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ORIGINAL ARTICLE

Frequency of bedwetting among primary school children in Benha city, Egypt

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KEYWORDS

Bedwetting;
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Abstract *Background:* Nocturnal enuresis (NE), is a distressing experience for children and young people, and successful treatment invariably improves their psychological functioning.

Objectives: The overall objective was health promotion of school children, and the specific objectives were: to determine the frequency and risk factors of nocturnal enuresis (NE) among school children in Qaluobia governorate Egypt, and to examine its associations with behavioral and emotional problems.

Subjects and methods: This study was a cross-sectional study that was conducted during the academic year 2011/2012 on 450 students aged 6–12 years in Qaluobia governorate. A brief questionnaire was distributed to screen the enuretic children (No. 70) who were invited and their parents, after their consent to fill a well-designed questionnaire.

Results: Prevalence of NE was 15.7 %, where primary NE was 67.1%, and the secondary enuresis was 32.9% with a non significant difference ($p > 0.05$). There was a high significant difference among various treatment strategies with the highest applicable one was medications and the least applicable one was the usage of bed alarm as well as physical therapy means. There was a significant decrease in the frequency of NE by aging with the highest rate by the age of 6 years and the lowest by 12 years where it declined markedly. Positive family history was 30% among the involved students.

Conclusion: The prevalence of NE in Qaluobia governorate is slightly higher than some other areas of the world. The frequency of enuresis declines by aging process. The primary as well as

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the secondary enuresis is common among the selected age group. The different strategies of treatment for nocturnal enuresis play an important role in relieving such complaint, and positive history of enuresis through the family may worsen the problem of enuresis.

1. Introduction

Bed-wetting is defined as the involuntary voiding of urine during nighttime sleep in the absence of defects of the central nervous system or urinary tract in a child aged 5 years or older. It is estimated that 6 million children wet the bed annually in the United States. The condition occurs in 15% of 5-year-old, 5% of 10-year-old, and 1% of 13-year-old children. Without treatment, 15% of children stop bed-wetting annually. The prognosis for bed-wetting is usually spontaneous resolution; however, 1% of these cases are resistant to all treatment modalities [1].

Primary nocturnal enuresis (PNE) consists of never having established urinary continence at night, while secondary nocturnal enuresis (SNE) refers to the development of enuresis after a period of established urinary continence. Nocturnal enuresis, also called bed-wetting, happens during the night while the child is sleeping [2].

In most cases the cause of bed-wetting is unknown. Examination by a medical doctor should always be the first step in ruling out any underlying illnesses or conditions such as diabetes, urinary-tract infection, abnormalities in the urethral valve in boys or the ureter in girls, and abnormalities in the spinal cord [3,4].

Parents and family members are frequently stressed by child's bedwetting. Soiled linens and clothing cause additional laundry. Wetting episodes can cause lost sleep if the child wakes and/or cries, waking the parents. An European study estimated that a family with a child who wets nightly will pay about $1000 a year for additional laundry, extra sheets, disposable absorbent garments such as diapers, and mattress replacement. Despite these stressful effects, doctors emphasize that parents should react patiently and supportively [5].

Treatment for enuresis relies on a thorough assessment of the individual child. Children should be seen by a family physician to see if special testing is necessary. If the child has no medical or emotional problems, which is the case in approximately 90% of the time, there is a very good chance that he/she will eventually outgrow the problem, even without treatment. If the bed-wetting child is older than six or seven, the physician may suggest a few treatment options since bed-wetting may cause embarrassment [6]. Traditional treatment of enuresis includes medication and behavioral therapy. There is not a ''best'' treatment per se for bed-wetting. Treatment should be designed around the needs of the child and the resources of the family [7,8].

Sometimes using a variety of treatment methods simultaneously is necessary to eliminate the bed-wetting behavior. Combination therapy is often more effective than single treatments, especially when previous individual treatments have not proven effective. Such combinations may include positive reinforcement and individual counseling, or positive reinforcement and the enuresis alarm [9].

