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10.21608/zumj.2020.22225.1687**ORIGINAL ARTICLE****Psychiatric Comorbidities in Children and Adolescents with Nocturnal Enuresis in Zagazig University Hospitals.****Sahar Abdel-Raouf El-Sharawy¹; Mohammed Mohammed abdel salam²; Usama Mahmoud Youssef³; Ahmed Abdelhameed Elsayed⁴***1Department of Pediatrics Faculty of medicine Zagazig university**2Department of pediatrics, faculty of medicine , zagazig university**3Department of Psychiatry, Faculty of Medicine, Zagazig University, Zagazig, Egypt**4Resident of pediatrics, department of pediatrics, Alahrar teaching hospital, Zagazig***Corresponding author**Ahmed Abdelhameed Elsayed
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E-mail:nsrelsharq@yahoo.com**Submit Date** 2020-03-20
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Accept Date 2020-06-19**ABSTRACT****Background:** Nocturnal Enuresis (NE) and its comorbid psychiatric disorders affect Quality of Life (QoL) of children and their families. This sample survey cross sectional study was carried out in pediatric department in coordination with psychiatric department from June 2018 to June 2019 to detect frequency of psychiatric disorders and associated risk factors in children and adolescents with NE in Zagazig University Hospitals to improve health and QoL of them.**Methods:** Thirty patients (16 male, 14 female) with NE aged 5 to 18 years were subjected to history taking and examination. A questionnaire was distributed to children and parents. An interview was done with cases with NE according to Diagnostic and Statistical Manual of Mental disorders (DSM- V) for application of the arabic version of Children's Manifest Anxiety Scale "CMAS" , Children Depression Inventory (CDI), arabic abuse and neglect scale for children , Child Behavior Checklist (CBCL-6-18), Pediatric Incontinence Questionnaire (PinQ) and DSM- V edition criteria for diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD) .**Results:** 73.3% of patients had their QoL affected , 70% of had behavioral abnormalities, 40% had decreased self-esteem and 36.7 % had high degrees of child abuse, 33.3 % had psychosocial problems, 83.3 % had parent stress and anxiety, 63.3% had ADHD, 50 % had ODD, 66.7 % had depression ,and all of them had anxiety with different degrees .**Conclusion:** Children with NE presented with increased rates of psychiatric disorders, impaired self-esteem and reduced QoL affects their relationships with friends.**Keywords:** nocturnal enuresis; psychiatric comorbidities ; quality of life; self-esteem.**INTRODUCTION**

Nocturnal enuresis (NE) is defined as regularly involuntary nighttime urination in one's bed or garments by children who are normally expected to have picked up bladder control and who don't have physical abnormalities [1]. NE is diagnosed when a kid wets his/her bed or garments at least 2 times per week for 3 sequential months, or when bedwetting creates a clinically important anxiety and dissatisfaction in the life [2]. NE is a multifactorial disorder with a genetic predisposition and there are some factors that

worsen it: family history, sleep disorders, overactivity of the detrusor muscle, male gender, attention deficit/hyperactivity disorder (ADHD), oppositional defiant disorder(ODD) low socioeconomic status, poor school performance and constipation [3]. The condition impacts health-related QoL , in both the children and their families , and many have revealed mental and social pain. Research has shown that bedwetting children have a poor self-image and lower confidence than their healthy companions [4]. The utilization of the minimal psychological screening tool should be considered mandatory in each primary setting. If

psychological problems are present, referral of the patient to a multidisciplinary setting is recommended, since therapy resistance is expected. Moreover, in every refractory patient, a full psychological screening and a high suspicion of non-adherence is required. Adherence is a cornerstone of effective therapy in enuresis. It is an issue involving the doctor, the patient, and the parents [5]. The aim of this study is to detect the frequency of psychiatric disorders and associated risk factors in children and adolescents with NE in Zagazig University Hospitals to help improving the health and QoL of them.

Methods: This study is a sample survey as Cross-sectional study. It was carried out in the outpatient clinic in the pediatric department in coordination with the psychiatric department in Zagazig University Hospitals from June 2018 to June 2019. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria: It included 30 patients (16 male, 14 female) with NE aged from 5 to 18 years who met the diagnostic criteria of DSM-V edition which defines enuresis as an involuntary voiding of urine during sleep, with a severity of 'at least twice a week', in children aged >5 years in the absence of congenital or acquired defects of the CNS. If the frequency or duration is less, the child may also be considered to be enuretic if there is associated parental concern and child distress[6].

Exclusion criteria: Children not met the DSM-V criteria, daytime urinary incontinence and fecal incontinence, urinary tract infection (UTI), diabetes insipidus (DI), epilepsy, diabetes, spina bifida or other physical illnesses leading to urinary incontinence, children with intellectual disability were also excluded.

