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Factors associated with enuresis among primary school children in Port Harcourt

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Abstract *Background:* Enuresis is a common childhood problem and can lead to important psychosocial disturbances.
Objectives: To determine the risk factors to enuresis, its methods of management and relationship with academic performance among school children in Port Harcourt City (PHC)
Methods: A cross sectional study of enuresis among school children in PHC was performed. Pretested questionnaires completed by parents/guardians was used to collect data. Validation of their academic performances was made using their results in the past one year from the schools head teachers' records. Descriptive statistics and chi-square test were used for analysis.
Results: A total of 922 children, consisting of 463 (50.2%) males and 459 (49.8%) females were studied. The response rate was 82.2%. The prevalence of enuresis was 23.2%. Arousal difficulty and positive family history of enuresis were significantly more frequent in the enuretic group ($p<0.05$). Enuresis was associated with family stressors in 45 (21.0%) of the children. The enuretic children had higher rates of poor school performance compared with non-enuretic children ($p < 0.001$) however; there was no statistical significant relationship between enuresis and social class. None of the enuretic children visited a physician for the management of enuresis. Prayers, punishment and herbal medication were the methods of treatment in 89(41.6%), 42 (19.6%) and 6 (2.8%) children respectively.
Conclusion: Arousal difficulty, positive family history of enuresis and family stress were common risk factors for enuresis. Also, enuretic children had higher rates of poor school performance compared with non-enuretic children. The inappropriate enuresis management methods requires health education intervention

Introduction

Enuresis, also known as bedwetting, 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, by night or day.[-1-3] Day-time bed-wetting is referred to as Diurnal Enuresis (DE) while nighttime bed-wetting is referred to as Nocturnal Enuresis (NE). Combined day and nighttime bed-wetting is referred to as Nocturnal/Diurnal Enuresis. NE may be primary or secondary.[4] Primary nocturnal enuresis (PNE) occurs when a child has never achieved a six month period of continuous nighttime bladder control while secondary nocturnal enuresis (SNE) refers to a child who has experienced a minimum six month period of continence before the onset of bedwetting.[4]

Nocturnal enuresis is frequently diagnosed among school children and it is an important cause of psychosocial problems for both parents and children. [4-6] The etiology/risk factors of enuresis is multifactorial and not yet completely understood despite numerous studies. Studies have implicated functional immaturity of the central nervous system, genetic disorder, sleep and arousal disorders, organic disorders as well as psychological disorders as risk and or aetiologic factors.[4,7-12]

However, due to its self-limiting nature, many parents/ care–givers often try to manage this problem by observation and traditional methods without proper medical attention.[1,2] There is evidence that effective intervention by motivational therapy, behavioral intervention and use of drugs can reduce the duration of the problem and help to improve the lives of these children and their families.[7]

Studies have shown restoration and new sense of confidence, improvement in self esteem and academic performance in treated enuretics. [7,8,13]

The objectives of this study was to determine the risk factors for enuresis among school children in PHC, to establish its relationship with their academic performance and to identify common methods of management used in these enuretic children.

Methodology

The study was carried out among 922 primary school children aged 6-12 years in thirteen primary schools selected by multi-stage stratified random sampling, between November 2008 and March 2009 in Port Harcourt, Nigeria. The State Ministry of Education and the Research and Ethics Committee of the University of Port Harcourt Teaching Hospital (UPTH) approved the study protocol. Informed written consent was obtained from the parents or guardians and all children who were 12year old gave assent for the study. In each selected school, 90 pupils (15 from each arm of class1 to 6) aged 6- 12 years were recruited by selecting all odd numbers using the class register. Children who dissent and those whose parents/ guardians refused consent for the study were excluded from the study.

A pretested questionnaire was used to get information on socio-demographic data, enuresis data, and family stressors. The questionnaires were distributed to the pupils with a written consent letter explaining the aims and procedure of the study in an enclosed envelop to the parents. The questionnaires were completed by the parents at home and returned to the investigator. The information obtained from the questionnaires was augmented by history obtained from the children and validation of their academic performances was made using their current and previous results in the past one year from the schools head teachers' records. Based on the average of their academic performance, they were classified into; Excellent, (>80%), Very good (70-79%), Average (50-69%) and below average (<50%) pupils. Socio-economic stratification of the children was done based on the socio-economic class described by Oyedeji.[14] The obtained data was analyzed using the computer program EPI INFO version 6 and SPSS 16.0 and comparisms of subgroups carried out using the chi square test. Statistical significance at 95% confidence interval was p value < 0.05