The aim of this study is to evaluate the frequency of bed-wetting among children aged 6–12 years in Benha city, as well as identifying the risk factors associated with such problems among children in this area.

2. Subjects and methods

The study was a community-based cross sectional, retrospective study. Through using a multistage stratified random sampling technique, the study was conducted in primary school children. They were selected from Benha city in Qaluobia governorate, representing the urban and rural areas.

2.1. Subjects

The sample size was 450. Students were selected by a stratified random sampling technique. The objectives of the study were explained to the local educational authorities who gave the permission to carry out the survey. The work has been carried out in accordance with the code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans, and parents filled approval consent to share in our study.

2.2. Tools of the study

i – A preliminary brief questionnaire (questionnaire No. 1) for screening of enuretic children of NE who suffer from at least one wet night per month for three consecutive months. ii – A full questionnaire (questionnaire No.2) for collection of information concerning: a – Personal data such as age, sex, residence, socio-economic level of the child, and the family income. b – Frequency of wetting of the affected children, constipation, previous treatment modalities, family history of wetting, and whether the child was embarrassed by his wetting or not.

2.3. Procedures

The preliminary brief questionnaire was distributed to all selected students within sealed envelopes in order to avoid embarrassment of the children, and they were asked by their teachers to take it home to their parents.

2.4. Statistical analysis

It was carried out using SPSS statistical program (Statistical Package for Social Sciences) for data entry and analysis. Chi-square test and a significant p-value were considered positive if less than 0.05.

3. Results and discussion

As revealed from statistical analysis; the age group from 6 to 7 years represented 44 children (62.9%), the age 8–9 years

represented 18 children (25.7%), and the age 10–12 represented 8 children (11.4%) in the current study. By considering the wet nights/week, children wetting the bed 1–3 times/week were 30 (42.9%), those wetting the bed 4–5 times/week were 23 (32.9%), and those wetting the bed 6–7 times/week were 17 (24.2%). Family troubles were found in 25 children (35.7%) and absent in 45 children (64.3%) as shown in Table 1 and Figs. 1–3.

The statistical analysis of factors associated with enuresis revealed that; urinary tract infection was found to be 75% among secondary enuretic children while it was 25% among primary enuretic children as it was shown by urine analysis, constipation was found to be 33.3% and 66.7% among secondary and primary enuretic children respectively, while deep sleeping was found to be 5.3% and 94.7% among secondary and primary enuretic children respectively as revealed in Table 2 and Fig. 4.

As shown in Table 3 and Fig. 5; the statistical analysis of parent's reaction toward enuresis and their residence, the results clarified that; the most common response in urban as well as in rural areas was consulting a physician which was found to be 48.8% in urban areas and 51.2% in rural areas with a non significant difference ($p > 0.05$).

4. Discussion

NE is a common health problem among Egyptian children, as in many other populations [7]. The frequency of nocturnal enuresis among the selected children in our study was found in 15.5%.

Such result comes in parallel with the work carried out in Saudi Arabia who mentioned that; the prevalence of nocturnal enuresis among school aged children was reported in 15% [10]. These results are nearly similar to the results of another study carried out in Turkey on 7–11 years old children, which accounted for 14% [11]. The prevalence of nocturnal enuresis was, reported to be 9.2% in South Korea on 12,570 children aged 7–12 years [12]. In a research performed in Pakistan the prevalence of nocturnal enuresis was 10% [13]. Also our results are supported by another study carried out in Wisconsin, USA [14] which reported a prevalence rate of 17.5% among children of 5–12 years old. This result comes in parallel with another Egyptian one carried out in Assiut city, and reported a prevalence rate of 17.8% among children of 5–12 years old joining a primary governate school, and such relative high value might be due to the low age involved in that study [15]. Also the work performed by Ghahramani and his co-workers reported that the prevalence of NE among primary school children in Iran was 17.5% [16]. Such differences among countries are correlated with the chosen age group, racial, environmental, socioeconomic conditions, and cultural differences among countries.

