Original Research Article

Socio Behavioral Factors Associated with Nocturnal Enuresis among Primary School Children in Abo Homous, Elbehira, Egypt

Abstract

Background: Nocturnal enuresis (NE) is intermittent urinary incontinence during sleep at children aged five years old or more after exclusion of organic diseases. NE has a negative impact on life quality of children and their families. The aim of this work was to find out the prevalence of nocturnal enuresis and its socio-behavioral risk factors among primary school children in Abo Homous, Elbehira, Egypt.

Methods: This cross sectional study was carried-out in Abo Homos, Elbehira governorate. It included (106) primary schools with total number of (65,045) students distributed over 52 urban and 54 rural schools. Data were collected via a predesigned self-administered questionnaire sheet; part 1: Questions related to students as [Age, gender, demographic and student characteristics, student's diseases], part 2 [Questions to assess familial factors] and part 3 [Question to assess criteria of NE in the studied population].

Results: The prevalence of nocturnal enuresis was 13.9%. Nocturnal enuresis was observed more in younger age groups of 6 and 7 years 23.2% & 21.2% respectively. There was no statistically significant association as regard age, gender or residence. Urinary tract infection, constipation, and caffeine beverages consumption significantly associated with NE. Family history of NE was positive in 29.1% of cases. Deep sleep and exposure to school or home (problems/violence) related significantly with occurrence of NE. Level of education and work status of parents, number of persons per room, and socioeconomic status significantly associated with occurrence of NE.

Conclusions: Prevalence of nocturnal enuresis is significantly associated with younger age, urinary tract infection, constipation, and caffeine beverages consumption, deep sleep, exposure to school or home (problems/violence), level of education and work status of parents, number of persons per room, and socioeconomic status.

Keywords: Socio Behavioral, Nocturnal enuresis, Primary School, children.

Introduction:

One of significant milestones of childhood development is the development of urinary continence, during day and night. Most children gain bladder control between the ages of 4 and 7 years. Any type of wetting episode that occurs in distinct amounts during sleep is called nocturnal enuresis, regardless of the presence or absence of daytime symptoms or any other symptoms that may exist [2 ,1]

The current categorization of the International Childhood's Continence Society (ICCS) classifies nocturnal enuresis into monosymptomatic (MNE), when there is a bed wetting without other lower urinary tract (LUT) symptoms, and non-monosymptomatic (NMNE), when bed wetting accompanied by LUT symptoms such as urgency, frequency, or diurnal urinary incontinence[3] .

Nocturnal enuresis (NE) also classifies according to (ICCS) regarding to its onset, to primary NE and secondary NE. The primary NE (PNE) when there are, children with NE have never attained urinary control for a period of at least 6 consecutive months. While, secondary NE (SNE) disorders occur after the child has developed a period of at least six consecutive months of urinary control [4, 5].

Nocturnal enuresis was thought to be a result of psychological condition but now it appears that psychological problems are the result of enuresis and not the cause. NE impacts children's psychology and trigger a variety of emotional and behavioral issues, such as anxiety, inferiority, irritability, social failure, and a failure to participate in group activities. The perception of their own place in society is reflected in the children's self-concept [6, 7].

Parental attitudes toward a child's bedwetting can play an important role in effective treatment and the reduction of negative effects. Parental perceptions for their child's enuresis have had a positive impact on parental behaviors and adjustment. As a result of their lack of understanding of the issue and their stress, parents often become intolerant and punish their

children. Enuretic children were found to have a high rate of punishment, whether it was verbal or physical [7, 8].

The pathogenesis of NE is multifactorial etiologies, which include psychological and physiological aspects of NE is most likely a multifactor condition triggered by a mixture of these etiologies so, it difficult to identify the pathogenesis accurately [9].

Prevalence of NE in Egypt has not been exactly determined due to under reporting. In Egypt, NE overall prevalence among school children have not been established yet but individual studies across different governorates estimated a prevalence ranging from 8.3% to 18 % [4, 6].

Nocturnal enuresis has a significant negative impact on children's self-esteem and academic performance. Treatment that worked tended to improve physical strength and overall self-esteem.

