total	26/1000	2.6	21/1000	2.1	0.545 0.460	47/2000	2.35
x^2 Sig		7.826 0.020		18.644 0.000				
Enuresis	5-11	143/579	24.70	92/535	17.20	9.401 0.002	235/1114	21.10
	12-14	23/300	7.67	13/263	4.95	1.737 0.188	36/563	6.39
	15-18	6/121	4.96	3/202	1.49	3.371 0.066	9/323	2.79
	total	172/1000	17.18	108/1000	11.82	17.010 0.000	280/2000	14
x^2 Sig		54.732 0.000		50.279 0.000			107.362 0.000	

Table 3 shows that mean of all demographic factors and sleeping time at night were statistically different into enuresis and non-enuresis groups. In all factors the average is lower for enuresis group against of not enuretic individuals. The average age, weight and height of enuretic children (8.36±2.78, 24.36±10.47 and 123±15.67) was lower than that of the nonaffected ones (11.20±3.30, 33.67±12.73and 136±17.05) respectively. In addition, these children were in average lower in BMI (24.36±10.47 versus 33.63 ±12.75) in compared to those without enuresis. Same trends established for Birth order, Family size and Weight on birth. Children with NE had lower BMI, weight and height for overall age 5-18 years compared to their control group. The mean (weight, height, BMI) ± SD were (24.36 ±10.47, 123 ± 15.67, 24.36±10.47) for enuretic and (33.67±12.73, 136±17.05, 33.63±12.75) for control group. The differences for these three factors are statistically significant.

Table3: Demographic background and some other characteristics in children with and without enuresis

Group Statistics	Enuresis	Mean±SD	t	p
age	No	11.20±3.30	12.62	0.000
	Yes	8.36±2.78		
weight	No	33.67±12.73	11.61	0.000
	Yes	24.36±10.47		
height	No	136±17.05	12.17	0.000
	Yes	123±15.67		
Birth order	No	2.78±1.96	2.74	0.006
	Yes	2.44±1.71		
Family size	No	5.94±2.70	2.73	0.006
	Yes	5.47±1.94		
Weight on birth	No	3.04±0.57	12.96	0.000
	Yes	2.54±0.75		
Sleeping time	No	11.39±1.57	2.68	0.007
	Yes	11.12±1.39		

Discussion

Enuresis is a common clinical problem in children. Although it is considered as a benign indicator, it causes substantial distress and presents significant psychosocial problems for children and their parents (11). To identify the prevalence of NE many studies have been conducted in different countries which have been reported different conditions. The difference in study design: population based or health facility based, as well as possible socio- demographic ,economic, cultural, racial and genetic difference in population. This study was done on school age population between 5 to 18 years in Zahedan city of Sistan va Baluchestan province, Iran to detect the prevalence rate and its relationship to some individual factors. Enuresis and especially nocturnal enuresis are common among younger schoolchildren and it is frequency decreases with increasing age. In most countries the prevalence of enuresis among 6-12 years old is reported as 1.4-28% (1- 3). In our study, the prevalence of DE, NE and combined were 2.05%, 9.6% and 2.35% respectively and totally the prevalence for overall enuresis was 14%. 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%)(12, 13) , and other countries such as UK (18.9%)(14) Ankara, Turkey (17.2%)(1) , Zaria, Nigeria (22.2%)(15) , Jamaican primary school children(52%)(16) and Amman, Jordan (23.8%)(17) , but is higher than the prevalence reported in Mumbai, India (7.61%)(18) , Malaysia and United Arab Emirates (8% in each) (19,20) , in Chinese children (4.3%) (21) and Tafila, Jordan (8.8%) (22). The overall prevalence of enuresis was found to be 12.95% in children aged 5-16 years from France 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. All these differences in prevalence of enuresis reported in different countries show that, it is 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 (61%) versus in girls (39%), with gender differences being statistically significant($r=17.010$, $p<0.001$). Our results in the case of gender difference is similar with Gonabad (significantly difference in gender) (12) but unlike to the one in Urima(13). This finding is consistent with similar studies from other countries.

In our study, we also found the prevalence in DE of 2.35% for the population in study. That is lower but still comparable with findings from studies conducted in Finland and the UK which reported 1.6% and 3.3% of children having both DE and NE, and is much lower than in studies conducted in Sweden and Turkey, which reported 17.0% and 21.0% of children having combined DE and NE (23- 26).