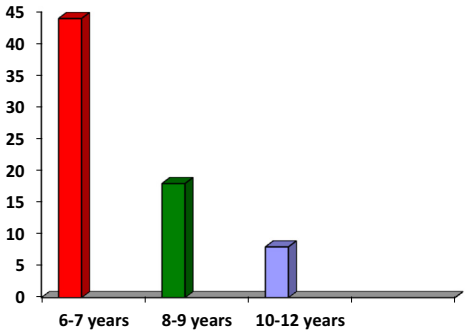

Figure 1 Frequency distribution of age among the selected cases.

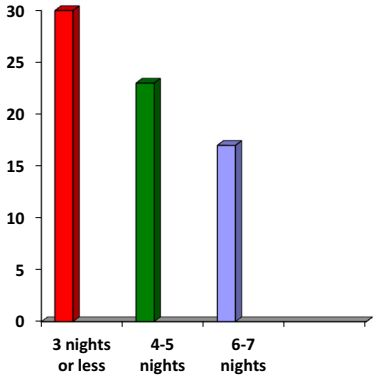

Figure 2 Frequency distribution of wet nights per week among cases.

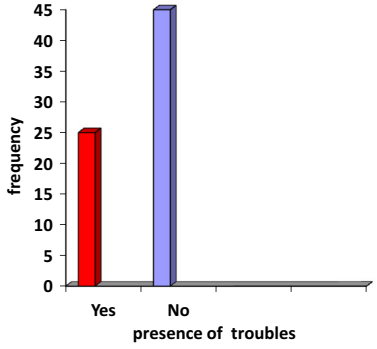

Figure 3 Cases according to the presence of family troubles.

The current study showed that, there was no difference among boys and girls as NE was 16.1% among females and 14.1% among males, and such results were parallel with another Egyptian study in Assiut city [15]. Another Egyptian study carried out in Menoufia governorate approved that gender did not have a significant effect on the prevalence of enuresis [17]. A Chinese study reported that the prevalence

Table 1 Frequency distribution of age, family troubles, and wet nights per week among the selected cases.

	Age/years			Nights/week			Family troubles	
	6–7	8–9	10–12	1–3	4–5	6–7	Yes	No
No.	44	18	8	30	23	17	25	45
%	62.9	25.7	11.4	42.9	32.9	24.2	35.7	64.3

Table 2 Factors associated with enuresis.

	Secondary		Primary		Total		*Z*	*p* Value
	No	%	No	%	No	%		
Nothing	0	0	30	100	30	100	–	–
UTI	9	75	3	25	12	100	10.8	0.04
Constipation	3	33.3	6	66.7	9	100	9.1	0.05
Deep sleep	1	5.3	18	94.7	19	100	18.3	0.001
Total	13	18.6	57	81.4	70	100	15.5	0.001

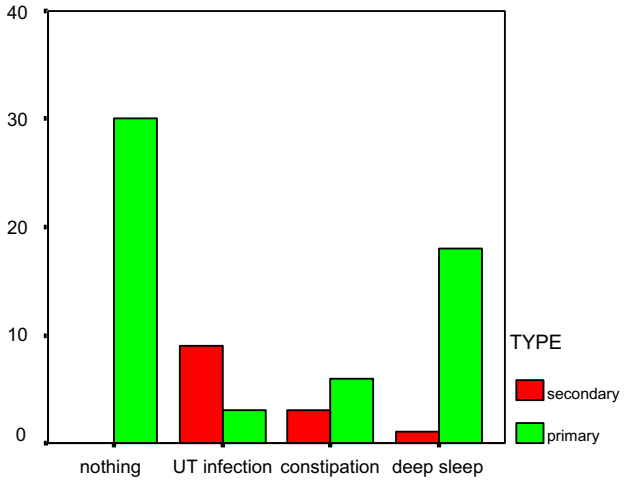

Figure 4 Factors associated with enuresis.