The aim of this work was to find out the prevalence of nocturnal enuresis and its socio-behavioral risk factors among primary school children in Abo Homous, Elbehira, Egypt.

Patients and Methods:

This cross sectional study was carried-out in Abo Homos, Elbehira governorate after approval by the council of Public Health Department in July 2019 and lastly from the University Council in September 2019. It included (106) primary schools with total number of (65045) students distributed over 52 urban and 54 rural schools. Approval of the ethical committee of Tanta Faculty of Medicine was obtained before conducting the study. Subjects were informed about the purpose, procedure of the study and benefits of sharing in it and that all collected data will be used only for scientific purposes.

All students from 6 to 11 years old both males and females were included.

Students with proved organic or neurological disease were excluded.

Pilot study: A pretest was carried out before starting data collection including 20 students of the target population with the following objectives: to test and evaluate the adequacy and validity of the designed questionnaire, to estimate the time needed for filling the questionnaire and assessment of each student or his/her parents and to determine the potential obstacles that might be met with during the execution of the study.

Feedback: Some questions of the questionnaire were added, and others were deleted or rephrased. The time needed for filling the questionnaire ranged from 5to10 minutes.

Validity and Reliability:

The study tools were tested for is content and face validity by jury test of three experts from Public Health and Community Medicine Department of Tanta Faculty of Medicine to evaluate the individual items as well as the entire tool as being relevant and appropriate to test what they wanted to measure.

The face validity of the questionnaire was calculated based on experts' opinion after calculating content validity index (%) of its items and it was 82% [10]

The results of this pretest were not included in the final results.

Data were collected via a predesigned self-administered questionnaire sheet (Appendix 1) that was constructed after review of literature [11] and consisted of three parts:

Part 1: Questions related to students as: 1) Age and gender, 2) Demographic characteristics as; birth order, siblings' number, socio-economic status and number per room, 3) Student characteristics as; sleep, tea / caffeinated drink consumption (and frequency), home (problems\ violence), school (problems\ violence), school performance, drinking water before going to bed, exposure to stressful events, stubbornness, easily distracted, delaying (speech and motor development), 4) Student's diseases as; chronic constipation, respiratory tract problems, pinworm infestation, frequent urinary tract problems and complaining of lower urinary tract symptoms.

Part 2: Questions to assess familial factors as; positive family history, living parents, education level and parents working were included.

Part 3: Question to assess criteria of NE in the studied population as; bed wetting time, Frequency of bed wetting, waking up to go to the toilet while still dry, child had dry period > 6 months after the age of 5 years, waked up to go to the toilet while still dry, waking up after wetting, wetting more often in stressful times and if NE bother child or family.

Data collection: Data were collected anonymously**, t**he researcher used to go to urban and rural school on average once or twice a week and distribute nearly 100-150 questionnaires for about four months, and every visit she received about 60 to 70 fulfilled questionnaires.

II - Operational design: Preparatory phase [Writing and ethical approval of the Protocol of the study: (from March 2019 till June 2019). The protocol was prepared and submitted for approval of the Ethical Committee of the Faculty of Medicine, Tanta University in June 2019, choosing of the tools of the study: (from March 2019 till June 2019), submission for University Council approval: (from July 2019 till September 2019)]

Preliminary visits: (through October 2019): Preliminary visits were carried out to the Directorate of Abo Homous and the selected governmental primary schools to determine the number of school children and to orient relevant personnel about objectives and procedures of the study and to get their cooperation, help and support.

Pretesting: (through October 2019): A pretest was carried out before starting data collection.

III-Administrative design: Communication with the directors of Governmental schools in Abo Homous was done to orient them with the objectives and the procedures of the study and to get their co-operation and help.

Confidentiality and privacy were guaranteed during the whole period of the study.

Sample size was calculated using Epi-info software created by Center for Disease Prevention and Control, Atlanta USA Version 7.2.3.0. The level of significance was decided at 95%,

absolute precision of 3%, estimated prevalence of 18% [10], in a population of 65045 primary school children and assuming 30% non-response rate, the minimal sample size was calculated to be 811 students. For more accuracy, 1000 students were included in the study.

Sampling: Two stage random sampling. Firstly, one urban and one rural school were selected randomly. In the second stage, students were selected randomly from each grade from the 1st to the 6th in both schools according to their weight till fulfilling the required sample size.