Stage I: All cases were subjected to **History taking** Including age, sex, residence, level of education of patients and parents, frequency of voiding, volume, onset of it, polydipsia, polyuria, had there been a previous period of 6 months of nighttime dryness or not, history of UTI, any other accompanying symptoms and other daytime symptoms e.g urgency, frequency, dribbling, incomplete emptying, straining, weak stream, leakage, holding maneuvers, dysuria, constipation (< 4 stools per week, hard stools), fecal incontinence, weight loss, snoring or daytime somnolence, history of motor or learning disabilities, delayed development, trials of treatment, medication received, presence of enuresis in other sibling or parents. **General Examination** for height and weight, head, eyes, ears, nose, and throat examination. **Local**

Examination including Abdomen for enlarged bladder or kidneys, hard stool in colon (may suggest constipation), Genitalia for physical abnormalities e.g hypospadias, meatal stenosis, phimosis, labial adhesions and signs of sexual abuse e.g perianal and perineal excoriations and vulvovaginitis, Rectum for fecal incontinence and constipation, dimple, hair tuft, lipoma, or other finding above gluteal cleft suggest spinal dysraphism and neurogenic bladder, Nervous system for gait abnormality, sensory deficit, abnormal reflexes in lower limbs, tight heel cords, hammer or claw toes suggest neurologic disorder.

Laboratory investigation including Urine analysis to exclude UTI, Pelvi-abdominal U / S to exclude renal or urinary anomalies.

Stage II: A structured questionnaire was distributed to all children and parents, they were asked to hide it from each other to keep secrecy and privacy. The name, age, gender, educational level of children and educational level of the parents were filled. An interview was done with cases that have NE according to DSM- V edition for application of the **arabic version of Children's Manifest Anxiety Scale "CMAS"** which is the modified form of Taylor anxiety scale. It was prepared for the Egypt environment by doctor Veola El Beblawi. The scale involves 42 items to be answered by 'yes' or 'no', it represent the psychological, physiological and behavioral aspects of anxiety [7]. **Children Depression Inventory (CDI)** which originally prepared by Marya Kovacs who depended on Beck and Albert through many studies to apply the scale on children. It was prepared for the Egypt environment by doctor Ghareeb Abd El-Fatah. The scale involve 27 items that represent a wide range of depressive symptoms each item composed of three phrases from which the child choose only one that have a score from 0 to 2 [8,9]. **The arabic abuse and neglect scale for children** which is a valid and reliable arabic scale that measures the three aspects of child abuse physical, psychological and neglect. The scale measures the parents source of child abuse and neglect. Each aspect of child abuse is represented in 22 phrases, the child by self report choose one from four levels never, seldom, sometimes and many times. This scale was prepared for arabic environment by professor doctor Amal Melegi Baza by the aid of other international scales [10]. **The Child Behavior Checklist (CBCL-6-18)**, as behavioral symptoms were evaluated through the (CBCL-6-18). This is a validated normative questionnaire with 113 items, filled out by parents, regarding the social, behavioral aspects of their children and its effects on parental stress and anxiety[11,12]. **The**

Paediatric Incontinence Questionnaire (PinQ) to assess QoL , self-esteem and psychosocial problems . It consists of 20 items with five response options that follow a Likert scale: zero equals no, one is hardly, two is sometimes, three is often, and four is all the time. It is translated to Arabic and a total score is calculated and 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 [13,14]. **ADHD**; There are 3 basic forms of ADHD described in the DSM-V edition of the American Psychiatric Association: predominantly inattentive, predominantly hyperactive-impulsive and combined[15]. **ODD**; it is defined by (DSM-V) as a recurrent pattern of angry/irritable mood, argumentative/defiant behavior, or vindictiveness lasting at least 6 months. To fulfill the diagnosis, an individual must have at least 4 symptoms of the previous patterns [16].

Ethical declaration : A written informed consent was taken from parents of the participants after full explanation the aim of the study .They were informed that participation in the study was voluntarily. The parents were given the opportunity to refuse participation. The parents were also assured that any information collected would be confidential and use for the research purpose only.The study was approved by our ethical committee of faculty of medicine ,Zagazig university (Institutional Review Board ,IRB).

Statistical Analysis: Data analysis was performed using the software SPSS (Statistical Package for the Social Sciences) version 20. Quantitative variables were described using their means and standard deviations. Categorical variables were described using their absolute frequencies and were compared using Chi square and Fisher exact tests. Kolmogorov-Smirnov (distribution-type) and Levene (homogeneity of variances) tests were used to verify assumptions for use in parametric tests. To compare means of two groups, independent

sample t test (for normally distributed data) and F one way ANOVA test for comparison of more than two groups were used. Binary logistic regression was used to calculate odds ratio of independent variables in predicting certain dependent one.The level statistical significance was set at 5% (P<0.05). Highly significant difference was present if p≤0.001.