Results

One thousand one hundred and seventy questionnaires were given to pupils selected from thirteen schools. Nine hundred and sixty two completed questionnaires were returned giving an overall response rate of 82.2%. Forty questionnaires were excluded because of incomplete and inconsistent data; therefore 922 questionnaires one were included in the final analysis. Of these 922 children, 463 (50.2%) were males while 459 (49.8%) were females, giving a male female ratio of 1:1. The mean age of the study group was 8.6years ± 1.9years. Females 87(64.0%) were more represented among the 8year olds, and more males 39 (60.9%) among 11years old pupils. (Table 1)

Table 1: Age and Sex distribution of the study population

Age(yrs)	Males (%)	Females (%)	Total (%)
6	70 (46.4)	81 (53.6)	151 (16.4)
7	95 (54.6)	79 (45.4)	174 (18.9)
8	49 (36.0)	87 (64.0)	136 (14.8)
9	83 (49.4)	85 (50.6)	168 (18.2)
10	72 (56.7)	55 (43.3)	127 (13.8)
11	39 (60.9)	25 (39.1)	64 (6.9)
12	55 (53.9)	47 (46.1)	102 (11.1)
Total	463 (50.2)	459 (49.8)	922 (100.0)

X^2 =18.86, df=6, p=0.004

Prevalence of Enuresis

Out of the 922 pupils, 214 pupils had enuresis, giving a prevalence rate of 23.2 %.

More males (59.3%) than females (40.7%) were found to be enuretic (male: female ratio of 1.4: 1). The observed sex difference in proportion was statistically significant p=0.002. (Table 2)

Table 2: Prevalence of Enuresis

	Males (%)	Females (%)	Total (%)
Enuretics	127 (59.3)	87 (40.7)	214 (23.2)
Non-enuretics	336 (47.5)	372 (52.5)	708 (76.8)
Total	463 (100.0)	459 (100.0)	922 (100.0)

(X^2 =9.29, p =0.002)

Types of Enuresis

Among the enuretic children, 197(92.1%) had nocturnal enuresis, 2(0.9%) had diurnal enuresis, while 7% had nocturnal-diurnal enuresis (Table 3). Out of the 197 with nocturnal enuresis, 181(92.0%) had primary nocturnal enuresis (PNE), 15(7.5%) had SNE while in 1(0.5%) it was not known if it was primary or secondary nocturnal enuresis.

Table 3: Classification according to type of Enuresis

Type of enuresis	Male (%)	Female (%)	Total (%)
Nocturnal	115 (58.4)	82 (41.6)	197 (92.1)
Diurnal	1 (50.0)	1 (50.0)	2 (0.9)
Nocturnal/Diurnal	11 (73.3)	4 (26.7)	15 (7.0)
Total	127 (59.3)	87 (40.7)	214 (100.0)

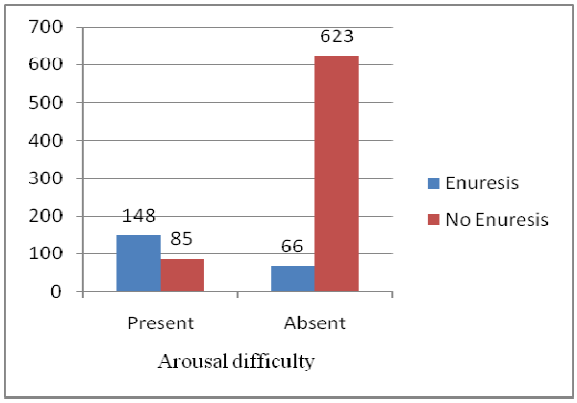
Aetiology/predisposing factors of enuresis

Enuresis and arousal difficulty

Two hundred and thirty three (25.3%) of the study popu-

lation were reported to have arousal difficulty ie difficulty waking child to pass urine. Fig 1 shows that arousal difficulty was more among children with enuresis 148 (63.5%) compared to those without enuresis 85 (36.5%). The observed difference was statistically significant
(p =0.00, X^2 =284.2)

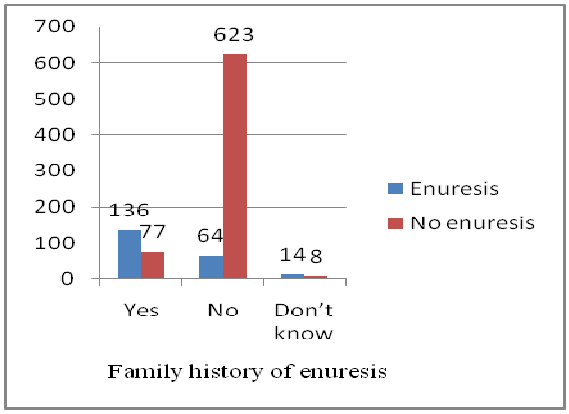
Figure 1: Enuresis and Arousal difficulty



