

Original Research Article

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

Abstract

Background: We describe the pattern and challenge of nocturnal 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+/-3.1years with prevalence of enuresis in children aged 5years 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).

Conclusions: Enuresis is a concealed medical and social malaise and its importance therefore cannot be downplayed especially its impact on mental health of a child and their family.

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

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29 **Introduction**

30 Nocturnal enuresis (NE) is a challenging issue mostly seen in childhood. It is defined as an
31 involuntary voiding of urine during sleep with a frequency of at least twice a week in children
32 aged >5 years in the absence of congenital or acquired defects of the central nervous system [1].

33 Studies have estimated the prevalence of NE to be around 20% in children of age 5 years and
34 above, with a male predominance [2-4].

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

39 The spontaneous resolution rate of nocturnal enuresis is approximately 15% per year, with about
40 1% of teenagers at 15 years of age still wetting the bed. Parents and caregivers usually get
41 worried about nocturnal enuresis when their child reaches 5 to 6 years of age [7,8]. This age is
42 important since it is the year of school entry. Most children are not concerned until 7 to 8 years
43 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 [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 5-12 in Enugu and Ebonyi states.

67 **Study Population**

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

70 Younger children between the ages of 5 and 9 have their questionnaires filled by the help of their
71 parents and teachers while those from 10 years were assisted. The school proprietress was asked
72 for permission to recruit students. Consent was obtained from individual parents and students
73 through their principals after they had been told that their participation was completely voluntary
74 in nature and that they could discontinue their involvement at any time. Confidentiality of
75 responses was also conveyed. Students were chosen by systemic sampling from elementary 1 to
76 6. Each form has about 4 classes with about 20 per class.

77 **Study Procedure**

78 The instrument employed for data collection was a structured self administered questionnaire
79 developed from (enuresis and encopresis questionnaire) [11]. This questionnaire covers
80 questions on all the aspects of both enuresis and encopresis, parents education and
81 occupation, drug history etc. For purposes of this study, enuresis was defined as involuntary
82 voiding of urine during sleep with a frequency of at least twice a week in children aged >5 years
83 in the absence of congenital or acquired defects of the central nervous system [1].

84 The families were assigned socioeconomic classes using the recommended method (modified)
85 by Oyedele [12]. The parents' occupation and highest education attained were scored from 1
86 (highest) to 5 (lowest). The mean score for both parents gives social class falling within the 1-5
87 range. Those with the mean score of <2 were further reclassified into upper class while those
88 with the mean score of >2 were reclassified into lower social class. For the occupation score,
89 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 in table I. One hundred sixty- eight Pupils (43.1%) had enuresis between aged 5 to 10 while 136 pupils (35.4%) had enuresis above 10 years. The association between age and enuresis is significant ($\chi^2=49.139$; $p=0.008$). When prevalence of enuresis is stratified into ages, children of 5 years of age had a prevalence of 13.2%; 6 years prevalence of 8.8%; 7 years prevalence of 9.4%. 8 years prevalence of 10.7%; 9 years prevalence of 5.7%; 10 years prevalence of 5.7%. 11 years prevalence of 10.1%; 12 years prevalence of 2.5%; 13 years

113 prevalence of 3.7%; 14 years prevalence of 0.6%; and 15 years prevalence of 0.6%. Above 15
114 years; the prevalence is zero

115 Overall prevalence at 5 years and above =36.2%.Table 1

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

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

119 . 86.4% of children who bed wet had parent(s) who bed wet p=0.02). 94.7% of children who took
120 caffeine bed wet p=0.0001). Table 2.Other significant associations include history of allergy in
121 87.7 % of pupils (P value = 0.008) and 57.4% of pupils with history of bedwetting in the siblings
122 (P value = 0.003

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

124 **Discussion**

125 Enuresis could be Monosymptomatic (MNE) or polysymptomatic(PNE) [6]. The former is
126 defined as a normal void occurring at night in bed in the absence of any other symptoms
127 referable to the urogenital tract, and it precludes any daytime symptomatology [6]. The later is
128 bed-wetting associated with other bladder symptoms such as urgency, frequency, instability, or
129 voiding dysfunction. Approximately 80% to 85% of children who have nocturnal enuresis have
130 MNE. Another 5% to 10% of cases meet the definition of PNE, with daytime wetting or other
131 bladder symptoms [7]. Organic causes are responsible for nocturnal enuresis in fewer than 5%
132 of cases [7].