RESULTS

A total of 30 patients and their parents were invited to participate in the study. Mean age of studied patients was 8.97 years old. About 53% of them were males. About 37% were the third among their sibling or more. The largest percentage of them (86.7%) were in primary education stage. 60% of them came from urban descent, 40% came from rural descent, There was non-significant difference between presence of clinical , subclinical psychiatric disorders, self-esteem , QoL and residence of cases (Table 1-5). About 37% of parents of the studied patients received high education, 16.7% were illiterate , There are statistically non-significant difference between presence of behavioral symptoms and parents’ level of education (Table 1). 83.3% , 80% of patients reported -ve history of NE among their parents or brothers respectively, this may be attributed to that parents did not want to talk about private concerns, also that they could not remember their urinary habits while they were young . 80% of them underwent trials of treatment and only 25 % of them received drug therapy. 16.7 % had motor developmental delay and 20% had mental delay. 83.3 % of studied patients had urgency. 33.3 % of the studied patients had psychosocial problems, 36.7% had high parent stress and anxiety, 63.3% of patients had ADHD, 50 % had ODD, 46.7% and 6.7% had high anxiety and depression respectively.70% of patients had behavioral abnormalities, 40% had decreased self-esteem and 36.7 % patients had high degrees of child abuse, 73.3% of the studied patients had their QoL affected.

Table 1 Relation between behavioral symptoms , child abuse and both demographic characteristics and family history of the studied patients:

Demographic characteristics	Behavioral symptoms		p	Child abuse				p
	Absent	Present		No effect	Mild	Moderate	High	
	N=9 (%)	N=21(%)		N=3 (%)	N=9 (%)	N=7 (%)	N=11 (%)	
Age: Mean ± SD	6.67±0.75	9.95±1.97	<0.001**	6.83 ± 0.44	8.06 ± 2.3	9.43±1.02	10±2.57	0.075

Demographic characteristics	Behavioral symptoms		p	Child abuse				p
	Absent	Present		No effect	Mild	Moderate	High	
	N=9 (%)	N=21(%)		N=3 (%)	N=9 (%)	N=7 (%)	N=11 (%)	
Gender: Male Female	6 (66.7) 3 (33.3)	10 (47.6) 11 (52.4)	0.440	2 (66.7) 1 (33.3)	5 (55.6) 4 (44.4)	4 (57.1) 3 (42.9)	5 (45.5) 6 (54.5)	0.908
Residence: Rural Urban	5 (55.6) 4 (44.4)	7 (33.3) 14 (66.7)	0.418	1 (33.3) 2 (66.7)	2 (22.2) 7 (77.8)	3 (42.9) 4 (57.1)	6 (54.5) 5 (45.5)	0.525
Level of education: Primary Secondary	9 (100) 0 (0)	17 (81) 4 (19)	0.287	3 (100) 0 (0)	8 (88.9) 1 (11.1)	7 (100) 0 (0)	8 (72.7) 3 (27.3)	0.33
Birth order: 1 st 2 nd Third or more	4 (44.4) 2 (22.2) 3 (33.3)	5 (23.8) 8 (38.1) 8 (38.1)	0.494	3 (0) 0 (0) 0 (0)	2 (22.2) 6 (66.7) 1 (11.1)	1 (14.3) 2 (28.6) 4 (57.1)	3 (27.3) 3 (27.3) 5 (45.5)	0.037*
Parents' level of education: Illiterate Primary education Secondary education High education	3 (33.3) 2 (22.2) 1 (11.1) 3 (33.3)	2 (9.5) 6 (28.6) 5 (23.8) 8 (38.1)	0.426	1 (33.3) 1 (33.3) 1 (33.3) 0 (0)	2 (22.2) 1 (11.1) 2 (22.2) 4 (44.4)	0 (0) 2 (28.6) 1 (14.3) 4 (57.1)	2 (18.2) 4 (36.4) 2 (18.2) 3 (27.3)	0.755
Parental history of NE: Negative Positive	6 (66.7) 3 (33.3)	19 (90.5) 2 (9.5)	0.143	2 (66.7) 1 (33.3)	7 (77.8) 2 (22.2)	6 (85.7) 1 (14.3)	10 (90.9) 1 (9.1)	0.733
Sibling history of NE: Negative Positive	4 (44.4) 5 (55.6)	20 (95.2) 1 (4.8)	0.005*	2 (66.7) 1 (33.3)	6 (66.7) 3 (33.3)	6 (85.7) 1 (14.3)	10 (90.9) 1 (9.1)	0.525

t independent sample t test, X2 Fisher test, F one way ANOVA test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant

Table 2 Relation between self-esteem , QoL and both demographic characteristics and family history of the studied patients:

Demographic characteristics	Self esteem		p	QoL		p
	No effect	Decreased		Not affected	Affected	
	N=18 (%)	N=12 (%)		N=8 (%)	N=22 (%)	
Age: Mean ± SD	7.83 ± 1.56	10.67 ± 2.15	0.001**	6.75 ± 1.07	9.77 ± 2.05	<0.001**
Gender: Male	8 (44.4)	8 (66.7)	0.284	4 (50)	12(54.5)	1

