Comorbid Psychiatric Disorders in Children and Adolescents with Nocturnal Enuresis

Shahrokh Amiri, Ali Reza Shafiee-Kandjani* , Roghayeh Naghinezhad, Sara Farhang, Salman Abdi

Purpose: The present study was conducted with the aim of identifying the frequency of comorbid psychiatric disorders in children and adolescents with nocturnal enuresis (NE).

Materials and Methods: In this descriptive-analytical study, 183 children and adolescents aged 5-18 years with NE referred to psychiatric clinics at Tabriz University of Medical Sciences were selected in 2015. A structured clinical diagnostic interview, the kiddie-schedule for affective disorders and schizophrenia (K-SADS), was employed based on the diagnostic and statistical manual of mental disorders (DSM-IV-TR) for the diagnosis of NE and comorbid psychiatric disorders.

Results: In this study, 39 participants (21.3%) were female and 144 (78.7%) were male. The mean age of participants was 8.69 ± 2.34 years. The lifelong incidence of mental disorders among enuretic children and adolescents was 79.23%. The highest incidence belonged to attention deficit/hyperactivity disorder (ADHD) with 74.9%, oppositional-defiant disorder (ODD) with 53%, and tic disorders with 12% (motor tics together with a single case of vocal tic). The lowest incidence was for conduct disorder, bipolar affective disorder, and post-traumatic stress disorder (PTSD) with 5%. Based on the Fisher exact test, there was no significant difference between girls and boys in terms of psychiatric disorders incidence ($P > .05$).

Conclusion: Comorbid psychiatric disorders with NE are common among children and adolescents. Therefore, in-depth examination of other psychiatric disorders needs to be carried out in enuretic children and adolescents, which will affect the treatment and prognosis of NE.

Keywords: attention deficit-hyperactivity disorder; comorbidity; nocturnal enuresis; prevalence; psychiatric disorders.

INTRODUCTION

Nocturnal enuresis (NE) is a common disorder in children defined as an often involuntary diurnal or nocturnal urination in one's bed or clothes by children who are normally expected to have gained bladder control and who lack manifest physical abnormalities[1]. NE is diagnosed when a child wets his/her bed or clothes at least 2 times a week for 3 consecutive months, or when bedwetting creates a clinically important anxiety and frustration in the life[2].

The incidence of NE has been reported in approximately 10% of 5-year olds and 3-5% of 10-year old children. Meanwhile, 1% of adolescents aged 15-18 suffer from the disease[1]. In a meta-analysis, the incidence of NE in boys (11.2-16.7 years) and girls (6.3-10.6 years) was reported to be 13.9% and 8.4%, respectively, and the overall incidence (9.2-12.8 years) was reported as 11.01%[3]. The incidence of NE and day time incontinence was reported to be 18.7 and 5.5%, respectively [4]. There is no general consensus regarding the cause of NE, with such factors as delayed puberty and nervous system development, reduced bladder capacity, and impaired antidiuretic hormone (ADH) secretion (which results in water absorption by the kidneys) being suggested[5]. Since NE is not regarded as a disease but as a mere symptom by a number of authorities, numerous physical and psychological factors have been identified as the cause of this condition. Since NE is observed in the majority of childhood psychiatric disorders, enuretic children struggle with multiple psychiatric problems [6]. In this regard, in a study in Kashan, Iran, the incidence of comorbid psychiatric disorders has been reported as high as 89% [7].

A study on pre-school children revealed that up to 9.1% had at least one subtype of incontinence (8.5% had nocturnal enuresis, 1.9% daytime urinary incontinence and .8% fecal incontinence). 6.4% had attention deficit/hyperactivity disorder (ADHD), 6.2% had oppositional-defiant disorder (ODD) and 2.6% were affected by to ADHD and ODD. 10.3% of the children with any kind of incontinence had ADHD while 10.3% had ODD. Children with both ADHD and ODD having higher rates of incontinence than children with only one disorder[8].

Other reports reveal that 17.5% of children and adolescents with ADHD suffer from NE[9]. It has also been observed that ODD in ADHD children is predictive of NE[10]. Accordingly, screening comorbid psychiatric disorders with NE is of great significance[11].

Research Center of Psychiatry and Behavioral Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.

*Correspondence: Department of Psychiatry, Razi Mental Hospital, El Goli Boulevard, PO Box: 5456, Tabriz, Iran.

Tel/Fax: +98 41 33803351. Email: shafieear@tbzmed.ac.ir.

