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Nocturnal Enuresis and Its Effect on Quality of Life among Egyptian Children

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Abstract

Objectives: This study was conducted to assess the effect of Nocturnal Enuresis (NE) on quality of life of affected children and the associated socio-demographic, family and clinical characteristics of enuretic children.

Methods: A hospital-based cross sectional study with analytic component was conducted on 200 children recruited from NE clinic of Mansoura University Children's Hospital, Mansoura, Egypt. A structured interviewing questionnaire was used including the modified NE questionnaire to assess the socio-demographic and clinical characteristics of enuretic children and pediatric incontinence questionnaire (PinQ) to assess the pediatric quality of life.

Results: The mean age of the children with NE was 10.5±2.2 years where 55.5% of their mothers were always tolerant to their enuretic act. Positive family history to NE was reported by 56% of studied children and clinically NE was severe among only 29% of studied group. Unfortunately, the quality of life was moderately affected in 68% of enuretic children and severely affected in only 3%. Significant predictors for poorer quality of life among the affected children were ranked as: medication to treat enuresis (OR=8.7), accidental urination (OR=8.04), moderate to severe clinical affection (OR=4.2), consumption of caffeinated drinks (OR=2.95), older age >10 years (OR=2.4) and intolerant mothers to the enuretic act (OR=2.2).

Conclusions: This study reflected that NE has a negative impact on the child quality of life, family dynamics and peer relations resulting in negative emotional and social effects. Poorer child quality of life is mostly related to medication, accidental urination, clinical affection and consumption of caffeinated drinks. Thus, information and support should be given to families and care givers of affected children. Also, knowing the degree of QoL affection at the time of intake to the clinic can help to target resources.

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Introduction

Nocturnal Enuresis (NE) is a common childhood disorder and is defined by an intermittent wetting during sleep after organic causes have been ruled out, with a minimum wetting frequency of once per month [1]. Enuresis is differentiated to monosymptomatic and non-monosymptomatic according to the presence of lower urinary tract symptoms. It is also classified according to the longest period of dryness into primary with less than 6 months dryness and secondary with relapse after more than 6 months dryness [2]. Mono-Symptomatic Nocturnal Enuresis (MNE) is defined as wetting episode that occurs in discrete amounts during sleep after age of 5 years. MNE negatively affects the quality of life of children and their families. The impaired health-related quality of life can be improved after treatment of MNE [3]. Primary NE is defined as: unintentional bed wetting for at least two nights in a week, in three successive months, in children who are five years of age. Secondary Nocturnal Enuresis (SNE) is bedwetting that develops after at least six months of consistent dryness [4].

Eighty to ninety percent of enuresis cases are identified as primary enuresis and are based on genetic predisposition, biological, and developmental factors. On the other hand, secondary enuresis frequently arises from psychological factors [2]. A variety of potential causes have been proposed including dysfunction of sleep arousal, altered diurnal antidiuretic hormone secretion, decreased nocturnal bladder storage ability, genetic factors, psychological factors, maturational delay, and parental age and education level [3].

Worldwide the prevalence of NE is between 6–10% at age 7, decreasing to 2% at 15 years and 0.5-2 % in adults [5]. In Egypt the overall prevalence of MNE was 18 % in Upper Egypt [3] while it was 15.4% in Damietta governorate [6], 15.7% in Banha governorate [7] and 14.7% in Menoufia governorate [8].

Quality of Life (QoL) studies have attracted an increased level of interest over the last two to three decades. The World Health Organization defines QoL as 'the individuals' perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. The condition has a negative influence on Health-Related Quality of Life (HRQoL), in both children and their families whereas many have reported psychological and social distress. Research has shown that bedwetting children have a poor self-image and lower self-esteem than their healthy peers. This, in turn, may cause psychosocial dysfunction. Consequently, 20-30 % of children with NE show some degree of psychological distress, with a higher risk of behavioral problems [9]. Intermittent incontinence is both psychologically and physically distressing, and if left untreated, has considerable psychological ramifications on children as they get older. Considering this, during the past few years, it has been emphasized that early screening and treatment can help enuretic children to improve their quality of life [10].