Demographic characteristics	Self esteem		p	QoL		p
	No effect	Decreased		Not affected	Affected	
	N=18 (%)	N=12 (%)		N=8 (%)	N=22 (%)	
Female	10 (55.6)	4 (33.3)		4 (50)	10(45.5)	
Residence:						
Rural	9 (50)	3 (25)	0.26	3 (37.5)	9 (40.9)	1
Urban	9 (50)	9 (75)		5 (62.5)	13 (59.1)	
Level of education:						
Primary	18 (100)	8 (66.7)	0.018*	8 (100)	18 (81.8)	0.55
Secondary	0 (0)	4 (33.3)		0 (0)	4 (18.2)	
Birth order:						
1 st	8 (44.4)	1 (8.3)	0.084	4 (50)	5 (22.7)	0.237
2 nd	4 (22.2)	6 (50)		3 (37.5)	8 (36.4)	
Third or more	6 (33.3)	5 (41.6)		1 (12.5)	9 (40.9)	
Parents' level of education:						
Illiterate	4 (22.2)	1 (8.3)	0.586	3 (37.5)	2 (9.1)	0.313
Primary education	5 (27.8)	3 (25)		2 (25)	6 (27.3)	
Secondary education	4 (22.2)	2 (16.7)		1 (12.5)	5 (22.7)	
High education	5 (27.8)	6 (50)		2 (25)	9 (40.9)	
Parental history of NE:						
Negative	14 (77.8)	11 (91.7)	0.622	7 (87.5)	18 (81.8)	1
Positive	4 (22.2)	1 (8.3)		1 (12.5)	4 (18.2)	
Sibling history of NE:						
Negative	12 (66.7)	12 (100)	0.057	4(50)	20 (90.9)	0.029*
Positive	6 (33.3)	0 (0)		4(50)	2 (9.1)	

t independent sample t test, X2 Fisher test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant

Table 3 Relation between psychosocial problems , parental stress and anxiety and both demographic characteristics and family history of the studied patients:

Demographic characteristics	Psychosocial problems		p	Parent stress and anxiety				p
	Absent	Present		No effect	Mild	Moderate	High	
	N=20 (%)	N=10 (%)		N=5 (%)	N=5 (%)	N=9 (%)	N=11 (%)	
Age:								
Mean ± SD	9.45 ± 2.15	8 ± 2.31	0.1	8 ± 1.46	9.2 ± 1.15	9.56 ± 2.7	8.82 ± 2.64	0.68
Gender:								
Male	10 (50)	6 (60)	0.709	2 (40)	3 (60)	6 (66.7)	5 (45.5)	0.714
Female	10 (50)	4 (40)		3 (60)	2 (40)	3 (33.3)	6 (54.5)	
Residence:								
Rural	8(40)	4 (40)	1	4 (80)	1 (20)	4 (44.4)	3 (27.3)	0.173
Urban	12 (60)	6 (60)		1 (20)	4 (80)	5 (55.6)	8 (72.7)	
Level of education:								
Primary	17 (85)	9 (90)	1	5 (100)	5 (100)	7 (77.8)	9 (81.8)	0.498
Secondary	3 (15)	1 (10)		0 (0)	0 (0)	2 (22.2)	2 (18.2)	
Birth order:								
1 st	7 (35)	2 (20)	0.258	1 (20)	2 (40)	1 (11.1)	5 (45.5)	0.215
2 nd	6 (30)	5 (50)		2 (40)	2 (40)	2 (22.2)	5 (45.5)	
Third or more	7 (35)	3 (30)		2 (40)	1 (20)	6 (66.7)	1 (9)	

Demographic characteristics	Psychosocial problems		p	Parent stress and anxiety				p
	Absent	Present		No effect	Mild	Moderate	High	
	N=20 (%)	N=10 (%)		N=5 (%)	N=5 (%)	N=9 (%)	N=11 (%)	
Parents' level of education:								
Illiterate	3 (15)	2 (20)	0.951	2 (40)	0 (0)	1 (11.1)	2 (18.2)	0.565
Primary education	5 (25)	3 (30)		0 (0)	1 (20)	3 (33.3)	4 (36.4)	
Secondary education	4 (20)	2 (20)		0 (0)	2 (40)	2 (22.2)	2 (18.2)	
High education	8 (40)	3 (30)		3 (60)	2(40)	3 (33.3)	3 (27.3)	
Parental history of NE:								
Negative	17 (85)	8 (80)	1	4 (80)	4 (80)	7 (77.8)	10 (90.9)	0.865
Positive	3(15)	2 (20)		1 (20)	1 (20)	2 (22.2)	1 (9.1)	
Sibling history of NE:								
Negative	20 (100)	4 (40)	<0.001**	5 (100)	5 (100)	6 (66.7)	8 (72.7)	0.277
Positive	0 (0)	6 (60)		0 (0)	0 (0)	3 (33.3)	3 (27.3)	

t independent sample t test, X2 Fisher exact test, F One way ANOVA test **p≤0.001 is statistically highly significant

Table 4 Relation between ADHD, ODD and both demographic characteristics and family history of the studied patients:

