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Nocturnal Enuresis among School-age Children in South-eastern Nigeria: A Concealed Social Malaise

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Authors' contributions

All the authors made substantial intellectual contributions to this study. Authors JMC and PCM 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. Authors HAO and OIO contributed in conception, design, manuscript preparation and approval of the final document. Authors JMC, PCM, HAO, and OIO made substantial contributions in the design, data collection and interpretation of results as well as the approval of the final document.

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ABSTRACT

Background: We describe the pattern of nocturnal enuresis among school-age children in South-eastern Nigerian.

Methods: A total sample size of 245 pupils was selected for the purpose of this study with age between 6 and 12 years. The Stratified method of sampling was employed to get a sample that represents the population. Selection of the two schools was done based on the cooperation and readiness of the management and parent/guardian to participate in the research.

Results: Two hundred and forty five children were enrolled for the study with 151 male (61.6%) while the female children are 94 (38.4%). The prevalence of enuresis was noted to be 22.8%. The prevalence is higher in males (60%) than 39% in females (P value <0.05) with higher incidence in lower socioeconomic background and in children with positive family history of bedwetting in the first degree relative though not significant.

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Conclusions: The prevalence of nocturnal enuresis in our setting is 22.8%, which is higher than that obtained in various studies elsewhere in the world with a male preponderance. There were strong association between the prevalence of nocturnal enuresis and socioeconomic background.

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

1. 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 (International Children's Continence Society) definition; enuresis can also be defined as in-continenence 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 (Lower urinary tract) 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 is 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 down played 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.

2. METHOD

2.1 Study Area

The study was carried out among children in a four primary schools within age range of 6-12 in Enugu and Ebonyi states.

2.2 Study Population

The questionnaire was administered to parents and principals of Pupils of selected schools. Younger children between the ages of 6 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.

2.3 Study Procedure

A total sample size of 245 pupils was selected for the purpose of this study. The Stratified method of sampling was employed to get a sample that represents the population. Selection of the two schools was done based on the cooperation and readiness of the management and parent/guardian to participate in the research.

This questionnaire covers questions on all the aspects of enuresis [11]. For purposes of this study, enuresis was 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].

Children aged 6 years to 12 years with obtained consent were included in this study while children with congenital abnormalities of the genitourinary tract and who did not give consent were excluded.

The families were assigned socioeconomic classes using the recommended method (modified) by Oyedeji [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].

The objectives of this study are to determine the overall prevalence of enuresis between 6 years and 12 years, to determine the relationship between gender and enuresis and the relationship between enuresis and socioeconomic background. Other significant associations like history of bedwetting in the siblings were ascertained.

2.4 Data Analysis

Data analysis was done using statistical package for social sciences (SPSS) version 17. Chi-square was used under the bivariate level of analysis to test the effect/significant of the Independent variables (Gender, history of enuresis among sibling, parental/relative history of enuresis) on the dependent variable (Enuresis); all the variables were grouped into different categories based on the responses provided.

3. RESULT

Table 1 Shows the percentage distribution of the children by their age, sex and mother's level of education. The mean age of the children is 9 (nine). The ages of the children ranges between age six (6) to age twelve (12), the distribution is even among the children as the number of the children in each category fall below the average number of sample. Children under age 7, 9 and 10 have equal percentage (16%), children who are in age 8 categories are eighteen percent (18%) of the sample. The males are (61.63%) while the female children are 38.37%.

Majority of their mothers have secondary education (32.25%) Mothers with primary and tertiary education are 27% respectively while mothers with no education are 14%. Although the number in each category still fall below average.

The prevalence of enuresis between 6 years and 12 years =22.8%. Table 2 above shows the percentage distribution of mothers by their attitude toward their children during enuresis. Greater percentage (87.75%) of the mothers claimed not to have used any treatment plan for their children to cure bedwetting, while only about 12% claimed to have used one means or the other to cure bedwetting. Also, more than average number (60.82%) of the mothers responded not to have been punishing their child for bedwetting while the remaining 39% claimed to have been punishing their children for bedwetting.

Table 3 above show the percentage distribution of the children by their family history of enuresis. Majority (64.9%) of the respondent claimed neither mother or father have record of enuresis, while 14.1% of them claimed there is a record of enuresis in either of the parents, the remaining 21% claimed they cannot really ascertain if there is or not.

Children that bed wets are majorly male children as the 60% of the children that bed wets are male while 39% of those children are female.

