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Original Research Article

To Determine the Prevalence and Identify the Risk Factors of Nocturnal Enuresis among School-Going Children: A Retrospective Study

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Abstract

Aim: To determine the prevalence and identify the risk factors of nocturnal enuresis among school-going children in Darbhanga, Bihar.

Material and Methods: This retrospective study was conducted in the Department of Community Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India from January 2018 November 2018. School going child in the age group of 5 to 15 years and Child and parents ready to participate in the study and responded to the questionnaire were included in this study. A predefined questionnaire, prepared in English and translated to local languages, Hindi, was handed over to all the children attending the selected schools. Children were asked to hand over the questionnaire to their parents and return with the filled questionnaire. The questionnaire was prepared to obtain the information related to the socio-demographic factors of the family, information related to child's age, sex and other factors, frequency of enuresis and information related the risk factors.

Results: So, the response rate was 83.63%. Out of that 657 were from Hindi medium schools and 773 were from English medium schools. The response rate from English medium schools (87.64%) was better than the response rate from Hindi Medium schools (79.35 %). The overall prevalence of nocturnal enuresis was 11.4 %. The maximum prevalence was found in the age group of 8-9 years (22.96 %). The prevalence of nocturnal enuresis in the age group of 7 -8. was 18.92 %. There was only one child suffering from nocturnal enuresis in the age group of 13-14, whereas no child complained of it above the age of 14 years. The differences in the prevalence rates in these age groups were statistically significant. ($\chi^2 7 = 77.65$, $p = 4.15 \times 10^{-14}$). The prevalence of nocturnal enuresis in boys (14.34 %) was significantly more than the prevalence in girls (8.31 %). The odds ratio was 1.85 (95 % confidence interval-1.32-2.59). The prevalence of nocturnal enuresis was more in Hindi medium school as compared with English medium school. Table 4 shows the association of nocturnal enuresis with various socio-demographic and other factors. It shows that the nocturnal enuresis was significantly associated with socio-economic status, stress, poor school performance, sleep pattern (hard to awaken), family history, burning micturition, not going to toilet before bed. But it was not associated with maternal or paternal education, birth order, type of family. A total of 102 (62.58 %) children's parent felt that it was an abnormal condition and consulted any doctor. Remaining 61 parents felt that the nocturnal enuresis or bedwetting is a common and normal phenomenon.

Conclusion: Nevertheless, the study has concluded that the prevalence of nocturnal enuresis is 11.40 % in school going children and it is associated with age, sex, stress, family history, burning micturition, hyperactive child, poor school performance, sleep pattern (hard to awake) avoidance of going to micturate before sleep etc.

Keywords: Burning micturition, Nocturnal enuresis, School going children, Sleep pattern

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Introduction

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 (night time wetting) is more common in boys, whereas diurnal enuresis (daytime wetting) is more common in girls. Nocturnal enuresis is an important developmental problem for

school age children and it can cause emotional and family stress and social isolation for the child. [2,3] Enuresis has no clear etiology; it is hypothesized to be related to genetics, sleep arousal dysfunction, maturational delay, stress, poor toilet training, altered smooth-muscle physiology, and occasionally organic causes. Bedwetting can be diagnosed at 5-year-olds and beyond; clinically, it is generally left untreated until the children are 7-8 years old. [4] There are several forms of enuresis. Primary nocturnal enuresis consists of never having established urinary continence at night, while secondary nocturnal enuresis refers to the development of enuresis after a period of established urinary continence. Mono-symptomatic nocturnal enuresis is defined as bedwetting in the absence of accompanying symptoms of the lower urinary tract, such as urgency, daytime incontinence and urinary flow anomalies. [5]

Material and Methods

This retrospective study was conducted in the Department of Community Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar India from January 2018 November 2018

Inclusion Criteria

- School going child in the age group of 5 to 15 years.
- Child and parents ready to participate in the study and responded to the questionnaire.

Exclusion Criteria

- Child below the age of 5 years and above 15 years
- Did not respond to the questionnaire.