133 This study has gone a long way to show the pattern of nocturnal enuresis in our setting. We
134 noted a waxing and waning prevalence of enuresis from the age of five years and above.
135 However the prevalence of enuresis decreases as the child gets older especially from the age of
136 12 to 14. This is similar to the work of Yeung et al [13] who a marked reduction in the overall
137 prevalence of Enuresis with advancing age.

138 The overall prevalence of enuresis from this study is 36.2%. The prevalence obtained in this
139 study is very high when compared to that of Wen [14] who had an overall prevalence of 4.07%
140 but similar to studies where prevalence of nocturnal enuresis among children older than five
141 years of age was reported as 10-30 % in literature [15,16]. The disparate estimates can be
142 accounted for primarily by the differences in the definitions of enuresis in the *International*
143 *Classification of Diseases and Related Health Problems-Tenth Edition (ICD-10)* [17], the *DSM-*
144 *IV* [18], and the International Children's Continence Society (ICCS) [19]. In addition to different
145 diagnostic criteria, differences in the age range and ethnicity of children and reference periods
146 for prevalence rates (e.g., point prevalence versus 12-month prevalence), as well as cultural
147 differences, may also account for the widely varying prevalence estimates of enuresis published
148 worldwide [20].

149 We noted from this study that nocturnal enuresis is very rare from the age of 15. Michael and
150 colleagues [21] noted that spontaneous resolution rate of nocturnal enuresis is approximately
151 15% per year, with 1% of teenagers at 15 years of age still wetting the bed. The reason for this
152 dryness at 15 is due to the fact that some children who have enuresis may have a small bladder
153 capacity. [22] The bladder capacity increases with age. Children who have small bladder
154 capacities probably represent a subgroup of patients who have MNE and presumably cannot hold

155 the normal amount of urine produced at night [22]. They are more likely to report frequent
 156 daytime voiding, some nights with multiple episodes of enuresis per night, and no history of
 157 attaining dryness [22]. Enuresis is slightly higher in males (39.3%) than 35.9% in females. This
 158 male predominance had also been noted in other studies [23,24]. However Hasan et al [25] had a
 159 contrary view. He found a female preponderance in his study in Yemen. The reason for this
 160 disparity in gender in the later could be a racial, socio-cultural and genetic variables.

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

164 It is interesting to note in this study that majority of children who bed wet had parent(s) who bed
 165 wet and this is a significant. Some studies have shown that Seventy percent of children who have
 166 enuresis have a parent who has a history of the disorder [26]. It also indicated that if one parent
 167 had enuresis, the probability of a child having it is approximately 40% to 45% [26]. If both
 168 parents were affected, the probability of a child having the condition increases to 70% to 77%
 169 [26]. If neither parent had enuresis, only 15% of offspring will have enuresis [26]. The single
 170 most potent reason for this is genetic. It has been noted that chromosomes 12q, 13q, and 22 all
 171 have been named as possible locations of a gene(s) resulting in enuresis, but a specific
 172 mechanism for enuresis related to a gene locus is not known.

173 Socio-economic factors are a causal factor that affects the prevalence of enuresis. Several
 174 studies indicated that Children with lower socioeconomic background and large family size
 175 are associated with the development of enuresis [27-29]. These acts as stressors to the child and
 176 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 [30] et al 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 [31] 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.

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 female 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.

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. 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; 73:149-55.
3. Bayoumi RA, Eapen V, Al-Yahyaee S, Al Barwani HS, Hill RS, Al Gazali L. The genetic basis of inherited primary nocturnal enuresis: A UAE study. *J Psychosom Res* 2006; 61:317-20.