Up to our knowledge, the literature on HRQoL among bedwetting children in Egypt is scarce, thus we decided to conduct the present study aiming to assess the effect of NE on QOL of affected children and its associated socio-demographic and clinical characteristics of enuretic children attending Nocturnal Enuresis (NE) clinic at Mansoura University Children's Hospital, Mansoura, Egypt.

Subjects and Methods

Study locality

This study was carried out at the NE out-patient clinic which affiliated to the Mansoura University Children's Hospital (MUCH); Mansoura; Egypt.

Study Design

This is a hospital based cross-sectional study with an analytic component.

Study duration

This study extended from October 2018 to July 2019 following the predetermined sample size and sampling technique.

Study population

The study population was a sample of children attending NE clinic in MUCH who accepted sharing in the study. The eligible children were aged 5-18 years of both male and female with primary NE and suffering from NE for more than six months. All children diagnosed with neuropathic bladder, diabetes and renal problems or with incomplete diagnostic protocol were excluded from this study.

Study Tools

A structured interviewing questionnaire was applied for all children with NE who joined this study. The used questionnaire was a packet of 2 instruments; the first is the modified NE questionnaire [11] which elicited some selected socio-demographic data of children and their families as well as it evaluates the clinical characteristics of the affected children. The second is the pediatric incontinence questionnaire (PinQ) which was developed by Bower et al., 2006) to measures the quality of life among the affected children [12].

The modified NE questionnaire was developed originally by Lazarus, 1996. Then it was modified by the authors to fit the study and checked by panel of expert and by piloting to test the validity. It consists of 24 items. The studied group was classified according to clinical severity of enuresis into infrequent, moderate and severe depending on frequency per week: infrequent is 1-2 wetting episode/week, moderate is 3-5 wetting episodes/week, and severe is 6-7 wetting episodes/week to be compared regarding different related factors [13,14]. Scholastic achievement was initially collected as 5 grades (excellent very good good pass failure) then it was collapsed into 3 grades: excellent ≥85%, good 70 - <85% and poor <70%. Mother response to the act of enuresis was initially collected as 4 different responses (anger tolerant punished disregard) and each response was graded into (rarely sometimes always), then it was collapsed into two responses only (always tolerant not always tolerant).

The Pediatric incontinence questionnaire (PinQ) had been proven to be a reliable and valid tool for assessing HRQoL in children with NE. It consists of 20 items that measure the impact of bladder dysfunction on daily life for children with Urinary Incontinence (UI). Each item has five response options that follow a Likert scale: 0 equals no, 1 is hardly, 2 is sometimes, 3 is often, and 4 is all the time. A total score was calculated whereas a higher score indicates a lower QoL. The tool has five subscales: social relations with peers, self-esteem, family and home, independence and mental health. The maximum sum score is 80, and the ranges for the subscales are 0-24, 0-16, 0-16, 0-8 and 0-16, respectively. The cut-off values for the PinQ

have been published to grade severity of impact on QoL into mild: ≤20, moderate: 21-50 and severe: ≥51 [15].

The questionnaire was pilot tested on a small scale purposive sample of 10 children (weren't included in the full-scale study) to test the questionnaire forms as regard clarity, understanding and the coding process. Also, to assist the formulation of the questionnaires in a good final form and to estimate the time needed for the interview as well as to give an idea about health related quality of life in children with NE.