Statistical analysis

The collected data were coded, entered, tabulated and presented according to their type using IBM SPSS software package version 20 (Statistical Package for Social Sciences of IBM Corporation version 20, SPSS Inc. Chicago, IL, USA). Statistical analysis was done using the appropriate tests of significance according to the type of data. Qualitative data were presented as number and percentage. Chi-square test was used for comparing between groups and when inappropriate, it was replaced by Monte Carlo exact test. The level of significance was considered at p value < 0.05 for interpretation of results of tests of significance.

Results:

There was no statistically significant difference between the two groups as regard age, gender or residence.

Also shows distribution of nocturnal enuresis cases according to some demographic and socioeconomic characteristics of studied school children. As regard the birth order, the highest frequency of NE cases 50.3% was observed in children having $3^{rd}/4^{th}$ birth order followed by those having $1^{st}/2^{nd}$ birth order 44.4%. Although, the difference was statistically significant concerning the sibling number, the highest frequency NE cases 70.2% was observed in children having 2-3 sibling followed by those having 3–4 sibling. On other hand, the highest frequency of NE cases 50.3% regarding socioeconomic level was observed in those with low socioeconomic level followed by those with moderate socioeconomic level 39.1% and lastly, those with high socioeconomic level 10.6%. The difference was statistically significant between two groups. Concerning number of persons per room, the highest frequency of NE cases 61.6% was observed in those with 3-4 persons per room followed by

those with1-2 persons per room 35.8% and only 2.6% for those with 5-6 person per room. There were statistically significant differences between two groups regarding number of persons per room.

Also shows distribution of nocturnal enuresis cases according to some behavioral and developmental risk factors of studied school children. As regard the sleeping depth, the highest frequency of NE cases 55.6% was observed in children with deep sleep followed by those with light sleep 44.4%. Although, the difference was statistically significant concerning the stubbornness the highest frequency NE cases 50.3% was observed in children with stubbornness. On other hand, the highest frequency of NE cases 81.5% and 91.4% was observed in those didn't have easily distracted and delaying speech and motor development respectively. The differences were statistically significant between two groups. **(**Table 1**)**

Table 1: Distribution of studied school children according to age, gender, residence, some demographic and socioeconomic characteristics, some behavioral and developmental risk factors of studied school children.

Variables	Total (N = 1085)				X^2	p value
	With NE n=151 (13.9%)		Without NE n=934 (86.1%)			
	n	%	N	%		
Age (years)						
6-	35	23.2	190	20.3	3.195	0.670
7-	32	21.2	162	17.3		
8-	25	16.6	163	17.5		
9-	27	17.9	170	18.2		
10-	16	10.6	130	13.9		
11+	16	10.6	119	12.7		
Gender						
Males	69	45.7	457	48.9	0.544	0.483
Females	82	54.3	477	51.1		
Residence						
Urban	66	43.7	443	47.3	2.059	0.161
Rural	85	56.3	491	52.5		
Birth order					14.386	**0.001***
1st/2nd	67	44.4	542	58.0		
3rd/4th	76	50.3	375	40.1		
5th/or more	8	5.3	17	1.8		
Sibling number					35.356	**<0.001***
0–1	20	13.2	214	22.9		
2–3	106	70.2	677	72.5		
4 or more	25	16.6	43	4.6		
Socioeconomic level					15.623	**<0.001***
High	16	10.6	180	19.3		
Moderate	59	39.1	431	46.1		

Low	76	50.3	323	34.6		
Number of persons/ rooms					20.261	**<0.001***
1–2	54	35.8	499	53.4		
3–4	93	61.6	429	45.9		
5–6	4	2.6	6	0.6		
Sleeping depth					21.456	**<0.001***
Deep	84	55.6	243	26.0		
Light	67	44.4	691	84		
Stubbornness					72.274	**<0.001***
Yes	76	50.3	176	18.8		
No	75	49.7	758	81.2		
Easily distracted					27.092	**<0.001***
Yes	28	18.5	58	6.2		
No	123	81.5	876	93.8		
Delaying speech and motor development					11.971	**0.002***
Yes	13	8.6	27	2.9		
No	138	91.4	907	97.1		

X^2: Chi square test, *: significant as p value < 0.05.