- 199 4. Kaneko K. Treatment for nocturnal enuresis: The current state in Japan. *Pediatr Int* 2012;
200 54:8-13.
- 201 5. Djurhuus JC, Rittig S. Current trends, diagnosis, and treatment of enuresis. *Eur Urol*. 1998;
202 33:30–33
- 203 6. Naseri M, Hiradfar M. Monosymptomatic and non-monosymptomatic nocturnal enuresis: a
204 clinical evaluation. *Arch Iran Med*. 2012 ;15:702-6
- 205 7. Michael RL, Darby HM. Nocturnal Enuresis: Current Concepts. *Pediatrics in Review* 2001;
206 22: 399-407 Obtainable at
207 http://www.fmed.ulaval.ca/pediatric/fileadmin/docs/serveur_pediatric/Acces_reserve/Medecins...
208 Assessed on 15/11/2013
- 209 8. Enuresis Causes, Diagnosis & Treatments - Clinical Key .Obtainable at
210 <https://www.clinicalkey.com/topics/urology/enuresis.html> .[assessed on 15/11/2013]
- 211 9. Singh H, Kaur L, Kataria SP. Enuresis: analysis of 100 cases. *Indian Pediatr*. 1991; 28: 375-80
- 212 10. Rona RJ, Li L, Chinn S. Determinants of nocturnal enuresis in England and Scotland in the
213 '90s. *Dev Med Child Neurol*. 1997; 39:677-81.
- 214 11. Enuresis and encopresis questionnaire. *Development-behavioural pediatrics* .Obtainable at
215 <http://www.pih-mpls.com/about-pih/daniel-kohen-md.html> . [Assessed on 23/11/2013]
- 216 12. Oyedele GA. Socio- economic and cultural background of hospitalized children in Ilesha.
217 *Nigeria Journal of Paediatrics* 1985; 12:111-7.

- 218 13. Yeung CK, Sreedhar B, Sihoe JD, Sit FK, Lau J. Differences in characteristics of nocturnal
219 enuresis between children and adolescents: a critical appraisal from a large epidemiological
220 study. BJU Int 2006 ; 97:1069-73.
- 221 14. Wen JG, Wang QW, Chen Y, Wen JJ, Liu K. An epidemiological study of primary nocturnal
222 enuresis in Chinese children and adolescents. Eur Urol. 2006 ; 49:1107-13
- 223 15. Fritz G, Rockney R, Bernet W, Arnold V, Beitchman J, Benson RS, et al. Practice parameter
224 for the assessment and treatment of children and adolescents with enuresis. J Am Acad Child
225 Adolesc Psychiatry. 2004; 43:1540–50.
- 226 16. Eapen V, Mabrouk AM. Prevalence of nocturnal enuresis in the United Arab Emirates. Saudi
227 Med J. 2003;24:49–51.
- 228 17. World Health Organization. International Classification of Diseases and Related Health
229 Problems (ICD-10) Classification of Mental and Behavioural Disorders: Diagnostic and
230 Research Criteria. Geneva: World Health Organization; 1993.
- 231 18. American Psychological Association. Diagnostic and Statistical Manual of Mental Disorders.
232 Washington DC: American Psychiatric Association; 1994.
- 233 19. Nevéus T, von Gontard A, Hoebeke P, et al. The standardization of terminology of lower
234 urinary tract function in children and adolescents: report from the standardisation committee of
235 the international children's continence society. J Urol. 2006; 176: 314–324.
- 236 20. Tai HL, Chang YJ, Chang SC, Chen GD, Chang CP, Chou MC. The epidemiology and
237 factors associated with nocturnal enuresis and its severity in primary school children in Taiwan.
238 Acta Paediatr. 2007; 96: 242–245.

- 239 21. Michael RL, Darby HM.Nocturnal enuresis: current concepts. *Pediatrics in Review* 2001;
240 22:399-406
- 241 22. chandra m. nocturnal enuresis in children. *Curr Opin Pediatr*.1998; 10:167–173
- 242 23. Srirangam S, Jian-ping H, Amanda K, Shannon B, Kathleen RM.Prevalence of Enuresis and
243 Its Association With Attention-Deficit/Hyperactivity Disorder Among U.S. Children: Results
244 From a Nationally Representative Study. *J Am Acad Child Adolesc Psychiatry*.2009; 48: 35–41.
- 245 24. Gümüş B, Vurgun N, Lekili M, Işcan A, Müezzinoğlu T, Büyüksu C. Prevalence of
246 nocturnal enuresis and accompanying factors in children aged 7-11 years in Turkey. *Acta*
247 *Paediatr*.1999; 88:1369-72.
25. Hasan MA, Omer AB, Faisel Y, Amen AB. Nocturnal enuresis among primary school
children. *Saudi J Kidney Dis Transpl* 2013; 24:1233-1241
- 248 26. Hjalmas K. Nocturnal enuresis: basic facts and new horizons. *Eur Urol*. 1998; 33:53–57
- 249 27. Ozkan KU, Garipardic M, Toktamis A, Karabiber H, Sahinkanat Enuresis prevalence and
250 accompanying factors in schoolchildren: a questionnaire study from southeast Anatolia. *Urol*
251 *Int*.2004; 73:149–155.
- 252 28. Iduoriyekemwen NJ, Ibadin MO, Abiodun PO. Survey of childhood enuresis in the Ehor
253 community, the Edo State, Nigeria. *Saudi J Kidney Dis Transpl*.2006; 17:177–182.
- 254 29. Kanaheswari Y. Epidemiology of childhood nocturnal enuresis in Malaysia. *J Paediatr Child*
255 *Health*.2003; 39: 118–123.
- 256 30.Senbanjo IO, Oshikoya KA, Njokanma OF.Micturitional dryness and attitude of parents
257 towards enuresis in children attending outpatient unit of a tertiary hospital in Abeokuta,
258 Southwest Nigeria. *Afr Health Sci*.2011; 11: 244–251.