The percentage distribution of the children by their enuresis status and the history of enuresis among their sibling is shown in Table 4. More than average number (54.62%) of the children with enuresis problem have no history or enuresis among their siblings, forty nine percent (49.18%) of them have history of enuresis among their siblings, the remaining four percent (4.20%) fall under the category of the children who cannot ascertain if there is any history of enuresis among the sibling or not.

Table 5 shows the percentage distribution of the children by their sex and enuresis. Children that bed wets are majorly male children as the 60% of the children that bed wets are male while 39% of those children are female. Among children with no enuresis problem 62% of them are male while 39% of them are female.

Table 6 shows the percentage distribution of the children by their enuresis status and the history of enuresis among their sibling. More than average number (54.62%) of the children with enuresis problem have no history or enuresis among their siblings, forty nine percent (49.18%) of them have history of enuresis among their siblings, the remaining four percent (4.20%) fall under the category of the children who cannot ascertain if there is any history of enuresis among the sibling or not.

Table 7 shows the percentage distribution of the children by their enuresis status and the history of enuresis among parent/relatives. Greater number (68.91%) of the children with enuresis problem have no history of enuresis among either parent or relatives, only a few number (15.13%) of them have history of enuresis among either parent or relatives while the remaining ones are those who cannot ascertain if there is any history of enuresis among either parent or relatives.

Table 8 shows hypothesis testing in the relationship between sex of a child and his/her history of enuresis as follows:

Hypothesis Testing 1

H_0 : There is no significant relationship between sex of a child and his/her history of enuresis

H_1 : There is a significant relationship between sex of a child and his/her history of enuresis

Level of significant: 0.05

Decision Rule: Reject H_0 if p-value is less than 0.05, otherwise accept H_0

We noted from Table 8 that since p-value (0.724) is greater than 0.05, we therefore accept H_0 .

It is thus concluded that at five percent level of significance, there is no significant relationship between gender and enuresis among children

Table 9 shows hypothesis testing in the relationship between parental/relative histories of enuresis and the enuresis of their child as follows:

H_0 : There is no significant relationship between parental/relative history of enuresis and the enuresis of their child

H₁: There is a significant relationship between parental/relative history of enuresis and the enuresis of their child

Level of significant: 0.05

Decision Rule: Reject H₀ if p-value is less than 0.05, otherwise accept H₀

We noted from Table 9 that since p-value (0.242) is greater than 0.05, we therefore accept H₀

We thus concluded that at five percent level of significant that there is no significant relationship between parental/relative history of enuresis and the enuresis of their child.

Table 10 shows hypothesis testing in the relationship between enuresis of a child and the enuresis of among siblings as follows:

H₀: There is no significant relationship between enuresis of a child and the enuresis of among siblings

H₁: There is a significant relationship between enuresis of a child and the enuresis among siblings

Level of significant: 0.05

Decision Rule: Reject H₀ if p-value is less than 0.05, otherwise accept H₀

We noted from Table 10 that since p-value (0.476) is greater than 0.05, we therefore accept H₀

Interpretation: We thus concluded that at five percent level of significant that there is no significant relationship between enuresis of a child and the enuresis among siblings.

Table 1. Percentages Distribution of the Children by age, sex and mother`s level of education

Age	Frequency	Percentage
6	38	15.51
7	40	16.33
8	46	18.78
9	41	16.73
10	41	16.73
11	27	11.02
12	12	4.9
Total	245	100
Sex		
Female	94	38.37
Male	151	61.63
Total	245	100
Mother`s Level of Education		
None	34	13.88
Primary	66	26.94
Secondary	79	32.25
Tertiary	66	26.94
Total	245	100

Table 2. Percentage distribution of mothers by their attitude towards their children during enuresis

Have you tried any treatment plans to cure bedwetting	Frequency	Percentage
No	215	87.75
Yes	30	12.24
Total	245	100
Do you punish your child for bedwetting		
No	149	60.82
Yes	96	39.18
Total	245	100

Table 3. Percentage distribution of the children by their family history of enuresis

Did either Parent or other relative have a bed wetting Problem	Frequency	Percentage
No	159	64.9
Yes	36	14.69
Don't know	50	20.41
Total	245	100
Do any of the child's siblings wet the bed at night		
No	131	53.47
Yes	99	40.41
Don't know	15	6.12
Total	245	100

Table 4. Relationship between enuresis in children and history of enuresis among parent/relatives

Did your child ever bed wet before (Enuresis)	Did either parent or other relative have a bed wetting problem			Total	Chi-square Value	p-value	Decision	Reason
	NO	YES	Don` t know					
NO	77	18	31	126	2.83	0.24	Accept H ₀	p-value (0.24) > 0.05
YES	82	18	19	119				
Total	159	36	36	245				

