

Nocturnal enuresis among school- age children in two states in the south- eastern Nigeria: a concealed social malaise.

Chinawa JM, Manyike PC, Obu HA, Odetunde OI

Abstract

Background: We describe the pattern and challenge of nocturnal enuresis among the school – age children in two states in the south- eastern Nigerian.

Methods: A structured self administered questionnaire developed for enuresis was used for data collection from primary school pupils that were selected by systematic sampling from the schools in two states in the south-east Nigeria.

Results: Three hundred and eighty- nine children were enrolled for the study with 164 (42.2%) females and 225(57.8%) males. The mean age of 7.95 ± 3.1 years with prevalence of enuresis in children aged 5 years to be 13.2%, and 15 years prevalence of 0.6%. Above 15 years; the prevalence is zero. The prevalence is slightly higher in males (39.3%) than 35.9% in females (P value = 0.331) with higher incidence in lower socioeconomic background and in children with positive family history of bedwetting in the first degree relative. Other factors identified to associated with enuresis are the use of caffeine (P value = 0.0001) and history allergy (P value = 0.008). Overall prevalence at 5 years and above = 36.2%.

Conclusions: The prevalence of nocturnal enuresis in our setting is 36.2%, which is higher than that obtained in various studies elsewhere in the world with slight male preponderance. There were strong association between the prevalence of nocturnal enuresis and age, socioeconomic background, positive family history in the first degree relative and history of allergy.

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Keywords: Nocturnal enuresis, school- age children, Nigeria.

Introduction

Nocturnal enuresis (NE) is a challenging issue mostly seen in childhood. It is defined as an involuntary voiding of urine during sleep with a frequency of at least twice a week in children aged >5 years in the absence of congenital or acquired defects of the central nervous system [1]. According to ICCS definition; enuresis can also be defined as in-continance in discrete episodes while asleep. Enuresis (or nocturnal incontinence) is a symptom and a condition [2]. The ICCS has grouped enuresis into two major classes. Enuresis in children without any other LUT symptoms (nocturia excluded) and without a history of bladder dys-function is classified as mono symptomatic enuresis while children with enuresis with lower urinary tract symptoms are graded as non- mono symptomatic enuresis [3].

Studies have estimated the prevalence of NE to be around 20% in children of age 5 years and above, with a male predominance [4].

Nocturnal enuresis affects approximately 5 to 7 million children in the United States, making it the most common pediatric urologic complaint encountered by primary care physicians. Despite its prevalence, nocturnal enuresis remains incompletely understood, which can frustrate patients, family members, and physicians [5,6].

The spontaneous resolution rate of nocturnal enuresis is approximately 15% per year, with about 1% of teenagers at 15 years of age still wetting the bed. Parents and caregivers usually get worried about nocturnal enuresis when their child reaches 5 to 6 years of age [7,8]. This age is important since it is the year of school entry. Most children are not concerned until 7 to 8 years of age.

The risk of a child being affected is 43% if one parent had nocturnal enuresis and 77% if both parents were affected [8]. Approximately 75% of children with nocturnal enuresis have a first-

degree relative who had enuresis and 23% of nocturnal enuresis is associated with encopresis and daytime incontinence.[8].

There are conflicting studies on whether social class of parents has an effect on enuresis among children .For instance Singh et al [9], in India, noted no significant correlation between enuresis and sex, education of parents, social class, sleep patterns, age of mother at marriage and intellectual grades of the children [8].Rona et al [10] however had a contrary view. He noted that Father's social class was associated with enuresis only in girls and that enuresis are commoner in males and decreases as the age increases.

Evaluation of enuresis among primary school children is a very vital issue often under reported in pediatrics practice and in this part of the world, its importance therefore cannot be downplayed especially its impact on health which had been mentioned above.

This study therefore is aimed at determining the pattern of enuresis among primary school children. The results will help us to know the burden of this disease. This will enable us to establish a baseline data where in other related issue will hinge on.

We are not aware of any study of this nature from this environment. It is hoped that this will add to the body of knowledge available on these disorders and the findings of this study could form the template for intervention strategies in helping reduce this social malaise and managing such cases.

Methods

Study Area

The study was carried out among children in a four primary schools within age range of 4-12 in Enugu and Ebonyi states.

Study Population

The questionnaire was self administered Pupils of selected schools for the study in the two states during the school hour.