Sample size and sampling technique

According to Jönson Ring et al., [9] who estimated that the mean of Pediatric Incontinence Questionnaire (PinQ) was 26.3 ± 13.37, sample size was calculated using G*Power program with 3% absolute precision, 0.05 alpha error and 0.80 study power. Thus, the estimated sample size was found to be at least 166 and after adding 20% to compensate for defaulters so it was totally 200. Children were recruited consecutively until the estimated sample size was completed.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS program (version 16). Qualitative data were described using number and percentages. Quantitative data were first tested for the normality with one-sample Kolmogorov-smirnov test and presented by mean ± standard deviation for normally distributed variables, while Median and range (minimum-maximum) for non-normally distributed variables. Significance of the results was judged at p-value<0.05. Chi-square and Fischer exact tests were used to test the significance of categorical data. Student t-test was used for testing significance of quantitative data. Binary stepwise logistic regression analysis was used for prediction of independent variables for severe affection of the pediatric QoL. Significant predictors in the bivariate analysis were entered into regression model using inter method. Adjusted Odds Ratios (AOR) and their 95% Confidence Interval (CI) were calculated.

Results

Regarding the child characteristics, the mean age of the studied children was 10.5 ± 2.2 years where the highest frequency (41.5%) was in the age group of 8 - 11 years. More than half (55.5%) were females, 43.5% were of 2nd child order and with affection of scholastic performance whereas 5% recorded school absenteeism due to NE and about 15% showed poor school achievement. The family characteristics of the studied children revealed that most of families were rural (85.5%) with just enough income (63.5%). Mothers of affected children mostly were of ≤35 years (63.5%) with mean age 34.5 ± 4.9, 94% were married, 75.5% had ≤3 children and 79.5% were housewife with 62% of 2ry education and more than half of them (55.5%) were always tolerant to the enuretic act of their affected children. Most of fathers of the affected children were manual worker (66%) with 49% of 2ry education.

Clinical characteristics of the studied children showed that the mean age of starting voluntary control of urination during the day was 2.2 ± 0.63 years with 56% of affected children had positive family history. Clinically, NE was severe among only 29% of the studied group. Most of the affected children (65%) reported urgency to urinate during the day with 81% had absence of accidental urination during the day and 58% were taking caffeinated drinks during or after dinner. The most frequent reported ways among the enuretic children to stay dry were night wakes followed by drinking little (87% and 55.5% respectively). Nearly half of enuretic children (46.5%) were treated by both desmopressin and oxybutynin. More than one third (37%) of affected children were suffering from other associated health problems whereas 51.4% were suffering from learning problem and attention deficit disorders.

The mean overall score of the pediatric QOL was 26.6 ± 11.6 where the mean of self-esteem domain was 6.4 ± 3.6 (Table 1), social relations domain was 7.97 ± 3.87, family and home domain was 6.7 ± 2.6, independence domain was 0.22 ± 1.09, mental health domain 5.3 ± 3.9.

The QOL of more than two third of the enuretic children (68%) was moderately affected and 3% were severely affected (Figure 1). The QOL of older children >10 years were significantly more affected than younger ones (78.1% versus 64.4% respectively with p-value=0.03) (Table 2). The QOL of children was significantly ranged from moderate to severe affection in those who showed lower school performance than those with excellent school performance (75.3%, 86.7% versus 60% and absenteeism 100% versus 69% with p-value= 0.04, 0.008 and 0.036 respectively). With low family education (maternal and paternal) and income there was more significant affection of pediatric QOL. The QOL of children with mothers who were not always tolerant to enuretic act was more significantly affected (p-value=0.014) (Table 3). With moderate to severe clinical affection of the child there was significantly more affection of the pediatric QOL (82.2% versus 54.9% with p-value=0.0001) (Table 4). The pediatric QOL was significantly more affected in those who received desmopressin or both desmopressin and oxybutynin for treatment than those with oxybutynin alone (90.9%, 79.61% versus 56.5% with p-value=0.003 and 0.001 respectively). Also the pediatric QOL showed more significant affection with caffeinated drinks and accidental urination during the day (p-value=0.002 and 0.001 respectively). Although there was no significant difference between degrees of pediatric QoL affection regarding methods used to stay dry (Figure 2), the most frequent method used to stay dry among children with mild affection of their QoL was rewards while it was diaper in children with moderate to severe QoL affection. After logistic regression the child clinical and socio-demographic characteristic predictors of the pediatric QOL were ranked as follow: medication to treat enuresis as desmopressin (OR=8.7), accidental urination (OR=8.04), moderate to severe clinical affection (OR=4.2), caffeinated drinks (OR=2.95) and older age >10 years (OR=2.4) (Table 5). Logistic regression also found that the only family characteristic predictor of the pediatric QOL was intolerant mothers to enuretic act of affected children (OR=2.2).