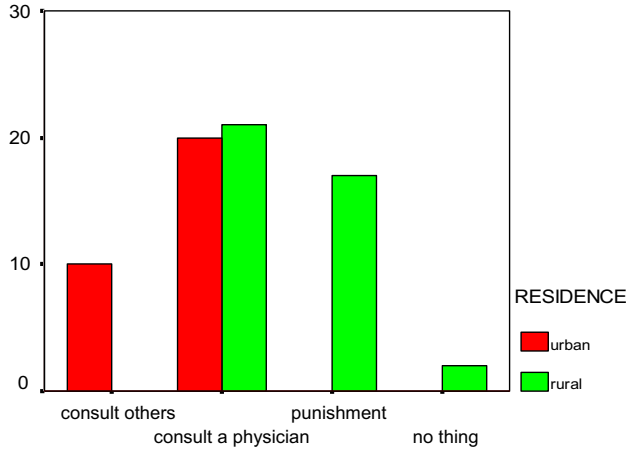

Figure 5 Cases according to the relation between parental dealing toward enuresis and the residence.

of enuresis was not significant among males and females [18]. On the other hand these results were not in accordance with a study performed in Turkey which mentioned that male predominance was detected in 16.9% while it was 10.6% for girls [11] and another study in Malaysia which showed that, enuresis was more common in boys 18.2% than in girls 13.4 % [19].

The present study also demonstrated that NE is more common among low social class (61.4%) and among offspring of non working mothers (57.1%) with a significant difference ($p < 0.05$). Such results correlated with work carried out in Assiut city [15] which mentioned that, the prevalence of enuresis is significantly lower among children with high socioeconomic status (11.7%) than those of low socioeconomic status (32.4%) ($P < 0.05$). Also the work of Caldwell et al. [20] mentioned that low socioeconomic status has been found to be a risk factor for the development of wetting problems and in spite of this high risk condition there was no significant difference between low and high socioeconomic levels ($p > 0.05$), which is not consistent with our results.

Our study revealed that the frequency of NE decreases markedly as the age increases, as it was 62.9% at the age of 6–7 years, 25.7% at the age of 8–9 years, and 11.4% at the age of 11–12 years. These results are in accordance with another study which mentioned that; the condition, generally resolves spontaneously with age at a rate of 15% annually till the age of 6 years; but for some children it persists into adolescence. By age 12 prevalence falls to 4–8% among adolescents, and only about 1–3% continues to wet the bed [21,22]. Also this comes in agreement with a study done in Korea, and approved that the prevalence of enuresis declined from 20.4% in 7-year-old to 5.6% in 12 year-old children [12]. Also our results are supported by another Egyptian study, which mentioned a gradual decline in the prevalence of NE from 17.4% at 6–8 years old to 7.6% at 12–15 years old children [17].

Table 3 Cases according to the relation between parental dealing toward enuresis and the residence.

	Urban		Rural		Total		*Z*	*p* Value
	No	%	No	%	No	%		
Consult others	10	100	0	0	10	100	–	–
Consult a physician	20	48.8	21	51.2	41	100	0.218	0.41
Punishment	0	0	17	100	17	100	–	–
Nothing	0	0	2	100	2	100	–	–
Total	30	42.9	40	57.1	70	100	1.523	0.064

The frequency of primary NE represented the majority among cases (81.4%), while secondary NE represented 18.6%, and such results are on line with another Egyptian study carried out in Menoufia and mentioned that; the prevalence rate of primary enuresis in children was found to be more common than secondary enuresis [17]. Also it is supported by the work done on Jamaican primary school children where primary NE is 52% [23], in Saudi Arabia 15% [10], in France 12.95% [24], in Chinese 4.3% [25].

The current study focused on the frequency of wetting times per week. We found that, 42.9% urinate 3 nights or less per week, 32.9% urinate 4–5 nights/week and 24.2% urinate 6–7 nights/week, and this result is consistent with a study carried out in Karachi [13] where 30% of the NE children wet the bed every night, and in Turkish children where [3] 33.3% of enuretics wet the bed every night. On the other hand our results are not consistent with another study which reported that 3% wet the bed more than twice a week [26].