Younger children between the ages of 4 and 9 have their questionnaires filled by the help of their parents and teachers while those from 10 years were assisted. The school proprietress was asked for permission to recruit students. Consent was obtained from individual parents and students through their principals after they had been told that their participation was completely voluntary in nature and that they could discontinue their involvement at any time. Confidentiality of responses was also conveyed. Students were chosen by systemic sampling from elementary 1 to 6. Each form has about 4 classes with about 20 per class.

Study Procedure

The instrument employed for data collection was a structured self administered questionnaire developed from (enuresis and **encopresis** questionnaire) [11]. This questionnaire covers questions on all the aspects of both enuresis and **encopresis**, parents education and occupation, drug history etc. For purposes of this study, enuresis was defined an involuntary voiding of urine during sleep with a frequency of at least twice a week in children aged >5 years in the absence of congenital or acquired defects of the central nervous system [1]. **The reason why we used questionnaire on enuresis and encopresis is for convenience and it has a wide coverage of factors affecting enuresis, moreover 23% of nocturnal enuresis is associated with encopresis and daytime incontinence [8].**

The families were assigned socioeconomic classes using the recommended method (modified) by Oyediji [12]. The parents' occupation and highest education attained were scored from 1 (highest) to 5 (lowest). The mean score for both parents gives social class falling within the 1-5 range. Those with the mean score of <2 were further reclassified into upper class while those

with the mean score of >2 were reclassified into lower social class. For the occupation score, those in upper social class included parents, such as senior public officers, large-scale traders, large-scale farmers and professionals. Lower class included artisans, primary school teachers, peasant farmers, labourers and the unemployed. For the education score, those with PhD, master degree, bachelor degree and higher national diploma (HND) were categorized as upper class. Those with ordinary national diploma (OND), national certificate of education (NCE), technical education, grade II teachers' certificate, junior and senior secondary school certificate, primary school certificate and those with no formal education were classified as lower social class [12].

Data Analysis

Data was analyzed with Statistical package for social sciences (SPSS) software, version 20. Data presentation was in form of tables and charts. Frequencies, proportions and percentages were calculated for categorical variables. Results of continuous variables were expressed as medians. Pearson's chi-square was used to test for relationship between categorical variables while student t- test was used to test significant relationship between continuous variables. Test of significance was set at $p < 0.5$.

Results

We enrolled 389 children in this study. This is made up of 164 (42.2%) females and 225 (57.8%) males. The mean age of all participants is 7.95 ± 3.1 years. Age and gender distribution of participants is as shown in table I. One hundred and sixty- eight Pupils (43.1%) had enuresis between the age of 5 and 10 while 136 pupils (35.4%) had enuresis above the age of 10. There is a significant association between age and enuresis ($\chi^2 = 49.139$; $p = 0.008$). When prevalence of enuresis is stratified into ages, children of 5 years of age had a prevalence of 13.2%; 8.8% at 6; 9.4% at 7. 10.7% at 8; 5.7% at 9; 5.7% at 10. 10.1% at 11 and 2.5% at 12 years.

Overall prevalence at 5 years and above =36.2%.This is as shown in Table 1

Enuresis is slightly higher in males (39.3%) against 35.9% in females. Table 2

The incidence of enuresis is low in children of high socioeconomic background and higher in low and middle socioeconomic background. Figure 1

86.4% of children who bed wet had parent(s) who bed wet during childhood $p=(0.02)$. 94.7% of children who took caffeine bed wet $p=(0.0001)$. Table 2. Other significant associations include history of allergy in 87.7 % of pupils (P value = 0.008) and 57.4% of pupils with history of bedwetting in the siblings (P value = 0.003)

Table1 and 2. Only 63.5% of children who bed wets took various types of medications .

Discussion

According to ICCS definition; enuresis can also be defined as in-continance in discrete episodes while asleep. Enuresis (or nocturnal incontinence) is a symptom and a condition [2]. The ICCS has grouped enuresis into two major classes. Enuresis in children without any other LUT symptoms (nocturia excluded) and without a history of bladder dys-function is classified as mono symptomatic enuresis while children with enuresis with lower urinary tract symptoms are graded as non- mono symptomatic enuresis [3]. Majority of our subjects have mono symptomatic enuresis. It is well known that approximately 80% to 85% of children who have nocturnal enuresis have MNE [7]. Another 5% to 10% of cases meet the definition of PNE, with daytime wetting or other bladder symptoms [7]. Organic causes are responsible for nocturnal enuresis in fewer than 5% of cases [7].