Demographic characteristics	ADHD		p	ODD		p
	Absent	Present		Absent	Present	
	N=11 (%)	N=19 (%)		N=15 (%)	N=15 (%)	
Age:						
Mean ± SD	11.32 ± 1.74	7.61 ± 1.15	<0.001**	9.93 ± 2.74	8 ± 1.1	0.025*
Gender:						
Male	5 (45.5)	11(57.9)	0.707	9 (60)	7(46.7)	0.715
Female	6 (54.5)	8 (42.1)		6 (40)	8 (53.3)	
Residence:						
Rural	3 (27.3)	9 (47.4)	0.442	7 (46.7)	5 (33.3)	0.71
Urban	8 (72.7)	10 (52.6)		8 (53.3)	10 (66.7)	
Level of education:						
Primary	7 (63.6)	19 (100)	0.012*	11 (73.3)	15 (100)	0.1
Secondary	4 (36.4)	0 (0)		4 (26.7)	0 (0)	
Birth order:						
1 st	1 (9.1)	8 (42.1)	0.021*	3 (20)	6 (40)	0.275
2 nd	3 (27.3)	8 (42.1)		6 (40)	5 (33.3)	
Third or more	7 (63.6)	3(15.8)		6 (40)	4 (26.7)	
Parents' level of education:						
Illiterate	2 (18.2)	3 (15.8)	0.287	4 (26.7)	1 (6.7)	0.063
Primary education	5 (45.5)	3 (15.8)		6 (40)	2 (13.3)	
Secondary education	1 (9.1)	5 (26.3)		1 (6.7)	5 (33.3)	
High education	3 (27.3)	8 (42.1)		4 (26.7)	7 (46.7)	
Parental history of NE:						
Negative	11 (100)	14 (73.7)	0.129	14 (93.3)	11 (73.3)	0.129
Positive	0 (0)	5 (26.3)		1(6.7)	4 (26.7)	
Sibling history of NE:						
Negative	11 (100)	13 (68.4)	0.061	12 (80)	12 (80)	1
Positive	0 (0)	6 (31.6)		3 (20)	3 (20)	

t Independent sample t test, X2 Fisher exact test, **p≤0.001 is statistically highly significant, *p<0.05 is statistically significant

Table 5 Relation between anxiety , depression and both demographic characteristics and family history of the studied patients:

Demographic characteristics	Anxiety			p	Depression				P
	Mild	Moderate	High		No effect	Mild	Moderate	High	
	N=4 (%)	N=12 (%)	N=14 (%)		N=10 (%)	N=10 (%)	N=8 (%)	N=2 (%)	
Age: Mean ± SD	9 ± 2.94	8.21±1.96	9.61 ± 2.31	0.304	8.6 ± 1.33	8.55 ± 2.45	9.31 ± 2.89	11.5 ± 2.12	0.367
Gender: Male Female	1 (25) 3 (75)	4 (33.3) 8 (66.7)	11 (78.6) 3 (21.4)	0.033*	5 (50) 5 (50)	5 (50) 5 (50)	5 (62.5) 3 (37.5)	1 (50) 1 (50)	0.947
Residence: Rural Urban	1 (25) 3 (75)	4 (33.3) 8(66.7)	7 (50) 7 (50)	0.554	2 (20) 8 (80)	3 (30) 7 (70)	6 (75) 2(25)	1 (50) 1 (50)	0.1
Level of education: Primary Secondary	3 (75) 1 (25)	11 (91.7) 1 (8.3)	12 (85.7) 2 (14.3)	0.69	10 (100) 0 (0)	9 (90) 1 (10)	6 (75) 2 (25)	1 (50) 1 (50)	0.179
Birth order: 1 st 2 nd Third or more	2 (50) 2 (50) 0 (0)	4 (33.3) 4 (33.3) 4 (33.3)	3 (21.4) 5 (35.7) 6 (42.9)	0.58	5 (50) 3 (30) 2 (20)	4 (40) 3 (30) 3 (30)	0 (0) 5 (62.5) 3 (37.5)	0 (0) 0 (0) 2 (100)	0.11
Parents' level of education: Illiterate Primary education Secondary education High education	0 (0) 1 (20) 2 (40) 2(40)	1 (11.1) 3 (33.3) 2 (22.2) 3 (33.3)	2 (18.2) 4 (36.4) 2 (18.2) 3 (27.3)	0.565	2 (20) 3 (30) 1 (10) 4 (40)	1 (10) 3 (30) 3(30) 3 (30)	0 (0) 2 (25) 2 (25) 4 (50)	2 (100) 0 (0) 0 (0) 0 (0)	0.145
Parental history of NE: Negative Positive	4 (100) 0 (0)	11 (91.7) 1 (8.3)	10 (71.4) 4 (28.6)	0.765	8 (80) 2 (20)	8 (80) 2 (20)	7 (87.5) 1 (12.5)	2 (100) 0 (0)	0.883
Sibling history of NE: Negative Positive	3 (75) 1 (25)	9 (75) 3 (25)	12 (85.7) 2 (14.3)	0.765	9 (90) 1 (10)	7 (70) 3 (30)	6 (75) 2 (25)	2 (100) 0 (0)	0.599