Table (2) shows distribution of nocturnal enuresis cases according to some psychological risk factors of studied school children. As regard the home problems\ violence 39.7% was observed in children with NE. Although, the difference was statistically significant concerning school problems\ violence with frequency 35.1% was observed in children with NE. On other hand, the highest frequency of NE cases 42.4% regarding school performance was observed in those with bad school performance followed by those with moderate school performance 39.7% and lastly, those with good school performance 17.9%. The difference was statistically significant between two groups. Concerning exposure to stressful events with frequency 31.8% was observed in children with NE. There was statistically significant difference between two groups regarding.

Also shows distribution of nocturnal enuresis cases according to drinking habits of studied school children. As regard tea / caffeinated drink consumption 62.3% was observed in children with NE. Although, the difference was statistically significant concerning drinking water before going to bed with frequency 61.6% was observed in children with NE. Frequency of consumptions/ day in children with NE group had a mean value of 3.01±0.886 while in children without NE had a mean value of 2.32±0.763. **(**Table 2**)**

Table 2: Distribution of studied school children according to school performance, some psychological risk factors and drinking habits of studied school children

Variables	Total (N = 1085)				X^2	p value
	With NE n=151 (13.9%)		Without NE n=934 (86.1%)			
	n	%	n	%		
Home problems\ violence					89.190	**<0.001***
Yes	60	39.7	98	10.5		
No	91	60.3	835	89.5		
School problems\ violence					55.382	**<0.001***
Yes	53	35.1	110	11.8		
No	98	64.9	824	88.2		
School performance					8.129	**0.017***
Good	27	17.9	249	26.7		
Moderate	60	39.7	407	43.6		
Bad	64	42.4	278	29.8		
Exposure to stressful events					68.455	**<0.001***
Yes	48	31.8	79	8.5		
No	103	68.2	855	91.5		
Tea / caffeinated/sugary drink consumption					58.995	**<0.001***
Yes	94	62.3	282	30.2		
No	57	37.7	652	69.8		
Drinking water before going to bed						
Yes	93	61.6	188	20.2	116.223	**<0.001***
No	58	38.4	745	79.8		
Number of consumptions/days	3.01±0.886		2.32±0.763		t = -10.070	**<0.001***

X^2: Chi square test, *: significant as p value < 0.05.

Table (3) shows distribution of nocturnal enuresis cases according to presence or absence of co-morbid conditions. As regard the chronic constipation, 21.9% of children group with NE complaining of chronic constipation, 13.2% had respiratory tract problems and 20.5% had parasitic infestation. There were statistically significant differences between two groups regarding co-morbid conditions except parasitic infestation has no statistically significant difference.

Also shows distribution of nocturnal enuresis cases according to presence or absence of urinary tract problems. Frequency of 25.8% of children group with NE had past history of urinary tract problems and 29.1% had concurrent lower urinary tract symptoms most of them 54.5% were complaining of urgency and dysuria followed by straining and frequency. There were statistically significant differences between two groups. **(**Table 3**)**

Table 3: Distribution of studied school children according to presence or absence of co-morbid conditions and urinary tract problems.

Variables	Total (N =1085)		X^2	p value
	With NE n=151 (13.9%)	Without NE n=934 (86.1%)		

	n	%	n	%		
Chronic constipation					50.099	**<0.001***
Present	33	21.9	50	5.4		
Absent	118	78.1	884	94.6		
Respiratory tract problems					7.773	**0.008***
Present	20	13.2	63	6.7		
Absent	131	86.8	871	93.3		
Parasitic infestation					3.138	**0.090**
Present	31	20.5	139	14.9		
Absent	120	79.5	795	85.1		
Past history of urinary tract problems					65.308	**<0.001***
Present	39	25.8	55	5.9		
Absent	112	74.2	879	94.1		
Concurrent lower urinary tract symptoms					81.708	**<0.001***
Absent	107	70.9	877	93.9		
Present	44	29.1	57	6.1		
Urgency	24	54.5	40	70.2	1.931	0.210
Dysuria	24	54.5	22	38.6	2.547	0.158
Straining	23	52.3	40	70.2	3.392	0.097
Frequency	23	52.3	20	35.1	3.000	0.106
Interrupted stream	3	6.8	17	30.4	8.533	**0.005***
Other	8	18.2	5	8.9	1.865	0.233

X^2: Chi square test, *: significant as p value < 0.05.