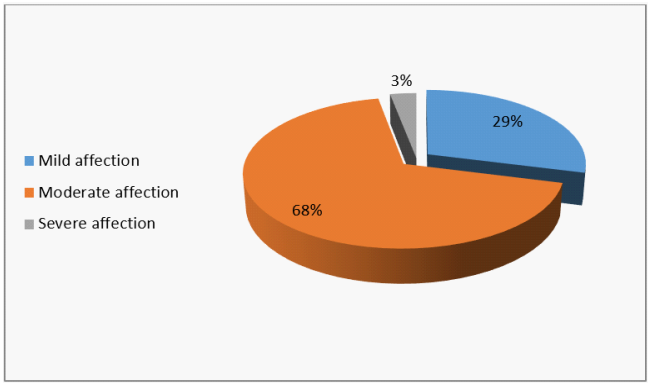

Figure 1: Grades of Pediatric QOL.

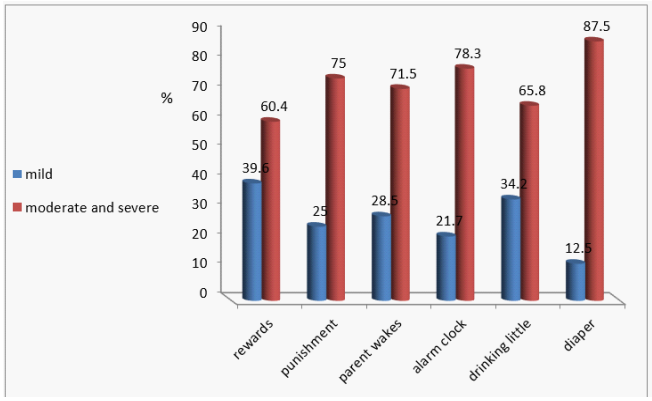

Figure 2: Degree of pediatric QoL affection and methods used to stay dry among enuretic children.

Table 1: Pediatric QOL scale and domains among the studied children.

Items	Mean ± SD	Median (min-max)
Overall score (0-80) Domains:	26.6 ± 11.6	26 (6-55)
- Self-esteem (0-16)	6.4 ± 3.6	6 (0-14)
- Social relations (0-24)	7.97 ± 3.87	7 (0-19)
- Family and home (0-16)	6.7 ± 2.6	7 (1-14)
- Independence (0-8)	0.22 ± 1.09	0 (0-6)
- Mental health (0-16)	5.3 ± 3.9	6 (0-15)

Table 2: Distribution of pediatric QOL of the studied children by the child socio-demographic characteristics.