Enuresis and positive family history

Positive family history of enuresis was found in 63.6% of the enuretic group and 10.9% of the non-enuretic group (Fig. 2). This difference was found to be statistically significant (P=0.00, X^2 = 291.96). Among the enuretic children, 84(61.8%) had a positive history of enuresis in their fathers, 31(22.8%) in their mothers and 21(15.4%) in their siblings. Sixty two (45.6%) of the enuretics had a positive history of enuresis in both the mother and father.

Figure 2: Enuresis and positive family history



Enuresis and family stressors

Enuresis was associated with family stressors in 45 (21.0%) of the enuretic children.
Thirty (66.7%) of those with PNE had positive family history of stressors, whereas all of the 15 (33.3%) with SNE had family history of stressors. Birth of a baby was the commonest stressor, accounting for 38(84.4%) as shown in Table 4. Thirty (66.7%) of these children were classified as primary enuresis as the duration of bladder control was between three and five months (less than the required six months in the definition of secondary enuresis).

Table 4: Types of family stressors in enuretic children

Family stressors	Type of Enuresis Primary (%)	Secondary (%)	Total (%)
Birth of a baby	27 (71.1)	11 (28.9)	38 (84.4)
Parental divorce	2 (40.0)	3 (60.0)	5 (11.3)
Parental death	1 (50.0)	1 (50.0)	2 (4.4)
Total	30 (66.7)	15 (33.3)	45 (100.0)

Enuresis and social class

Of the 214 pupils who were enuretic, 151 (70.6%) belonged to social class III and below. Sixty three (29.4%) of the enuretics were from higher social classes-1 and 11. There was no statistically significant difference between enuresis and social class as shown in Table 5

Table 5: Enuresis and social class

Social class	Enuresis Yes (%)	No (%)	Total
I-II	63 (29.4)	243 (34.3)	306 (33.2)
III	112 (52.3)	315 (44.5)	427 (46.3)
IV-V	39 (18.3)	150 (21.2)	189 (20.5)
Total	214 (100.0)	708 (100.0)	922 (100.0)

(X^2=4.07 p= 0.131)

Types of enuresis and its relationship with other variables in the study group

Among the children with nocturnal enuresis, 135 (68.5%) had arousal difficulty, 126 (64.0) had a positive family history of enuresis while 137 (69.5%) belonged to social class III and below. (Table 6)

Table 6: Types of enuresis and its relationship with other variables in the study group

Variables	Types of enuresis Nocturnal n= 197	Diurnal n= 2	Nocturnal/Diurnal n=15
Arousal difficulty			
Yes	135 (68.5)	1 (50.0)	12 (80.0)
No	62 (31.5)	1 (50.0)	3 (20.0)
Positive Family history of enuresis			
Yes	126 (64.0)	-	10 (66,7)
No	60 (30.5)	1 (50.0)	3 (20.0)
DK	11 (5.5)	1 (50.0)	2 (13.3)
Social Class			
I-II	60 (30.5)	1 (50.0)	1 (6.6)
III	102 (51.8)	1 (50.0)	10 (66.7)
IV-V	35 (17.7)	-	4 (26.7)

DK-Don't Know

Enuresis and academic performance

Significantly more pupils without enuresis had excellent academic performance 292(41.2%) versus 47(22.0%). Whereas, more of those with enuresis 23(10.7%) had below average academic performance compared to non enuretics (Table 7).

Table 7: Enuresis and academic performance

Academic Performance	Enuresis Yes (%)	Enuresis No (%)	Total (%)	X^2	p Value
Excellent	47 (22.0)	292 (41.2)	339 (36.8)	26.27	0.000
Very Good	12 (33.6)	233 (32.9)	305 (33.1)	0.04	0.841
Average	72 (33.6)	156 (22.0)	228 (24.7)	11.90	0.000
Below Average	23 (10.7)	27 (3.8)	50 (5.4)	15.41	0.000
Total	214 (100.0)	708 (100.0)	922 (100.0)		

Management of enuresis

Methods of management of enuresis in the study group

None of the subjects presented to the hospital for medical treatment. All the subjects were awaken to urinate at night, though inconsistently. In 89(41.6%) prayers was the form of treatment given (Table 8).