F ANOVA test, X2 Fisher exact test, **p≤0.001 is statistically highly significant, *p<0.05 is statistically significant

Table 6 Relation between child abuse, QoL and subclinical and clinical significant psychiatric disorders of the studied patients:

	Child abuse				p	QoL		p
	No effect	Mild	Moderate	High		Not affected	Affected	
	N=3 (%)	N=9(%)	N=7 (%)	N=11(%)		N=8 (%)	N=22 (%)	
Behavioral symptoms: No Yes	2 (66.7) 1 (33.3)	5 (55.6) 4 (44.4)	0 (0) 7 (100)	2 (18.2) 9 (81.8)	0.031*	6 (75) 2 (25)	3 (13.6) 19 (86.4)	0.003*
Self-esteem: No effect decreased	3 (100) 0 (0)	5 (55.6) 4 (44.4)	5 (71.4) 2 (28.6)	5 (45.5) 6 (54.5)	0.331	7 (87.5) 1 (12.5)	11 (50) 11 (50)	0.099

	Child abuse				p	QoL		p
	No effect	Mild	Moderate	High		Not affected	Affected	
	N=3 (%)	N=9(%)	N=7 (%)	N=11(%)		N=8 (%)	N=22 (%)	
Psychosocial problems:								
Absent	2 (66.7)	3 (33.3)	5 (71.4)	10 (90.9)	0.058	3 (37.5)	17 (77.3)	0.078
Present	1 (33.3)	6 (66.7)	2 (28.6)	1 (9.1)		5 (62.5)	5 (22.7)	
Parental stress and anxiety:								
Non	1 (33.3)	1 (11.1)	1 (14.3)	2 (19.2)	0.273	2 (25)	3 (13.6)	0.408
Mild	0 (0)	1 (11.1)	3 (42.9)	1 (9.1)		0 (0)	5 (22.7)	
Moderate	1 (33.3)	1 (11.1)	3 (42.9)	4 (36.4)		2 (25)	7 (31.8)	
High	1 (33.3)	6 (66.7)	0 (0)	4 (36.4)		4 (50)	7 (31.8)	
ADHD:								
Absent	0 (0)	1 (11.1)	4 (57.1)	6 (54.5)	0.07	0 (0)	11 (50)	0.014*
Present	3 (100)	8 (88.9)	3 (42.9)	5 (45.5)		8 (100)	11 (50)	
ODD:								
Absent	0 (0)	5 (55.6)	4 (57.1)	6 (54.5)	0.341	3 (37.5)	12 (54.5)	0.409
Present	3 (100)	4 (44.4)	3 (42.9)	5 (45.5)		5 (62.5)	10 (45.5)	
Child abuse								
Non						3 (37.5)	0 (0)	<0.001**
Mild						5 (62.5)	4 (18.2)	
Moderate						0 (0)	7 (31.8)	
High						0 (0)	11 (50)	

*p<0.05 is statistically significant , X² Fisher exact test

Table 7 Relation between anxiety , depression and both subclinical and clinical significant psychiatric disorders of the studied patients:

	Anxiety			p	Depression			p	
	Mild	Moderate	High		No effect	Mild	Moderate		High
	N=4 (%)	N=12 (%)	N=14 (%)		N=10 (%)	N=10 (%)	N=8(%)		N=2(%)
Behavioral symptoms:									
No	1 (25)	4 (33.3)	4 (28.6)	0.94				0.567	
Yes	3 (75)	8 (66.7)	10 (71.4)		2 (20)	4 (40)	3 (37.5)		0 (0)
Self-esteem:									
No effect	2 (50)	9 (75)	7 (50)	0.392	5 (50)	8 (80)	4 (50)	0.475	
Decreased	2 (50)	3 (25)	7 (50)		5 (50)	2 (20)	4 (50)		1 (50)
Psychosocial problems:									
Absent	1 (25)	8 (66.7)	11 (78.6)	0.134				0.25	
Present	3 (75)	4 (33.3)	3 (21.4)		7 (70)	5 (50)	6 (75)		2 (100)
Parental stress and anxiety:									
Non	0 (0)	2 (16.7)	3 (21.4)	0.21	1 (10)	1 (10)	2 (25)	0.086	
Mild	0 (0)	2 (16.7)	3 (21.4)		4 (80)	0 (0)	1 (12.5)		0 (0)
Moderate	0 (0)	4 (33.3)	5 (35.7)		0 (0)	4 (40)	4 (50)		1 (50)
High	4 (100)	4 (33.3)	3 (21.4)		5 (50)	5 (50)	1 (12.5)		0 (0)
Child abuse:									
No	1 (25)	1(8.3)	1 (7.1)	0.598	1 (10)	2 (20)	0 (0)	0.457	
Mild	2 (50)	4 (33.3)	3 (21.4)		4 (40)	4 (40)	1 (12.5)		0 (0)
Moderate	0 (0)	3 (25)	4 (28.6)		2 (20)	2 (20)	3 (27.5)		0 (0)
High	1 (25)	4 (33.3)	6 (42.9)		3 (30)	2 (20)	4 (50)		2 (100)