Characteristics:	Total	Mild affection of pediatric QOL	Moderate and severe affection of pediatric QOL	x^2 (p-value)	UOR (95% CI)
Child age: #					
- ≤ 10 (r) - > 10	104 (52%) 96 (48%)	37 (35.6%) 21 (21.9%)	67 (64.4%) 75 (78.1%)	------- 4.6 (0.03)*	------ 1.97 (1.05-3.7)
Child sex:					
- Male - Female (r)	89 (44.5%) 111 (55.55%)	20 (22.5%) 38 (34.2%)	69 (77.5%) 73 (65.8%)	3.32 (0.068) ------	1.8 (0.95-3.38) ------
Order of sibling:					
- 1st - 2nd (r) - ≥ 3rd	81 (40.5%) 87 (43.5%) 32 (16%)	20 (24.7%) 30 (34.5%) 8 (25%)	61 (75.3%) 57 (65.5%) 24 (75%)	1.92 (0.165) ------- 0.97 (0.33)	1.6 (0.82-3.14) ------ 1.6 (0.63-3.9)
Scholastic achievement: [a]					
- Excellent (r) - Good - Poor	83 (41.9%) 85 (42.9%) 30 (15.2%)	33 (39.8%) 21 (24.7%) 4 (13.3%)	50 (60.2%) 64 (75.3%) 26 (86.7%)	------ 4.36 (0.04)* 6.99 (0.008)*	------ 2 (1.04-3.89) 4.3 (1.4-13.4)
Absenteeism from school: [b]					
- Yes - No (r)	10 (5.1%) 188 (94.9%)	0 (0.0%) 58 (30.9%)	10 (100%) 130 (69.1%)	Fisher exact test (0.036)* -------	Undefined -------

a, b: total number of children attending school=198. *: statistically significant.
#: child age classification according to median.
R: Reference Group; UOR: Unadjusted Odds Ratio; CI: Confidence Interval

Table 3: Distribution of the pediatric QOL by family characteristics of the studied children.

Characteristics:	Total	Mild affection of pediatric QOL	Moderate and severe affection of pediatric QOL	x^2 (p-value)	UOR (95% CI)
Mother age:					
- ≤ 35 - > 35 (r)	127 (63.5%) 73 (36.5%)	34 (26.8%) 24 (32.9%)	93 (73.2%) 49 (67.1%)	0.84 (0.36) ------	1.3 (0.72-2.5) ------
Marital status:					
- Married - Divorced/separated widow (r)	188 (94%) 12 (6%)	54 (28.7%) 4 (33.3%)	134 (71.3%) 8 (66.7%)	0.12 (0.73) -------	1.24 (0.36-4.29) ------
No. of sibling:					
- ≤3 (r) - >3	151 (75.5%) 49 (24.5%)	46 (30.5%) 12 (24.5%)	105 (69.5%) 37 (75.5%)	------ 0.64 (0.42)	----- 1.35 (0.65-2.8)

Maternal Educational Level:					
- Illiterate/read & write/basic - 2ry - >2ry (r)	40 (20%) 124 (62%) 36 (18%)	7 (17.5%) 31 (25.0%) 20 (55.6%)	33 (82.5%) 93 (75.0%) 16 (44.4%)	11.98 (0.0005)* 11.996 (0.0005)* -----	5.89 (2.07- 16.8) 3.8 (1.7-8.1) ------
Maternal Occupation:					
- House wife - Working (r)	159 (79.5%) 41 (20.5%)	46 (28.9%) 12 (29.3%)	133 (71.1%) 29 (70.7%)	0.002 (0.97) -----	1.02 (0.48-2.16) ------
Paternal educational level:					
-Illiterate/read & write/basic - 2ry - >2ry (r)	61 (30.5%) 98 (49%) 41 (20.5%)	14 (23%) 25 (25.5%) 19 (46.3%)	47 (77%) 73 (74.5%) 22 (53.7%)	6.13 (0.013)* 5.798 (0.016)* ------	2.9 (1.23-6.83) 2.52 (1.18-5.41) ------
Paternal Occupation:					
- Farmer - Manual work - Clerk (r) - Others	6 (3%) 132 (66%) 46 (23%) 16 (8%)	2 (33.3%) 34 (25.8%) 18 (39.1%) 4 (25.0%)	4 (66.7%) 98 (74.2%) 28 (60.9%) 12 (75.0%)	Fisher exact (1.00) 2.95 (0.09) ------ 1.04(0.31)	1.29 (0.21-7.76) 1.85 (0.91-3.77) ------ 1.93 (0.54-6.92)
Residence:					
- Rural - Urban (r)	171 (85.5%) 29 (14.5%)	47 (27.5%) 11 (37.9%)	124 (72.5%) 118 (62.1%)	1.31 (0.25) ------	1.61 (0.71-3.67) ------
Income:					
- Just enough - Enough and save (r) - Always in debt	127 (63.5%) 29 (14.5%) 44 (22%)	39 (30.7%) 12 (41.4%) 7 (15.9%)	88 (69.3%) 17 (58.6%) 37 (84.1%)	1.22 (0.27) ------ 5.89 (0.015)*	1.59 (0.69-3.65) ------ 3.73 (1.25-11.15)
Mother response:					
- Always tolerant (r) - Not always tolerant	111 (55.5%) 89 (44.5%)	40 (36.0%) 18 (20.2%)	71 (64.0%) 71 (79.8%)	------ 5.997 (0.014)*	------ 2.22 (1.16-4.24)