Table (4) shows distribution of nocturnal enuresis cases according to presence or absence of suspected familial risk factors. As regard positive family history of NE, the highest frequency 29.1% was observed in children having NE. Although, the difference was statistically significant concerning person with +ve family history, the highest frequency NE cases 56.8% was observed in children having mother positive history followed by those having sibling positive history of NE 34.1%. The highest frequency of NE cases 92.7% regarding living with was observed in those living with both parents and there was no statistically significant between two groups. There were statistically significant differences between two groups regarding positive family history of NE. **(**Table 4**)**

Table 4: Distribution of studied school children according to presence or absence of suspected familial risk factors.

Variables	Total (N =1085)				X^2	p-value
	With NE n=151 (13.9%)		Without NE n=934 (86.1%)			
	n	%	n	%		
Positive family history of NE					69.398	**<0.001***

Yes	44	29.1	66	7.1		
No	107	70.9	867	92.9		
Person with +ve family history	29.1**%**		7.1**%**			
Father	4	9.1	3	4.5	19.144	**<0.001***
Mother	25	56.8	13	19.7		
Sibling	15	34.1	50	75.8		
Living with						
Both parents	140	92.7	892	95.5		
Father	6	4.0	11	1.2	6.707	0.082
Mother	3	2.0	21	2.2		
Others	2	1.3	10	1.1		

X^2: Chi square test, *: significant as p value < 0.05.

Table (5) shows characteristics of nocturnal enuresis in the studied school children. As regard the bed wetting time, the highest frequency of NE cases 62.9% was observed at night time. On other hand, the highest frequency of NE episodes 39.1% was 1-3time / week followed by 23.8% once / week then 23.2% 4-5time / week and lastly 13.9% wetting bed daily.

More than half of children had dry period > 6 months after the age of 5 years 56.3% while 35.1% waking up to go to the toilet while still dry and (29.8%) waking up after wetting finally 18.5% wetting more often in stressful.

As regard NE bother the parents and children show that 31.1% and 46.4% were with sever bother to parents and children respectively. **(**Table 5**)**

Table 5: Characteristics of nocturnal enuresis in the studied school children

Variable	**Cases with NE n=151(13.9%)**	
	n	**%**
Bed wetting during		
Day	8	5.3
Night	95	62.9
Both	48	31.8
Frequency of bed wetting:		
Once/ week	36	23.8
1-3 times / week	59	39.1
4-5 times / week	35	23.2
Daily	21	13.9
Child had dry period > 6 months after the age of 5 ys		
Yes	85	56.3
No	66	43.7
Waking up to go to the toilet while still dry		
Yes	53	35.1

No	98	64.9
Waking up after wetting		
Yes	45	29.8
No	106	70.2
Wetting more often in stressful		
Yes	28	18.5
No	123	81.5
Bother the parents		
No	22	14.6
Mild	36	23.8
Moderate	46	30.5
Sever	47	31.1
Bother the child		
No	17	11.3
Mild	36	23.8
Moderate	28	18.5
Sever	70	46.4

Discussion

Nocturnal enuresis (NE) is a common non-organic "functional" disorder in children. Nocturnal enuresis is intermittent urinary incontinence during sleep at children aged 5 years old or more after exclusion of organic diseases [12, 13].

As regard age and sex, a study conducted in South Egypt revealed that the frequency of NE was relatively higher in the younger age groups compared to the older ones. It also revealed a non-significant difference in the prevalence of NE between girls and boys. Other study conducted in Benha showed that the prevalence of NE among school children was 15.7 %. Also it showed that, there was no significant difference among boys and girls. The prevalence of NE in Saudi Arabia was 43.5% of those children with NE aged 5–6 year and only 4.8% among those aged above 11 year. The prevalence of NE was more in boys than in girls. A study carried out in Santo Domingo, Dominican Republic, showed that girls had a higher prevalence rate of nocturnal enuresis than boys. These figures are more or less similar to results obtained in the current study. The frequency of NE was found to be 23.2% in the 6 years age group followed by 21.2% children in the 7 years group, and frequency decreased in the older age groups. There is no significant difference between girls and boys [11, 14-16].