A predefined questionnaire, prepared in English and translated to local languages, Hindi, was handed over to all the children attending the selected schools. Children were asked to hand over the questionnaire to their parents and return with the filled questionnaire. The questionnaire was prepared to obtain the information related to the socio-demographic factors of the family, information related to child's age, sex and other factors, frequency of enuresis and information related the risk factors. The required sample size was calculated by considering the prevalence of nocturnal enuresis as 12.6 % as reported by a study conducted amongst the school going children in Lucknow.[5] With alpha=0.05 and allowable relative error of 10 %, the calculated required sample size was 1360, to estimate the prevalence within 10 % relative error. Nocturnal enuresis was defined if the frequency of enuresis was more than twice per week 17. Nocturnal enuresis was defined as secondary, if the child had attained full control over his nocturnal bladder habits for a continuous period of at least six months. Otherwise, the nocturnal enuresis was defined as primary.

StatisticalA

Univariate analysis was done using appropriate statistical tests like chi-square test, t test etc. Data was analyzed using SPSS 23.

Results

The total number of questionnaires distributed were 1710 in the selected four schools. Out of these 1710 questionnaire distributed, only 1430 completely filled questionnaire were returned.

Table 1: Age wise prevalence of nocturnal enuresis.

Age Group	Nocturnal Enuresis	Percentage	No nocturnal Enuresis	Percentage	Total
5-6	24	15.69	129	84.31	153
6-7	25	17.61	117	82.39	142
7-8	28	18.92	120	81.08	148
8-9	31	22.96	104	77.04	135
9-10	21	14.29	126	85.71	147
10-11	16	11.59	122	88.41	138
11-12	11	7.91	128	92.09	139
12-13	6	3.95	146	96.05	152
13-14	1	0.71	140	99.29	141
14-15	0	0.00	135	100.00	135
Total	**163**	**11.40**	**1267**	**88.60**	**1430**

(χ^2= 77.65, d. f. = 7; p = 4.15 x 10 -14)

Table 2: Sex wise prevalence of nocturnal enuresis.

Sex	Nocturnal enuresis	Percentage	No nocturnal enuresis	Percentage	Total	OR (95% CI)
Boys	105	14.34	627	85.66	732	1.85 (1.32-2.59)
Girls	58	8.31	640	91.69	698	
Total	163	11.40	1267	88.60	1430	

(χ^2= 12.88, d. f. = 1, p = 0.0003)

So, the response rate was 83.63%. Out of that 657 were from Hindi medium schools and 773 were from English medium schools. The response rate from English medium schools (87.64%) was better than the response rate from Hindi Medium schools (79.35 %). The overall prevalence of nocturnal enuresis was 11.4 %. The maximum prevalence was found in the age group of 8-9 years (22.96 %). The prevalence of nocturnal enuresis in the age group of 7 -8. was 18.92 %. There was only one child suffering from nocturnal enuresis in the age group of 13-14, whereas no child complained of it above the age of 14 years (Table 1). The differences in the prevalence rates in these age groups were statistically significant. ($\chi^2 7$= 77.65, p = 4.15 x 10^{-14}). The prevalence of nocturnal enuresis in boys (14.34 %) was significantly more than the prevalence in girls (8.31 %). The odds ratio was 1.85 (95 % confidence interval-1.32-2.59) (Table 2). The prevalence of nocturnal enuresis was more in Hindi medium school as compared with English medium school (Table 3).

Table 3: Prevalence of nocturnal enuresis as per the medium of school.

Sex	Nocturnal enuresis	Percentage	No nocturnal enuresis	Percentage	Total	OR (95% CI)
English	65	8.41	708	91.59	773	0.52 (0.38-0.73)
Hindi	98	14.92	559	85.08	657	
Total	163	11.40	1267	88.60	1430	

(χ^2= 14.89, d. f. = 1, p = 0.0001)

Table 4: Association of nocturnal enuresis with various characteristics.