259 31. Mungan NA, Seckiner I, Yesilli C, Akduman B, Tekin IO. Nocturnal enuresis and allergy.
260 Scand J Urol Nephrol 2005; 39:237-41.

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269 **Table 1: Sociodemographic Characteristics**

Characteristics	Frequency	Per cent
Age:		
<5 Years	48	12.3
5-10 Years	262	67.4
10 Years	79	20.3
Sex: Female	164	42.2
Male	225	57.8
SEC: 1 (High Socioeconomic Class)	29	7.5
2-3 (Middle Socioeconomic Class)	237	60.9
4-5 (Low Socioeconomic Class)	127	31.7

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272 **Table 2: Characteristics of subjects**

Characteristic/Response	Did Your Child Ever Had Dried Nights?			X ²	P value
	NO	YES	I DON'T KNOW		
Age:					
5-10 Years	113(43.1%)	139(53.1%)	10(3.8%)		
>10 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

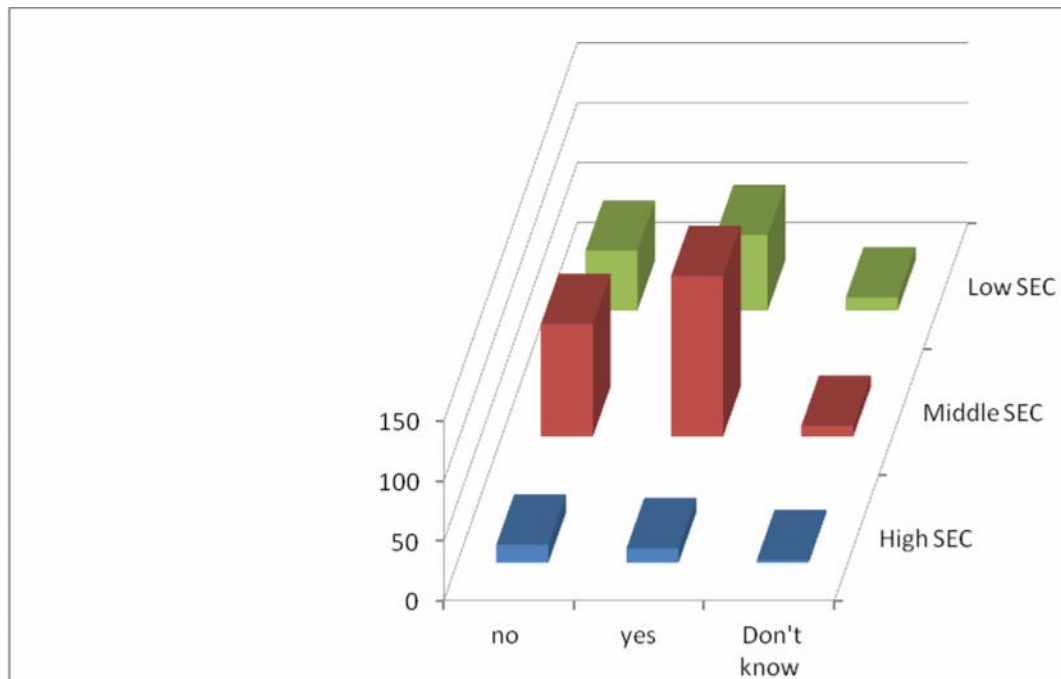
Yes	178(87.7%)	21(10.3%)	4(2.0%)		
I Don't Know	11(42.3%)	10(38.5%)	5(19.2%)		
Siblings Bedwet:					
No	89(56.0%)	63(39.6%)	7(4.4%)	15.675	0.003
Yes	120(57.4%)	79(37.8%)	10(4.8%)		
I Don't Know	4(19.0%)	13(62.0%)	4(19.0%)		

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

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