	Anxiety			p	Depression			p	
ADHD:									
Absent	1 (25)	3 (25)	7 (50)	0.366	3 (30)	3 (30)	3 (37.5)	2 (100)	0.279
Present	3 (75)	9 (75)	7 (50)		7 (70)	7 (70)	5 (62.5)	0 (0)	
ODD:									
Absent	2 (50)	3 (25)	10 (71.4)	0.062	3 (30)	5 (50)	5 (62.5)	2 (100)	0.251
Present	2 (50)	9 (75)	4 (28.6)		7 (70)	5 (50)	3 (37.5)	0 (0)	
QoL									
Not affected	2 (25)	4 (50)	2 (25)	0.289	3 (37.5)	4 (50)	1 (12.5)	0 (0)	0.473
Affected	2 (9.1)	8 (36.4)	12 (54.5)		7 (31.8)	6(27.3)	7 (31.8)	2 (9.1)	

*p<0.05 is statistically significant , X² Fisher exact test

DISCUSSION

Behavioral symptoms:In this study, 70% of patients had behavioral abnormalities, There were statistically significant differences between presence of behavioral symptoms and both patient age (which presented mostly in older ages), and negative history of other sibling, with increasing risk of behavioral symptoms by 15 fold in patients with negative history of NE in other siblings. There were statistically non-significant differences between presence behavioral symptoms regarding patient gender, residence, level of education, birth order, parents' level of education, or parental history of NE (Table 1).

Birdal and Doğangün found that 26.6 % of the children diagnosed with enuresis demonstrated behavioural problems at a clinical level, whereas this rate was found to be 3.3% in the control group [17]. Von Gontard et al confirmed that one third of the children who had a problem of bedwetting showed clinically significant behavioural problems[18].

Self esteem : According to the study, 40% of studied children had decreased self-esteem, increasing patient age significantly increased risk of decreased self-esteem by 2.113 folds. Children and adolescents in primary school (66.7%) were mostly affected. There were statistically significant differences between presence of decreased self-esteem and all of patient age and level of education. There were statistically non-significant differences between presence of decreased self-esteem regarding patient gender, residence, birth order, parents' level of education, parental history of NE or other sibling history of NE (Table 2).

Likewise, Theunis et al concluded that NE had significant negative impacts on the self-image and performance of children, and was significantly lower in higher ages than in lower, but was lower in girls than in boys[19]. Elbahasawy and Elnagar found no relation between lower self-esteem and gender[20].Gulisano et al and Jonson Ring et al found that children with NE have impaired self-

esteem influencing their relationships with friends [14,21].

Child abuse : 90% of cases had child abuse, 36.7 % of them had high degrees of child abuse. There was statistically significant differences between presence of child abuse and birth order (patients with second order had significantly mild abuse and those within third order or more had moderate abuse).There were statistically non-significant differences between presence of child abuse and all of patient gender, residence, level of education, parents' level of education, parental history of NE or other sibling history of NE .The high degree of child abuse presented at older age but without significant difference(Table 1). Results detected a significant difference between exposure of child abuse and development of behavioral symptoms among the studied patients (Table 6).

Elgohary et al showed significant differences among cases and controls regarding child abuse and neglect either verbal or physical in enuretic patients. Findings showed non significant differences between level of education of parents and child abuse, this may explained by the same culture and attitude towards the child even in different educational level in our society [22].

Quality of life (QoL) : Findings suggested an impairment of QoL of the studied patients with largest percentage (73.3%) as assessed by PinQ .Increasing age of studied patients and negative history of NE in other siblings is associated with poor QoL(Increasing age significantly increased risk of poor QoL by about 6 folds). Males and females QoL are equally affected. There are statistically non-significant differences between presence of poor QoL and all of patient residence, level of education, birth order, parents' level of education, or parental history of NE (Table 2). This is in line with a study done on Swedish children by Jonson Ring et al , using pinQ (Swedish translation),the same questionnaire we used in this study, to assess the QoL of children with NE,they found that children with NE have impaired QoL and their impaired QoL affected their relationships

with friends. In Jonson Ring et al, older children had a significant higher impact on social relations with peers, Boys had a significantly higher impact, namely lower QoL, than girls for the domain social relations with peers. No gender differences were seen for the overall scale or the other domains [14]. Results confirmed that patients with behavioral symptoms, ADHD or who are exposed to child abuse have poorer QoL but There are statistically non-significant relation between poor QoL and self-esteem, psychosocial problems, ODD, anxiety, depression or parent stress and anxiety (Table 6).