*: Statistically Significant R: Reference Group; UOR: Unadjusted Odds Ratio; CI: Confidence Interval

Table 4: Distribution of the pediatric QOL by clinical characteristics of the studied children.

Characteristics	Total	Mild affection of pediatric QOL	Moderate and severe affection of pediatric QOL	x^2 (p-value)	UOR (95% CI)
Age of voluntary urinary control during the day:	**mean ± SD**	2.1±0.62	2.2±0.63	Independent t.test t= 0.89 p= 0.375	
Clinical severity:					
- Infrequent (r) - Moderate and severe	82 (41%) 118 (59%)	37 (45.1%) 21 (17.8%)	45 (54.9%) 97 (82.2%)	----- 17.54 (0.0001)*	----- 3.89 (1.999-7.21)
Medicine to treat enuresis:					
- Desmopressin - Oxybutinin (r) - Both	22 (11%) 85 (42.5%) 93 (46.5%)	2 (9.1%) 37 (43.5%) 19 (20.4%)	20 (90.9%) 48 (56.5%) 74 (79.61%)	8.95 (0.003)* ----- 10.99 (0.001)*	7.7 (1.69-35.09) ----- 3.00 (1.55-5.82)
Caffeinated drinks:					
- Yes - No (r)	116 (58%) 84 (42%)	24 (20.7%) 34 (40.5%)	92 (79.3%) 50 (59.5%)	9.26 (0.002)* -----	2.6 (1.39-4.87) -----
Urgency:					
- Yes - No (r)	130 (65%) 70 (35%)	32 (24.6%) 26 (37.1%)	98 (75.4%) 44 (62.9%)	3.47 (0.063) -----	1.81 (0.97-3.39) -----
Accidental urination during the day:					
- Yes - No (r)	38 (19%) 162 (81%)	3 (7.9%) 55 (34.0%)	35 (92.1%) 107 (66.0%)	10.15 (0.001)* -----	5.997 (1.76-20.38) -----

Other associated health problem:					
- Yes - No (r)	74 (37%) 126 (63%)	16 (21.6%) 42 (33.3%)	58 (78.4%) 84 (66.7%)	3.11 (0.078) ------	1.8 (0.93-3.53) -----
Other associated medicine:					
- Yes - No (r)	33 (16.5%) 167 (83.5%)	9 (27.3%) 49 (29.3%)	24 (72.7%) 118 (70.7%)	0.057 (0.811) -----	1.11 (0.48-2.55) -----
Family history:					
- Yes - No (r)	112 (56%) 88 (44%)	28 (25.0%) 30 (34.1%)	84 (75.0%) 58 (65.9%)	1.98 (0.16) -----	1.55 (0.84-2.87) -----

*: Statistically significant. R: Reference Group; UOR: Unadjusted Odds Ratio; CI: Confidence Interval

Table 5: Child socio-demographic, clinical and family characteristics predictors of pediatric QOL.