Unlike to the reported in a study done in a city in Yemen, our subjects had gender difference in the prevalence of enuresis, but this was similar with some studies done in Turkey, Urmia city in Iran, Mombai in India, Nigeria, Jordan, UAE and China, which reported it to be mostly associated with male gender. On the other hand, the study finding that the prevalence of NE decreases with age is similar to most reported studies (1-3, 11, 17, 19, and 20) and also the report from urmia and Gonabad cities in iran. Though the number of siblings in this study had no effect on NE, other reports, including one from Mukala city, showed the reverse.

It is known that there are some variations in the pattern of enuresis prevalence between spring, summer and autumn, winter, and it is considered that NE decreases in the summer (27-28). Our study was performed from September to December, covering autumn and the beginning of winter. Although it is possible that the low prevalence of NE among Zahedanian schoolchildren in comparison with the results from other cities can be partially connected with seasonal weather conditions, we cannot draw any definite conclusions about such a connection; further studies focusing on this aspect of the problem are definitely needed.

In our study, children with all kind of enuresis had lower weight and height in compared to the healthy ones and is similar with the results in study in Goanabd, Iran. Other studies support our findings: A study performed in Finland in 1991 demonstrated that children with nocturnal enuresis suffered from slow growth in comparison with the control group. The findings of a research in England on aged 7-11 years showed that there was a significant statistical difference regarding height in 7 years old children with nocturnal enuresis and in children without it, the height of children with enuresis in adulthood was 1 cm shorter than those without it [15] when in our study the population with enuresis disorder was about 13 cm shorter in average than those without enuresis. The result of our study related to the family size and birth order showed significantly difference between two groups which is dissimilar to one study Urima and a study in Yemen in which non-significant in the case of family size and is unlike to the result of the study in Yemen in the case of birth order. One study in mosul city revealed that enuresis is significantly influenced by factors including family size, birth order which is similar to our results (29). The result was statistically significant related to the height, weight and BMI factors for two enuresis and non enuresis groups. Our results are similar to a study done in Basra (30).

CONCLUSIONS:

Our findings suggest that enuresis was more frequent among children with low weight and short height and nocturnal enuresis is more common than diurnal or diurnal/ nocturnal enuresis and furthermore they are declined with age increasing. It is a problem among schoolchildren, especially with smaller age, lower body mass index, being under weight at birth and sleeping soon at night. 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. In conclusion, we can say that the prevalence of NE in schoolchildren in Zahedan is lower than detected in other cities in Iran in which they have cool weather. We conclude that nocturnal enuresis was more common in males in the all age groups as well for overall enuresis. The significant differences in the prevalence reported by other country studies can be attributed to the criteria's selection and ranges of age, definition of enuresis, genetic predisposition, and traditional with cultural background. For this purpose, health educators and primary health caregivers must be educated for eliciting a detailed history not to miss diagnosis of nocturnal enuresis. Explaining detrimental effects of nocturnal enuresis and presenting true information about the medications are important for convincing the parents for treatment.

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Competing Interests:

None of the authors has any conflict of financial or other interest.