This study has gone a long way to show the pattern of nocturnal enuresis in our setting. We noted a waxing and waning prevalence of enuresis from the age of five years and above. However the prevalence of enuresis decreases as the child gets older especially from the age of 12 to 14. This is similar to the work of Yeung et al [13] who a marked reduction in the overall prevalence of Enuresis with advancing age.

The overall prevalence of enuresis from this study is 36.2%. The prevalence obtained in this study is very high when compared to that of Wen [14] who had an overall prevalence of 4.07% but similar to studies where prevalence of nocturnal enuresis among children older than five years of age was reported as 10-30 % in literature [15,16]. The disparate estimates can be accounted for primarily by the differences in the definitions of enuresis in the *International Classification of Diseases and Related Health Problems-Tenth Edition (ICD-10)* [17], the *DSM-*

IV [18], and the International Children's Continence Society (ICCS) [2]. In addition to different diagnostic criteria, differences in the age range and ethnicity of children and reference periods for prevalence rates (e.g., point prevalence versus 12-month prevalence), as well as cultural differences, may also account for the widely varying prevalence estimates of enuresis published worldwide [19].

We noted from this study that nocturnal enuresis is very rare from the age of 15. Michael and colleagues [20] noted that spontaneous resolution rate of nocturnal enuresis is approximately 15% per year, with 1% of teenagers at 15 years of age still wetting the bed. The reason for this dryness at 15 is due to the fact that some children who have enuresis may have a small bladder capacity. [21] The bladder capacity increases with age. Children who have small bladder capacities probably represent a subgroup of patients who have MNE and presumably cannot hold the normal amount of urine produced at night [21]. They are more likely to report frequent daytime voiding, some nights with multiple episodes of enuresis per night, and no history of attaining dryness [21]. Enuresis is slightly higher in males (39.3%) than 35.9% in females. This male predominance had also been noted in other studies [22,23]. However Hasan et al [24] had a contrary view. He found a female preponderance in his study in Yemen. The reason for this disparity in gender in the later could be a racial, socio-cultural and genetic variables.

The risk of a child being affected is 43% if one parent had nocturnal enuresis and 77% if both parents were affected [8]. Approximately 75% of children with nocturnal enuresis have a first-degree relative who had enuresis [8].

It is interesting to note in this study that majority of children who bed wet had parent(s) who bed wet and this is a significant. Some studies have shown that Seventy percent of children who have enuresis have a parent who has a history of the disorder [25]. It also indicated that if one parent

had enuresis, the probability of a child having it is approximately 40% to 45% [25]. If both parents were affected, the probability of a child having the condition increases to 70% to 77% [25]. If neither parent had enuresis, only 15% of offspring will have enuresis [25]. The single most potent reason for this is genetic. It has been noted that chromosomes 12q, 13q, and 22 all have been named as possible locations of a gene(s) resulting in enuresis, but a specific mechanism for enuresis related to a gene locus is not known.

Socio-economic factors are a causal factor that affects the prevalence of enuresis. Several studies indicated that Children with lower socioeconomic background and large family size are associated with the development of enuresis [26-28]. These acts as stressors to the child and therefore affect its rate of developmental milestones achievement.

The incidence of enuresis is low in children of high socioeconomic background and higher in low and middle socioeconomic background. However [Senbanjo et al \[29\]](#) in Nigeria noted a higher incidence of enuresis among family with high socioeconomic background.

It might be due to the fact that the highly educated and those in high socioeconomic classes are working class parents who do not have time for an early toilet training of their children.

We noted a significant association between enuresis and allergy in our subjects, though the specific type of allergen was not indicated. [Mungan et al \[30\]](#) showed that there may be a relationship between nocturnal enuresis and soybean and hazelnut food allergens but noted that the underlying mechanisms for this cannot be elicited. This study also showed a high prevalence of enuresis among children with allergy and caffeine consumption [31]. The reason for this could be that drinks containing methylxanthines (eg caffeine and theophylline found in 'high-energy' drinks) can aggravate enuresis by their diuretic action. These substances also include tea,

coffee, cola and chocolate [31]. The link between allergy and nocturnal enuresis had also been confirmed in other studies [32]. The reason for this cannot be ascertained [32].

Conclusion: The prevalence of nocturnal enuresis in our setting is 36.2%, which is higher than that obtained in various studies elsewhere in the world with slight male preponderance. There were strong association between the prevalence of nocturnal enuresis and age, socioeconomic background, positive family history in the first degree relative and history of allergy.