As regards residence, the current study revealed that more than one half 56.3% of primary school children with NE were from rural areas but, with no significant difference. These figures are lower than that obtained in another Egyptian study carried out in Zarka district, Damietta Governorate, where 60% of enuretic children were living in rural areas. Another Egyptian study showed a non-significant difference in the prevalence of NE between the rural and the urban areas. A Chinese study reported that NE is more likely to occur in children living in rural areas. Also, a study conducted in Sindh Province, Pakistan, reported that the prevalence of NE was higher in rural areas than urban ones [11, 17, 18].

Regarding sibling number and birth order, the current study showed a significant association with NE frequency among primary school children. The study showed that 3rd/4th birth order had more frequent NE cases compared to 1st/2nd birth order. As regards sibling number, NE was more frequent 70.2% in primary school children with 2-3 siblings compared to those with 4 or more siblings. The obtained differences regarding birth order and sibling number were statistically significant.

A study conducted among primary school children in Al-Mukalla City, Yemen, showed that large family size with more than five siblings were the most likely risk factor associated with the occurrence of NE. Other studies have also reported that enuresis was associated with factors related to family size and child order in the family. On the contrary, another study showed that 59.7% of the children with NE were first or second order in their families and this finding contradicted with those obtained in the current study [1, 14].

The present study reported a significant association between low socioeconomic level and NE prevalence among primary school children. This result was matching with that of other studies carried out in South Egypt and Benha .In addition, other studies conducted in India and Pakistan revealed that prevalence rate of NE is relatively higher in lower socio-economic levels [4, 11, 16, 19].

As regards sleep pattern, the current study showed a statistically significant association of nocturnal enuresis with deep sleep pattern. A finding which is similar to that of other studies carried out in South Egypt, India, Nigeria and Turkey. Nocturnal enuresis often occurs at sleep stage 2 and deep sleep. Several researches support the common conception of parents that children with NE are difficult to awaken. Children with NE and nocturnal polyuria differ in terms of hemodynamics and autonomic activation at night compared to healthy ones. Children with NE often suffer sleep disordered breathing, as well as disturbed sleep due to awakenings and arousals [11, 19-21].

Concerning delayed speech and motor development, the present study revealed that there is a significant association between NE and delaying milestone. This result goes in hand with that of other studies carried out in Kingdom of Saudi Arabia and Sindh Province, Pakistan as they reported that delayed milestones were all found to be significantly associated with occurrence of NE among primary school children. Some studies reported that increased incidence of delayed language and slowed motor performances has been identified among children with enuresis [17, 22, 23].

Concerning school performance, the current study revealed that the prevalence of NE among primary school children had a significant association with school performance. This association between prevalence of NE and school performance is more or less a similar findings with those obtained from other studies conducted in South of Egypt, Saudi Arabia, India and Nigeria [11, 19, 21].

The current study revealed that exposure to stressful events, home and school problems or violence had a significant association with nocturnal enuresis among primary school children. These results go in hand with those of other Egyptian studies carried out in South Egypt and Gharbia Governorate. However, a study conducted in Saudi Arabia showed that neither the exposure to stressful events, such as the birth of a new baby, or the recent shift in living

conditions, nor the punishment of the child showed any significant association with NE [11, 18, 24].

As regards drinking habit, the current study revealed that 62.3% of enuretic primary school children consume caffeinated and sugar containing beverages, also 61.6% of them drink water before going to bed. These results have a significant association with NE. A study conducted in South Egypt showed that 72.9 % of enuretic children drink caffeine-containing beverages with a significant association with NE. A study carried out at Al-Mukalla City, Yemen revealed drinking at least one cup of tea or coffee was highly statistically significant associated with NE. In addition, a study conducted in Beijing revealed that drinking water before going to bed was an independent risk factor affecting the severity of enuresis. Drinking water before going to bed leads to increasing the amount of urine at night and this can lead to increased frequency of enuresis [1, 11, 25].