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REFERENCES

1. Ozden C, Ozdal OL, Altinova S, Oguzulgen I, Urgancioglu G, Memis A.Prevalence and associated factors of enuresis in Turkish children. Int Braz J Urol 2007; 33(2):216-22. | 2. Gumus B, Vurgun N, Lekili M, Iscan A, Muezzinoglu T, Buyuksu C: Prevalence of nocturnal enuresis and accompanying factors in children aged 7-11 years in Turkey. Acta Paediatr 1999; 88:1369-72. | 3. Nevéus T, von Gontard A, Hoebeke P, Hjälmås K, Bauer S, Bower W, et al. The standardization of terminology of lower urinary tract function in children and adolescents : report from the Standardisation Committee of the International Children's Continence Society. J Urol 2006; 176: 314-324. | 4. Yeung CK, Sreedhar B, Sihoe JD, Sit FK, Lau J. Differences in characteristics of nocturnal enuresis between children and adolescents: a critical appraisal from a large epidemiological study. BJU Int 2006; 97: 1069-1073 | 5. Wen JG, Wang QW, Chen Y, Wen JJ, Liu K: An epidemiological study of primary nocturnal enuresis in Chinese children and adolescents. Eur Urol 2006; 49(6):1107-13. | 6. Bower WF, Moore KH, Shepherd RB, Adams RD. The epidemiology of childhood enuresis in Australia. Br J Urol 1996; 78:602-6. | 7. Byrd RS, Weitzman M, Lanphear NE, Auinger P. Bedwetting in US children: pidemiology and related behavior problems. Pediatrics 1996; 98:414-9. | 8. Chiozza ML, Bernardinelli L, Caione P, Del Gado R, Ferrara P, Giorgi PL, Montomoli C, Rottoli A, Vertucci P. An Italian epidemiological multicentre study of nocturnal enuresis. Br J Urol 1998; 81(3): 86-9. | 9. Hjalmas K: Nocturnal enuresis: basic facts and new horizons. Eur Urol 1998, 33(3):53-7. | 10. Lackgren G, Hjalmas K, van Gool J, von Gontard A, de Gennaro M, Lottmann H, Terho P: Nocturnal enuresis: a suggestion for a European treatment strategy. Acta Paediatr 1999; 88: 679-90. | 11. Marc cendron MD, Hitchcock .Primary Nocturnal Enuresis: Current Concepts.Am Fam. Physician. 1999 ; 59(5):1205-1214 | 12. Mohammad Ghahramani, Mahdi Basirymoghadam,AmirAli Ghahramani. Nocturnal Enuresis and its Impact on Growth. Iran J Pediatr 2008; 18 (2):167-170. | 13. Mahmoodzadeh, Hashem, Amestejani, Morteza, Karamyar, Mohammad, Nikibakhsh, Ahmad-Ali. Prevalence of Nocturnal Enuresis in School Aged Children: the Role of Personal and Parents Related Socio-Economic and Educational Factors. Iran J Pediatr 2013; 23 (1): 59-64. | 14. Redsell SA, Collierv J, Evans J. Children presenting at UK community clinics comparison with hospital based samples. Scandinavian J Urol Nephrol 2003; 37: 239–45. | 15. Mbibu NH, Ameh EA, Shehu AU, Wammanda RD. The Prevalence of enuresis among primary school children in Zaria, Nigeria. Nigeria J Surgical Res 2005; 7(1): 187-90. | 16. Readett DR, Bamigbade T, Serjeant GR. Nocturnal enuresis in normal Jamaican children - implications for therapy. West Indian Med J. 1991;40:181–4 | 17. Hazza I, Tarawneh H. Primary nocturnal enuresis among school children in Jordan. Saudi J Kidney Dis Transpl 2002; 13(4): 478-80. | 18. Avinash De Sousa, Hema Kapoor, Jyoti Jagtap, and Mercilina Sen. Prevalence and factors affecting enuresis amongst primary school children. Indian J Urol. 2007; 23(4): 354–35. | 19. Kanaheswari Y. Epidemiology of childhood noc¬turnal enuresis in Malaysia. J Paediatr Child Health 2003; 39: 118-23. | 20. Eapen V, Mabrouk AM. Prevalence and correlates of nocturnal enuresis in the United Arab Emirates. Saudi Med J 2003; 24(1): 49-51. | 21. Wen J, Wang Q, Chen Y, Wen J, Liu K. An epidemiological study of primary nocturnal enuresis in Chinese children and adolescents. Euro Urol 2003; 49(6): 1107-13. | 22. Al-Rashed KH, Bataineh HA. Frequency of enuresis in (5-10) year old children in Taifila, Jordan. Shiraz E-Med J 2007; 8(1):1-9. | 23. Jarvelin MR, Vikevainen-Tervonen L, Moilanen I, Huttunen NP. Enuresis in seven-year-old children.Acta Paediatr Scand 1988; 77: 148-153.. | 24. Butler RJ, Golding J, Northstone K; ALSPAC Study Team. Nocturnal enuresis at 7.5 years old: prevalence and analysis of clinical signs. BJU Int 2005; 96: 404-410. | 25. Ozkan KU, Garipardic M, Toktamis A, Karabiber H, Sahinkanat T. Enuresis prevalence and accompanying factors in schoolchildren: a questionnaire study from southeast Anatolia. Urol Int 2004; 73: 149-155 | 26. Hjalmas K. Functional daytime incontinence: definitions and epidemiology. Scand J Urol Nephrol Suppl 1992; 141: 39-44. | 27. Vande Walle J, Van Laecke E. Pitfalls in studies of children with monosymptomatic nocturnal enuresis. Pediatr Nephrol 2008; 23: 173-178. | 28. Shigeru J. Analysis of the singularity of nocturnal enuresis. Enuresis 2005; 10: 31-37. | 29. Shatha Abdul-Rahman, Rhadwan Hussain, Shahd Abdul-Rahman. Prevalence of Bedwetting for Children in Mosul City. J Med J 2009; 43 (1): 44-50 | 30. Hamsa Shaker Abdul-Nabi, , Sawsan Issa Habeeb. Frequency of Enuresis in Primary School Children in Basra and its Impact on Their Growth. 2Asian Journal of Pharmacy, Nursing and Medical Sciences (ISSN: 2321 – 3639) August 2013,Volume 01– Issue 02- pp 45-50 |