Competing Interest

The authors hereby declare that we have no competing interests.

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Authors' contribution

All the authors made substantial intellectual contributions to this study. CJM and MPC was involved in the conception, design and data collection as well as interpretation of results, preparation of the manuscript, revision of the article at various stages and preparation of the final draft. OHA and OOI contributed in conception, design, manuscript preparation and approval of the final document.

CJM, MPC, OHA, and OOI made substantial contributions in the design, data collection and interpretation of results as well as the approval of the final document.

References

1. Butler RJ, Golding J, Northstone K. Nocturnal enuresis at 7.5 years old: Prevalence and analysis of clinical signs. *BJU Int* 2005; 96: 404-10.
2. Nevéus T, von Gontard A, Hoebeke P, 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.
3. Nørgaard, J P, van Gool J D, Hjälmås, K, Djurhuus JC, Hellström AL.: Standardization and definitions in lower urinary tract dysfunction in children. *Br J Urol* 1998;81:1
4. Kaneko K. Treatment for nocturnal enuresis: The current state in Japan. *Pediatr Int* 2012; 54:8-13.
5. Djurhuus JC, Rittig S. Current trends, diagnosis, and treatment of enuresis. *Eur Urol.* 1998; 33:30–33
6. Naseri M, Hiraifar M. Monosymptomatic and non-monosymptomatic nocturnal enuresis: a clinical evaluation. *Arch Iran Med.* 2012 ;15:702-6
7. Michael RL, Darby HM. Nocturnal Enuresis: Current Concepts. *Pediatrics in Review* 2001; 22: 399-407 Obtainable a
http://www.fmed.ulaval.ca/pediatric/fileadmin/docs/serveur_pediatric/Acces_reserve/Medecins...
Assessed on 15/11/2013
8. Touchette E, Petit D, Paquet J, et al; Bed-wetting and its association with developmental milestones in early childhood. *Arch Pediatr Adolesc Med.* 2005 Dec;159(12):1129-34.
9. Singh H, Kaur L, Kataria SP. Enuresis: analysis of 100 cases. *Indian Pediatr.* 1991; 28: 375-80

10. Rona RJ, Li L, Chinn S. Determinants of nocturnal enuresis in England and Scotland in the '90s. *Dev Med Child Neurol.* 1997; 39:677-81.
11. Enuresis and encopresis questionnaire. *Development-behavioural pediatrics* .Obtainable at <http://www.pih-mpls.com/about-pih/daniel-kohen-md.html> . [Assessed on 23/11/2013]
12. Oyedele GA. Socio- economic and cultural background of hospitalized children in Ilesha. *Nigeria Journal of Paediatrics* 1985; 12:111-7.
13. 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 ; 97:1069-73.
14. 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 ; 49:1107-13
15. Fritz G, Rockney R, Bernet W, Arnold V, Beitchman J, Benson RS, et al. Practice parameter for the assessment and treatment of children and adolescents with enuresis. *J Am Acad Child Adolesc Psychiatry.* 2004; 43:1540–50.
16. Eapen V, Mabrouk AM. Prevalence of nocturnal enuresis in the United Arab Emirates. *Saudi Med J.* 2003;24:49–51.
17. World Health Organization. *International Classification of Diseases and Related Health Problems (ICD-10) Classification of Mental and Behavioural Disorders: Diagnostic and Research Criteria.* Geneva: World Health Organization; 1993.

18. American Psychological Association. Diagnostic and Statistical Manual of Mental Disorders. Washington DC: American Psychiatric Association; 1994.
19. Tai HL, Chang YJ, Chang SC, Chen GD, Chang CP, Chou MC. The epidemiology and factors associated with nocturnal enuresis and its severity in primary school children in Taiwan. *Acta Paediatr.* 2007; 96: 242–245.
20. Michael RL, Darby HM. Nocturnal enuresis: current concepts. *Pediatrics in Review* 2001; 22:399-406
21. chandra m. nocturnal enuresis in children. *Curr Opin Pediatr.* 1998; 10:167–173
22. Srirangam S, Jian-ping H, Amanda K, Shannon B, Kathleen RM. Prevalence of Enuresis and Its Association With Attention-Deficit/Hyperactivity Disorder Among U.S. Children: Results From a Nationally Representative Study. *J Am Acad Child Adolesc Psychiatry.* 2009; 48: 35–41.
23. Gümüş B, Vurgun N, Lekili M, Işcan A, Müezzinoğlu T, Büyüksu C. Prevalence of nocturnal enuresis and accompanying factors in children aged 7-11 years in Turkey. *Acta Paediatr.* 1999; 88:1369-72.
24. Hasan MA, Omer AB, Faisal Y, Amen AB. Nocturnal enuresis among primary school children. *Saudi J Kidney Dis Transpl* 2013; 24:1233-1241
25. Hjalmas K. Nocturnal enuresis: basic facts and new horizons. *Eur Urol.* 1998; 33:53–57
26. Ozkan KU, Garipardic M, Toktamis A, Karabiber H, Sahinkanat. Enuresis prevalence and accompanying factors in schoolchildren: a questionnaire study from southeast Anatolia. *Urol Int.* 2004; 73:149–155.
27. Iduoriyekemwen NJ, Ibadin MO, Abiodun PO. Survey of childhood enuresis in the Ehor community, the Edo State, Nigeria. *Saudi J Kidney Dis Transpl.* 2006; 17:177–182.