Concerning the co-morbid diseases, the current study showed a significant association between existence of co-morbid conditions and NE prevalence in primary school children. A frequency of 21.9% for chronic constipation, 13.2% for respiratory tract problems, 20.5% for parasitic infestations, 25.8% for past history of urinary tract problems and 29.1% for concurrent lower urinary tract symptoms which were statistically significant except parasitic infestation. These results go in hand with those of study conducted in Pakistan, which revealed 23% for constipation. In addition, another study conducted in South Egypt reported that UTI, pinworm infestation, and constipation were all present in higher rates in children with NE with a significant association. However, a study carried out in Saudi Arabia showed a significant association with pinworms infestations. The remaining morbidities, including the history of the urinary tract or respiratory infections did not show significant association with NE [4, 11, 24].

Concerning parents' educational level, the highest frequency of NE cases in the current study observed in children whose parents with high school educational level. On other hand, the highest frequency of NE regarding fathers' occupational status was observed in children whose fathers were craft work followed by those with non-craft work. While, the mothers' occupational status, the highest frequency of NE cases was observed in those are house wife. These results have a significant association with NE. These results go in hand with other Egyptian studies conducted in South Egypt and Minia city who revealed that nocturnal enuresis was associated with low educational level of the parents and non-working mothers [11, 26].

A study carried out on school children in Saudi Arabia revealed non-significant relation of mother's education or parents' occupational status and the frequency of NE but the father's education was significantly associated with NE. However, the results of an Iranian study revealed that most enuretic children have jobless fathers and working mothers. In addition, a study carried out in Pakistan reported that children of mothers with a higher education level had a greater risk of having NE. In contrary being illiterate was protective with the least risk of having an enuretic child [4, 24].

The present study reported that positive family history of NE in primary school children had a significant association with NE occurrence. This result is similar to that of study conducted in South Egypt which reported that 84.7 % of students with NE had a positive family history. Also, a study conducted in Dominican Republic showed that, maternal or paternal enuresis positive history has often been associated with a higher risk of enuresis in the child [11, 16].

The current study revealed that, 62.9% of enuretic primary school children have enuresis at night only and 31.8% of them have associated daytime incontinence. However, a study conducted in South Egypt reported only 16 % of cases with NE associated with daytime incontinence. While, another study carried out among Saudi children from different cities in

Saudi Arabia showed that 55.1% of the children had day and night incontinence over 40% of them had enuresis only at night [11, 22].

As regards NE frequency the present study reported that, the highest percent 39.1% for wetting bed were 1-3time / week and least one 13.9% for wetting bed were every night. This result is similar to that of a study conducted in Saudi Arabia showing that all the children with NE were wetting their bed at night time with higher frequencies every week than every night. While a study conducted in South Egypt revealed that, frequency of bed wetting varied from every night in 16.5% to less than once a week in 15.3% of the students [11, 13].

As regards waking up children to go to toilet, the current study revealed that 64.9% of primary school children didn't awake from sleeping to urinate. An Egyptian study conducted in outpatient departments of Sidi- Salem Hospital reported that a high percent of parents were either sometimes or never awaking up their children at night to urinate. Also, a Beijing study revealed that, non-awaking the child to toilet at night was associated with severity of nocturnal enuresis. The parents of children with nocturnal enuresis who awaken their children during the night to urinate help children learn how to identify the feeling of a full bladder that triggers the arousal from sleep to urinate at night [25-27].

A study conducted in South Egypt showed that, NE caused moderate to severe bother for 87.8%and 44.5% of parents and children respectively. While the current study reported that, NE problem caused severe bother for 31.1% and 46.4% of parents and enuretic primary school children respectively. Psychological problems can be the result of enuresis rather than the cause. Nocturnal enuresis has a negative impact on children and their families, as long as their clothes and beds continue to wet, enuresis is distressing for families and considered one of the most stressful child-rearing issue [11, 13, 28].

Conclusions:

Prevalence of Nocturnal enuresis is significantly associated with younger age, urinary tract infection, constipation, and caffeine beverages consumption, deep sleep, exposure to school or home (problems/violence), level of education and work status of parents, number of persons per room, and socioeconomic status.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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