Predictors	β	P	OR (95% CI)
Child age:			
- ≤ 10 (r) - >10	0.89	0.03*	2.4 (1.1-5.4)
Clinical severity:			
- Infrequent (r) - Moderate and severe	1.44	0.001*	4.2 (1.8-10.2)
Medicine to treat enuresis:			
- Oxybutinin (r) - Desmopressin - Both	2.17 1.18	0.013* 0.007*	8.7 (1.57-48.66) 3.26 (1.38-7.71)
Caffeinated drinks:			
- Yes - No (r)	1.08	0.008*	2.95 (1.32-6.6)
Accidental urination during the day:			
- Yes - No (r)	2.09	0.006*	8.04 (1.83-35.4)
Constant= 1.92 P<0.001* Model χ^2= 62.53 P<0.001* Overall Percent predicted= 74.2%			
Mother response:			
- Always tolerant (r) - Not always tolerant	0.79	0.046*	2.21 (1.02-4.81)
Constant= 1.36 P=0.018* Model χ^2= 56.17 P<0.001* Overall Percent predicted=76.5%			

*: Statistically significant. R: Reference Group; OR: Unadjusted Odds Ratio; CI: Confidence Interval

Discussion

In this study, the mean overall score of the pediatric QoL of the studied children was 26.6 ± 11.6 where the mean of self-esteem domain was 6.4 ± 3.6, social relations domain was 7.97 ± 3.87, family and home domain was 6.7 ± 2.6, independence domain was 0.22 ± 1.09, and mental health domain was 5.3 ± 3.9. These results were relatively supported by previous work [9,16]. Also, the present study revealed that the QOL of more than two third of the enuretic children (68%) was moderately affected and unfortunately 3% of them were severely affected. While the pediatric QOL was moderately affected in 14.3% and much affected in 13.8% of enuretic children in other study [2]. One Turkish study of showed that enuretic children's total HRQoL scores were significantly lower than their healthy peers and also four domains of emotional well-being, self-esteem, family, and friends were affected [17]. Regarding the relation between the pediatric QoL and the child socio-demographic, pediatric QoL is significantly more affected by increased age of children (OR=1.97). Similarly, it was reported that older children showed a significantly higher impact on social relations with peers, as well as on the overall assessment [9]. It was also mentioned that perceived competence in QoL decreased in children with NE as their age increased [18]. In addition children with lower school performance in our work (lower scholastic achievement and absenteeism) had statistically signifi-

cant poorer QoL; and this is supported by another study that reported the poor scholastic performance as a significant risk factors for enuresis and consequently poorer QoL [19]. Also, it is reported that the presence of enuresis in a child creates a vicious circle of decreased self-confidence, social avoidance, and lower school performance [20]. On the other hand another study found that approximately 71% of parents reported that poor school performance didn't have a negative impact on overall quality of their child's life [2]. This result might be due to the belief of families that this was a developmental condition so, didn't affect children's QoL.

Regarding the relation between the pediatric QoL and the child clinical characteristics, it was also found that with moderate to severe clinical affection of the child, there was significantly more affection of the pediatric QOL (82.2% versus 54.9% with p-value=0.0001). This is supported by previous study which concluded that children with lower symptom severity showed lower impairment of their HRQoL and Children with higher incontinence frequencies were more distressed [21]. However, another study found that there was no significant correlation between the severity of enuresis and QoL scores [4]. This discrepancy in the results may be due to smaller age range of included children in the other study from 8-12 years also might be due to occurrence of the problem at home at night and therefore, does not affect daily activities. Furthermore, the present study showed that the pediatric QOL was significantly more affected in those who received desmopressin or both desmopressin and oxybutynin for treatment than those with oxybutynin alone (90.9%, 79.61% versus 56.5% with p-value=0.003 and 0.001 respectively). This is may be due to the followed treatment protocol in MUCH where children with more clinical affection and consequently more affection of the pediatric QoL receive desmopressin alone or with oxybutynin. However, other study reported that the treatment method or modality had no effect on HRQoL scores [17]. Also, in the present study, the pediatric QOL showed more significant affection with accidental urination during the day in comparison to previous work which reported that the total HRQoL score was not affected by daytime urinary incontinence [17]. The difference in this finding may be due to the difference in cultural and social environment also, the way by which the children perceive their disease.