Nocturnal enuresis							
Characteristic	Yes	%	No	%	Total	OR	P
Maternal education less than graduation	55	12.14	398	87.86	453	1.11 (0.79-1.57)	0.55
Paternal Education less than graduation	32	13.06	213	86.94	245	1.20 (0.80-1.83)	0.37
Below poverty line family	81	13.55	517	86.45	598	1.43 (1.03-1.99)	0.03
Stressful events	35	17.07	170	82.93	205	1.76 (1.17-2.65)	0.005
Hyperactive child	47	17.74	218	82.26	265	1.95 (1.34-2.82)	0.0003
Poor school performance	51	15.79	272	84.21	323	1.67 (1.17-2.38)	0.004
Sleep pattern (hard to awaken)	113	20.14	448	79.86	561	4.13 (2.90-5.88)	<0.0001
Family history in first blood relative	76	28.46	191	71.54	267	4.92 (3.49-6.94)	<0.0001
History of burning micturition	45	36.59	78	63.41	123	5.81 (3.85-8.78)	<0.0001
No habit of going to micturate before bed	71	19.61	291	80.39	362	2.59 (1.85-3.62)	<0.0001
Birth order (first)	79	10.84	650	89.16	729	0.89 (0.64-1.24)	0.495
Type of family (nuclear)	109	11.53	836	88.47	945	1.04 (0.74-1.47)	0.921

Table 4 shows the association of nocturnal enuresis with various socio-demographic and other factors. It shows that the nocturnal enuresis was significantly associated with socio-economic status, stress, poor school performance, sleep pattern (hard to awaken), family history, burning micturition, not going to toilet before bed. But it was not associated with maternal or paternal education, birth order, type of family. A total of 102 (62.58 %) children's parent felt that it was an abnormal condition and consulted any doctor. Remaining 61 parents felt that the nocturnal enuresis or bedwetting is a common and normal phenomenon.

Discussion

The present cross-sectional study was conducted in school going children in the age group of 5 to 15 years to estimate the prevalence of nocturnal enuresis and its determinants. The study has reported that the prevalence of nocturnal enuresis was 11.40%. The reported prevalence was slightly less than the reports of Srivastava et al, who reported it as 12.6%. However, it was more than the reports of De Sousa A et al, who reported it as 7.61 %. [4,5]

The study has also revealed different prevalence rate as reported by various authors from different regions of the world. The prevalence of nocturnal enuresis in this study was lower than the reported studies from Stephanie Gonzalez Mejias and Kamleshun Ramphul (Dominican Republic, 27.9%), Aloni MN et al (Congo, 26%), Iduoriyekemwen NJ et al (Nigeria 21.3%), Bourquia A (Morocco, 35.0%), Järvelin MR (Finland 8.2%), Readett DR (Jamaica 50%). [17-22] However, it was higher than a study from Hansakunachai T et al (Bangkok 3.9%). [23]

The differences in the age groups and different socio- demographic characteristics were the main reasons in these different prevalence rates. The study has shown that the prevalence was more in the age group of 7-9 years. The findings are similar to the findings of Aljefri HM, De Sousa et al and Srivastava S et al. [4,5,12] The study has also reported that with advancing age, the prevalence decreased. The findings of the study, boys are more affected than girls, are also similar to the findings of De Sousa et al, Mithani S et al, Ozden C et al, Pashpour et al. However, the results were not consistent with reports of Yousef KA and Aljefri HM. [4,24,25,26]

The present study has also reported that there was statistically significant association of nocturnal enuresis with stress, family history of enuresis, lower socio- economic status. These findings are consistent with the findings of Chang JW et al and Akis N et al. [27,28] Other risk factors, as reported by this study, such as history of burning micturition, poor school performance is also reported by Srivastava S.[5] The study being a cross-sectional study, cannot comment on the longitudinal nature of spontaneous resolution with increasing age. Also, there was lack of any clinical data. The study was based only on the questionnaire and responses from the parents.

Conclusion

Nevertheless, the study has concluded that the prevalence of nocturnal enuresis is 11.40 % in school going children and it is associated with age, sex, stress, family history, burning micturition, hyperactive child, poor school performance, sleep pattern (hard to awake) avoidance of going to micturate before sleep etc. It has also pointed out that the nocturnal enuresis was not associated with maternal or paternal education, birth order or type of family.

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