Psychosocial problems: In this study, 33.3 % of the studied patients had psychosocial problems. There were statistically significant difference between presence of psychosocial problems and other sibling history of NE as negative history of NE in other sibling non-significantly protect against psychosocial problems. There were statistically non-significant differences between presence of psychosocial problems regarding patient age, gender, residence, level of education, birth order, parents' level of education, parental history of NE (Table 3).

A study by Joinson et al performed in Great Britain had shown that 24.5% of children with NE suffered from antisocial distress. One of more important signs of distress among enuretics is avoiding sleeping away from home, with that problem encountered 43.2% of questioned children [23].

Parental stress and anxiety: According to this study, 83.4% of parents had different levels of anxiety and stress, 36.7% of them had high parent stress had anxiety. There were statistically non-significant differences between presence of parent stress and anxiety and all of patient age, gender, residence, level of education, birth order, parents' level of education, parental history of NE or other sibling history of NE (Table 3).

This is in line with a recent study by Durmaz et al aimed to evaluate psychiatric dimensions in mothers having children with NE who manifested significant anxiety [24].

ADHD : According to this study, 63.3% of investigated patients had ADHD, young age patients, primary school children, and those who were 1st and 2nd in birth order had high percentage. So, young age, decrease birth order and primary education can be considered predictive to ADHD among the studied patients. There were statistically insignificant differences between presence of ADHD and all of patient gender, residence, level of education, parents' level of education, parental history of NE or other sibling history of NE (Table 4). This was in agree with a study made by Amiri et al in Iran in which 74.9% of enuretic patients

exhibited ADHD, It had also been reported that there was a strong comorbidity between ADHD and NE, The severity of NE appears to play a key role in ADHD comorbidity [25]. Similarly, Shreeram et al, Von Gontard and Equit and Gulisano et al reported that ADHD was more prevalent in children with NE [21,27,28].

ODD : Percentage of patients with ODD in this study is 50 %, young aged were mostly affected, There were statistically non-significant differences between presence of ODD and all of patient gender, residence, level of education, birth order, parents' level of education, parental history of NE or other sibling history of NE (Table 4). This was in agreement with Von Gontard et al, they described higher rates of symptoms of ODD in children with incontinence than in healthy controls (19.5% vs. 5.2%) [18]. This corresponds to a study done by Sepehrmanesh and Moavvaji reported that the incidence of ODD was lower than 12% [26].

Anxiety : Karničnik et al concluded that children with NE are especially burdened with weekly school trips. 36.3% of them were sometimes anxious about their bedwetting before departure. They also often avoid situations with a great probability of revealing their problems. They were more stressed on weekly school trips than at sleepovers at their friends because they trust their friends more than the whole group of classmates [29].

This study showed that all cases had anxiety and that 46.7% of them had high anxiety. There was statistically significant difference between presence of anxiety and patient gender (the largest percentage of those with high anxiety were males). There were statistically non-significant differences between presence of anxiety and all of patient age, residence, level of education, birth order, parents' level of education, parental history of NE or other sibling history of NE (Table 5). There were statistically non-significant differences between presence of anxiety and subclinical and clinical significant psychiatric disorders. There were statistically non-significant differences between presence of anxiety and child abuse among the studied patients (Table 7).

Depression : Results detected that 66.7% of cases had depression, 6.7% of them had high depression scores. There were statistically non-significant differences between presence of depression regarding patient age, gender, residence, level of education, birth order, parents' level of education, parental history of NE or other sibling history of NE (Table 5). There was non-significant difference between presence of depression and subclinical and clinical psychiatric disorders, also there was statistically non-significant difference between

presence of depression and child abuse among the studied patients (Table 7). In contrast, Al-Zaben and Sehlo assessed the relationship between parental punishment and depression showing a significant increase in the severity of depressive symptom. They found that approximately 33.8% of the children were punished for bedwetting and that punishment was associated with a greater severity of depression in children with NE[30].

Strengths and limitations

The sample included patients from different age groups, different education levels and different societies that gave an idea about the effect of NE on all these levels. The small sample did not complete the picture about the problem but this was due to refusal of some parents to complete our questionnaires as they did not want to talk about private concerns related to them or to their children or because of the embarrassment associated with wetting, insufficient knowledge of the parents that in many cases had showed to adopt punitive measures.

CONCLUSION

Children with NE have increased rates of comorbid psychiatric disorders. Large percentage of them have behavioral problems related to their age. They have impaired self-esteem and their reduced QoL affects their relationships with friends. Poor QoL have good relation to child abuse, behavioral symptoms and ADHD. There is an association between NE and both ADHD and ODD. NE has an obvious effect on parental stress and anxiety.

RECOMMENDATIONS

Thorough examination for psychiatric disorders in enuretic children. Enuretic Children and psychiatric disorders should be referred to specialized care. Programs for raising parent awareness regarding NE, they should be sensitized on the adverse effects of punishment on child development. Frequent follow-up with emotional support, reassurance and encouragement to improve children's self concept and parent's perception of their behavior regardless of the treatment outcome and improvement in QoL can follow.

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