The analysis of the present study focused on the presence of family troubles of NE cases as an effective social and psychological issue affecting the epidemiology of nocturnal enuresis. Among our families 35.7% suffer from family troubles. The same was also reported by Carman et al. [27], who mentioned that there is a close relationship between disturbed family environment and the frequency of enuresis, and this prevalence is 29.4% among disturbed families. On the other hand these results are not in agreement with another study in Assiut city, Egypt [15], where there was no significant difference between the enuretics and non-enuretics as regards family troubles (parents are living together or not).

In our study we focused also on constipation, sleep disorders, and infection as major factors associated with NE. Fifty-two percent of the children had no associated factors and 47.4% revealed associated factors. Constipation is one of these factors affecting 33.3% and 66.7% of secondary and primary enuresis respectively with a significant difference ($p < 0.05$). This result is in parallel with the work of Neveus et al. [28] who mentioned that approximately 15–30% of children who wet the bed will also have constipation, and McGrath et al. [29] reported that prevalence of constipation was 27.6% among children with nocturnal enuresis. It is important therefore to ensure optimal function of the bowels and bladder before starting treatment for nocturnal enuresis, as reported by other studies. Excessive stool in the colon can affect bladder capacity and cause the sensation of a full bladder. Relief of constipation has been shown to reduce the incidence of enuresis as well as symptoms of daytime urgency [30].

Our results clarified that urinary tract infection (UTI) is a common problem among NE children. The current work results revealed that; 75% of UTI cases were among secondary enuresis, while 25% were among the primary type with a non significant difference ($p > 0.05$). This infection manifested as drippling, frequency, burning micturition, and urgency was confirmed by urine analysis and culture. Urinary tract infection is a common cause of NE and is associated with 11% of NE children [22,30]. Also this result correlates with other studies [31,32], which confirmed that UTI is more strongly connected with secondary nocturnal enuresis and with daytime wetting. Less than 5% of all bedwetting cases are caused by infection or disease, the most common of which is the urinary tract infection.

In our study deep sleep was one of the associated problems of our patients with NE. Sleep problems (deep sleep) were found in 94.7% of primary enuresis cases and 5.3% of secondary enuresis cases with a significant difference ($p < 0.05$). The roles of sleep and arousal in cases of nocturnal enuresis have shown that enuresis occurs at all stages of sleep, not just the deepest stage. It is child's inability to be aroused by the sensation of a full bladder or, if aroused, to hold urine long enough to get to the bathroom that contributes to bed wetting [33]. Defects in sleep arousal have also been associated with bedwetting [34].

In our work, by correlating the residence of cases with parent's response, we found that; the majority of parents (48.8%) in urban areas and 51.2% in rural areas, reported that they asked for medical help in solving such problems by visiting a physician with statistically significant difference ($p < 0.05$), and 24.3% deal with the problem by punishment. In Australia 34% of families of children with bedwetting asked professional help [29]. In Karachi, Pakistan, only 54% of children asked help for their problem [13] .In Iran 90% of parents visit the physician seeking for medical help and such high ratio suggests a high level of concern among parents [35,36]. The attitudes of the child and parents to bedwetting (desire and motivation to change) influence the likelihood of treatment success. In contrast to our results other studies mentioned that; only 6.08% of parents visited a physician and received professional help [37,38].

5. Conclusion

Enuresis is a pediatric public health problem that is associated with smaller age, low socioeconomic factors, low educational level, family history of enuresis, history of urinary tract infection and GIT troubles in addition to a lot of emotional and psychological problems. It leads to low self-esteem, some secondary psychological problems and low school success.

6. Recommendations

NE in children is an alarming complaint that needs proper evaluation and proper management. From the results of the current study the following is recommended:

- Programs for raising parent awareness regarding nocturnal enuresis.
- Routine medical examination and laboratory investigations of children for early evaluation of the problem and proper treatment of such cases.
- Gastro-intestinal tract evaluation should be in mind during management of a child with NE.
- Pelvic floor exercises should be done and the child had to be aware of pelvic floor muscle action.
- Parent's reaction toward the child should be supportive and encouraging him to pass this state.

Conflict of interest

The authors declare no conflict of interest. There is no financial and personal relationship with other people or organizations that could inappropriately influence their work.

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