Table 8: Methods of management of enuresis in the study group

Treatment received	No	Percentage (%)
Medical treatment	0	0.0
Prayers	89	41.6
Waking up to urinate	214	100.0
Punishment	42	19.6
Herbs	6	2.8

Discussion

This study shows that the prevalence of enuresis in primary school children aged 6-12 years in PHC is 23.2% and it compares favorably with other studies.[9, 15-16]
Arousal difficulty was reported more frequently in enuretic children in this study and this finding supports results of other studies.[5,17,18,] The sleep patterns of patients with enuresis have been studied extensively but are difficult to interpret because of varying findings.[4] Investigators studying sleep electroencephalography have reported a higher incidence of increased slow brain wave activity in patients with nocturnal enuresis; however this has been considered a none specific finding.[19]

Recent study[20] documented that patients with nocturnal enuresis have difficulties in waking; they do not wake up normally in response to an auditory signal, signifying a relationship between difficulty in arousal and enuresis. Also, Sleep disordered breathing (SDB), is a disorder associated with an abnormality in arousal and nocturnal enuresis. The commonest cause of this condition is adenotonsilar hypertrophy which causes an upper aiway obstruction. Studies have shown that surgical relief of this obstruction by tonsillectomy, adenoidectomy or both improves arousal in these children and also diminish nocturnal enuresis in up to 76 percent of patients. [21]

In keeping with the proposed genetic basis of enuresis, many enuretic children (63.6%) had a positive family history of enuresis compared to 10.9% in the non enuretic family. Several previous studies reported incidence rates of 40-76% of a history of enuresis in families of wet children, in accordance with the result of this study.[5, 13,17-18]

A family history of nocturnal enuresis is found in most children with the condition and a positive history of enuresis in father has been found as a significant predictor of PNE.[14]
Studies have shown that in families where both parents had enuresis, 77% of the children will also have enuresis, if only one parent had enuresis, 44% of children will be affected, and only 15% of children will have enuresis if neither parent had enuresis. [1, 14, 16, 22-23]
Heredity as a causative factor of primary nocturnal enuresis has been confirmed by the identification of a gene marker associated with the disorder, however, different studies have shown different chromosome loci at chromosome 8, 12, 13 and 16 [4,24]

In this study, bedwetting was associated with psychological events such as birth of a new sibling, parental divorce or separation, a death in the family in 45(21.0%) of the enuretic cases. This is well documented in the literature that SNE occur after such personal or familial disturbances [12-13,] in keeping with the findings in the present study. However, in our study, thirty (66.7%) of these children were classified as primary enuresis as the duration of bladder control before the reoccurrence of enuresis was between three and five months, less than the required six months of continuous nighttime bladder control in the definition of secondary enuresis.

Bedwetting has been reported to be more in children from lower socioeconomic class. [1, 9, 22] In this study, 70.6% of bedwetters were of social class III or lower in keeping with other studies,[1,7] but 66.8% of non-enuretics were also from this social class. It is thought that low Socio-economic factors such as unemployed parents, low educational level and professional status of parents, large family size and low family income acts as stressors to the child and therefore affect its rate of developmental milestones achievement.
Enuresis can be a distressing experience for the child and may lead to social isolation, emotional distress, loss of self esteem and poor academic performance.[5-6, 25-26]
This study shows that enuretic children had a poorer school performance than non-enuretic children. The poor academic performance of some of these children is worse as they grow older and has been thought to be due to the emotional stress faced by these children, loss of self esteem, poor social interaction, punitive measures meted out on them or a combination of these factors.

In this study consultation for medical treatment was not used in any of the enuretics, highlighting the need for public health enlightenment, as many believe that nothing can be done medically and they must wait for their child to grow out of it, while others fail to report

enuresis due to the embarrassment it may cause for their child. As in most previous studies, the rates of consultation for the management of enuresis were low all over the world ranging from 0-38%.[4, 5,8,18] The role of prayers on the treatment of enuresis has not been documented, however the spiritual connotation of diseases in the African setting makes prayer an important aspect of treatment. The children were punished in 19.6% of the cases, however, studies have shown that punishment is not entertained in the management of enuresis because they adversely affect the psychological development of the child.[10, 11.] In 6(2.8%) children herbal treatment was given, herbal treatment is not surprising in our setting and involves the use of several non specific herbal preparations which have not been found to offer any help in the treatment of enuresis.

It is concluded from the study that arousal difficulty, positive family history of enuresis, psychological stress and lower socioeconomic status were common risk factors to enuresis. Also, enuretic children were more likely to have a poorer academic performance and traditional methods were commonly used to manage enuresis in PHC.

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