Table 5. Cross tabulation between enuresis and sex of the children

Did your child ever bed wet before (Enuresis)	Sex		Total (%)
	Female (%)	Male (%)	
No	47 (37.3)	79 (62.7)	126 (100)
Yes	47 (39.5)	72 (60.5)	119 (100)
Total	94 (38.37)	151 (61.63)	245 (100)

Table 6. Cross Tabulation between enuresis and child`s history of enuresis among siblings

Did your child ever bed wet before (Enuresis)	Do any of the child's siblings wet the bed at night			Total (%)
	No (%)	Yes (%)	Don't Know (%)	
No	66 (52.38)	50 (39.68)	10 (7.94)	126 (100)
Yes	65 (54.62)	49 (41.18)	5 (4.20)	119 (100)
Total	131 (53.47)	99 (40.41)	15 (6.12)	245 (100)

Table 7. Cross tabulation between enuresis and the child`s history of enuresis among parent/relatives

Did your child ever bed wet before (Enuresis)	Did either parent or other relative have a bed wetting problem			Total (%)
	No (%)	Yes (%)	Don't know (%)	
No	77 (61.11)	18 (14.29)	31 (24.60)	126 (100)
Yes	82 (68.91)	18 (15.13)	19 (15.97)	119 (100)
Total	159 (64.9)	36 (14.69)	50(20.41)	245 (100)

Table 8. Difference in enuresis by sex of the children

Did your child ever bed wet before (Enuresis)	Sex		Total	Chi-square Value	p-value	Decision	Reason
	F	M					
No	47	79	126	0.12	0.72	Accept H ₀	p-value (0.72) > 0.05
Yes	47	72	119				
Total	94	151	245				

Table 9. Difference in Enuresis of the child by the history of enuresis among parent/relatives

Did your child ever bed wet before (Enuresis)	Did either parent or other relative have a bed wetting problem			Total	Chi-square Value	p-value	Decision	Reason
	No	Yes	Don't know					
No	77	18	31	126	2.84	0.24	Accept H ₀	p-value (0.242) >0.05
Yes	82	18	19	119				
Total	159	36	36	245				

Table 10. Difference in Enuresis of the child by the history of enuresis among their siblings

Did your child ever bed wet before (Enuresis)	Do any of the child's siblings wet the bed at night			Total	Chi-square Value	p-value	Decision	Reason
	No	Yes	Don't know					
No	66	50	10	126	1.49	0.48	Accept H0	p-value (0.476) > 0.05
Yes	65	49	5	119				
Total	131	99	15	245				

4. DISCUSSION

According to ICCS definition; enuresis can also be defined as in-continance in discrete episodes while asleep. 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 (mono symptomatic enuresis) [7]. Another 5% to 10% of cases meet the definition of PNE (Primary nocturnal enuresis), 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 that the prevalence of enuresis decreases as the child gets older. 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 22.8%. 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 at the age of 12. 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 12 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]. There is gender ambivalence among children with enuresis, though it 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 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 important to note in this study that a fraction (14%) of children who bed wet had parent(s) who bed wet. 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. However we noted no significant relationship between children with enuresis and that of their siblings.

We noted that the incidence of enuresis is low in children of high socioeconomic background and higher in low and middle socioeconomic background. 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. 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.

This study also showed a high prevalence of enuresis among children with caffeine consumption [30]. The reason for this could be that drinks containing methylxanthines (eg caffeine and the ophylline found in 'high-energy' drinks) can aggravate enuresis by their diuretic action. These substances also include tea, coffee, cola and chocolate [30]. The link between allergy and nocturnal enuresis had also been confirmed in other studies [31]. The reason for this cannot be ascertained. Moreover it has been noted that Mothers who used alcohol, fed on pica, such as clay, smoked during pregnancy and used hard drug during pregnancy expose their children to enuresis [31].

About 39% of mothers claimed to have been punishing their children for bedwetting from this study. Immanuel and colleagues [32], in kerala, noted that mothers of the enuretic children were more punitive than those of the continent children. They also found that fathers of the continent children were more emotionally stable when compared to their counterparts in the enuretic group.

5. CONCLUSION

The prevalence of nocturnal enuresis in our setting is 22.8%, which is higher than that obtained in various studies elsewhere in the world with a male preponderance. There were strong association between the prevalence of nocturnal enuresis and socioeconomic background.

CONSENT

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.

ETHICAL APPROVAL

Not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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