Regarding the relation between the pediatric QoL and family characteristics of the studied children, this study found that with low family education (maternal and paternal) there was more significant affection of pediatric QoL. In contrast to this finding other study found that the total HRQoL score was not affected by maternal education level [17]. This different finding might be due to different knowledgeable levels of the parents about the disease and different effective ways of dealing with this problem to help their children in order to overcome the problem with better QoL. Also the current study revealed that with low income level there was more significant affection of pediatric QOL. Similarly, previous study found that family income level affected the total HRQoL score whereas low income rate group with lower total HRQoL score compared to high income group [17]. In addition our work revealed that the QOL of children with mothers who were not always tolerant to enuretic act was more significantly affected. This came in accordance with another study when the children's self-perceived QoL was assessed regarding mother response, the physical health subscale scores and the total scores were significantly lower in children who had been scolded or punished, compared to those who had been tolerated and disregarded [4]. This might be explained by fear of the children to be scolded or punished and thus they are more stressed than the tolerated or disregarded group.

The current study indicated that the child socio-demographic and clinical characteristic predictors of the pediatric QOL by logistic regression were ranked as follow: accidental urination during the day (OR=8.04), moderate to severe clinical affection (OR=4.2), and older age >10 years (OR=2.4). These findings are supported by other studies, whereas older age, was independent predictor of decreased quality of life [22], also combined day-and-night symptoms was among significant variables associated with greater impairment in quality of life [23]. In addition a linear regression analysis was undertaken with age, gender, type, extent and severity of wetting as predictive factors and it was found that severity of wetting was statistically associated with negative self-image scores and so affected pediatric QoL [24]. Also, it was found that the increase in the frequency (severity) of nocturnal enuresis was a significant predictor for increased depressive symptom severity and poor psychosocial HRQL [25].

Logistic regression in present study revealed that the only family characteristic predictor of the pediatric QOL was the intolerant mothers to enuretic act of affected children (OR=2.2). This is supported by multiple regression analysis in a previous study that found that verbal and punishment with physical harm, were strong predictors for increased depressive symptoms severity and poor psychosocial HRQL [25]. This study had some limitations; it was hospital based single center so, the clinical severity of cases might be above average and we can't generalize the results. Also, a larger sample size could increase the strength of the study results. No follow up assessment of children with NE was included in this study.

Conclusion

In conclusion, the present study revealed that NE unfavorably affects the QoL of children. It has a negative impact on the child, family dynamics and peer relations resulting in negative emotional and social effects. Unfortunately, the attention deficit hyperactivity disorder and learning problems are commonly associated disorders in children with enuresis. The study also revealed that the associated accidental urination during the day, moderate to severe clinical affection, consumption of caffeinated drinks at dinner time, older age of children >10 years and intolerant mothers to the enuretic act were significant predictive factors for poorer QoL among affected children. It was recommended to reassure parents that bedwetting is not due to a children's laziness but beyond their control. Referral of the patient to a multidisciplinary setting should be considered, not only to allow psychological assessment to screen for a possible psychopathology, but also since therapy resistance might be expected. Information and support should be given to families and care givers of affected children. Knowing the degree of affection of the QoL at the time of intake to the clinic can help to target resources and ensure that those families are getting whatever additional supports may be necessary.

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Ethical approval

The study protocol was approved by the Institutional Research Board (IRB) of Mansoura faculty of medicine (Code Number: MS.18.04.115). Informed written consent was obtained

from the caregiver of each child sharing in the study after assuring that data will be secured and will not be used for any other purpose. Confidentiality and personal privacy were respected in all levels of the study.

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