28. Kanaheswari Y. Epidemiology of childhood nocturnal enuresis in Malaysia. *J Paediatr Child Health*.2003; 39: 118–123.
- 29.Senbanjo IO, Oshikoya KA, Njokanma OF.Micturitional dryness and attitude of parents towards enuresis in children attending outpatient unit of a tertiary hospital in Abeokuta, Southwest Nigeria. *Afr Health Sci*.2011; 11: 244–251.
30. Mungan NA, Seckiner I, Yesilli C, Akduman B, Tekin IO. Nocturnal enuresis and allergy. *Scand J Urol Nephrol* 2005; 39:237-41.
31. Nocturnal Enuresis in Children.Obtainable at <http://www.patient.co.uk/doctor/nocturnal-enuresis-in-children> assessed on 29/01/2014
- 32 Mungan NA, Seckiner I, Yesilli C, Akduman B, Tekin IO. "Nocturnal enuresis and allergy". *Scand. J. Urol. Nephrol* 2005; **39** : 237–41.
33. "[Allergies and Sensitivities](#)". Cedars-Sinai Health System. Assessed on 29/01/2014 .

Table 1: Sociodemographic Characteristics

Variable	Number (Percent) (N/%)
Age	
<5 Years	48 (12.3)
5-10 Years	262 (67.4)
10-12 Years	79 (20.3)
Sex	
Female	164(42.2)
Male	225 (57.8)
Socioeconomic Class	
1 (High)	29 (6.4)
2-3 (Middle)	237 (60.9)
4-5 (Low)	127 (32.7)
Total number	389(100)

Table 2: Characteristics of subjects

Characteristic/Response	Did Your Child Ever Had Dried Nights(Primary enuresis)?			X ²	P value
	NO	YES	I DON'T KNOW		
Age:					
5-10 Years	113(43.1%)	139(53.1%)	10(3.8%)		
10-12 Years	28(35.4%)	43(54.4%)	8(10.2%)		
Sex: Female	60(35.9%)	95(56.9%)	12(7.2%)	2.211	0.331
Male	99(39.3%)	144(57.1%)	9(3.6%)		
Parents Bedwet: No					
	99(72.3%)	27(19.7%)	11(8.0%)	17.298	0.02
Yes	152(86.4%)	24(13.6%)	0(0%)		
I Don't Know	33(43.4%)	33(43.4%)	10(13.2%)		
Caffeine:					
No	137(83.5%)	13(8.0%)	14(8.5%)	20.931	0.000
Yes	197(94.7%)	8(3.8%)	3(1.5%)		
I Don't Know	9(53.0%)	4(23.5%)	4(23.5%)		
Medications:					
No	112(67.9%)	41(24.8%)	12(7.3%)	2.908	0.573
Yes	132(63.5%)	68(32.7%)	8(3.8%)		
I Don't Know	6(37.5%)	9(56.3%)	1(6.2%)		
Allergy:					
No	128(80.0%)	20(12.5%)	12(7.3%)	13.814	0.008

Yes	178(87.7%)	21(10.3%)	4(2.0%)		
I Don't Know	11(42.3%)	10(38.5%)	5(19.2%)		
Siblings Bedwet:					
No	89(56.0%)	63(39.6%)	7(4.4%)	15.675	0.003
Yes	120(57.4%)	79(37.8%)	10(4.8%)		
I Don't Know	4(19.0%)	13(62.0%)	4(19.0%)		

Figure 1: Response of the Pupils with correspondent socioeconomic classes (SEC)