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Table 1. Patients' individual and family characteristics

		Frequency	Percentage
Children's birth order	First	125	68.3
	Second	36	19.7
	Third or higher	22	12
Children's level of education	Not entered into school	26	14.2
	Primary school student	141	77
	Junior and high school student	19	8.8
History of NE in the family	Brother	9	4.9
	Sister	9	4.9
	Mother	15	8.2
	Father	37	20.2
	Both parents	4	2.2
The family's place of residence	Urban areas	152	83.1
	Rural areas	31	16.9
Parents' level of education	Illiterate	9	4.9
	Primary school	47	25.7
	Junior school	46	25.1
	High school diploma	48	26.2
	University	33	18
Mothers' level of education	Illiterate	7	3.8
	Primary school	39	21.3
	Junior school	53	29
	High school diploma	64	35
	University	20	10.9

A review of previous studies demonstrates that psychiatric disorders exhibit great comorbidity with NE. On the other hand, previous studies lack correspondence with regard to the incidence of psychiatric disorders. Based on the clinical experiences, we have realized that the parents of NE children in Iran are unwilling to report bedwetting to avoid psychiatric stigmata. Therefore, data in this field is so scarce that the evaluation of etiology, prevalence and risk factors is much justified and may be of great importance to gain a thorough understanding of psychiatric problems involved in NE. It also meets scientific needs and facilitate therapeutic interventions in dealing with NE. The present study was therefore conducted with the aim of determining the comorbid psychiatric disorders with NE in children and adolescents in a referral center in north western Iran.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in 2015.

Study Population

183 children and adolescents aged 5-18 years with NE referred to psychiatric clinics at Tabriz University of Medical Sciences were selected through the convenience sampling method.

As the mentioned university clinics are the places in which several referred and outpatient children are visited from all over the province, the population may be considered as the representative of the existing society. Inclusion criteria were parental consent for the participants, the first diagnosis of NE based on DSM-IV-TR criteria, lack of previous treatment, and being 5-18 years of age. Daytime urinary incontinence and fecal incontinence were excluded. In case of urinary tract infection, diabetes insipidus, or other physical illnesses leading to urinary incontinence, the participants were excluded from the study. Patients with intellectual disability were also excluded.

Procedure

Data pertaining to family medical histories as well as individual and family characteristics were respectively collected by medical records and interviews with parents. K-SADS semi-structured diagnostic interview was used for the diagnosis of NE and lifelong comorbid psychiatric disorders.

Evaluations

Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS)

K-SADS is a semi-structured diagnostic interview

Table 2. The incidence of lifelong psychiatric disorders comorbid with NE in children and adolescents

Psychiatric Disorders	N (%)	Boy		Girl		Fisher's exact test	
						P	
		NO	Yes	NO	Yes		
ADHD[a]	137 (74.9)	34(23.6)	110 (76.4)	12(30.8)	27 (69.2)	.83	.36
ODD[b]	97 (53)	66(45.8)	78 (54.2)	20(51.3)	19 (48.7)	.36	.59
Chronic tic disorders	22 (12)	123(85.4)	21 (14.6)	38(97.4)	1 (2.6)	4.19	.051
Generalized anxiety disorder	17 (9.3)	132(91.7)	12 (8.3)	34(87.2)	5 (12.8)	.73	.36
Obsessive-compulsive disorder	14 (7.7)	132(91.7)	12 (8.3)	37(94.9)	2 (5.1)	.44	.73
Separation anxiety disorder	12 (6.6)	133(92.4)	11 (7.6)	38(97.4)	1 (2.6)	1.29	.46
Specific phobia	11 (6)	134(93.1)	10 (6.9)	38(97.4)	1 (2.6)	1.04	.46
Tourette syndrome	7 (3.8)	137(95.1)	7 (4.9)	39(100)	0	1.97	.34
Fecal incontinence	3 (1.6)	141(97.9)	3 (2.1)	39(100)	0	.82	1
Social Phobia	2 (1.1)	143(99.3)	1 (.7)	38(97.4)	1(2.6)	.99	.38
Conduct disorder	1 (.5)	143(99.3)	1 (.7)	39(100)	0	.27	1
Bipolar mood disorder I	1 (.5)	144(100)	0	38(97.4)	1 (2.6)	3.71	.21
PTSD[c]	1 (.5)	143(99.3)	1 (.7)	39(100)	0	.27	1

[a]: attention deficit hyperactivity disorder; [b]: oppositional-defiant disorder; [C]: post-traumatic stress disorder.

designed based on DSM-III-R and DSM-IV criteria, which is filled by a psychiatrist through interviews with parents and children. K-SADS is scored using a 0-3 point rating scale. Zero score indicates lack of adequate information, score one indicates presence of symptoms, score two represents sub-threshold level of symptoms and score three represents the threshold criteria[12]. In Iran, Ghanizadeh et al.[13] reported the reliability of the Persian version of K-SADS: .81 through the test-retest method and .69 through inter-rater method.

Statistical Analysis

Data were analyzed using SPSS v.21. Descriptive statistics (frequency distribution, percentage, mean score, and standard deviation) were used to describe the variables and estimate the prevalence of comorbid psychiatric disorders. Fisher's exact test was utilized to examine the prevalence variation of NE among boys and girls. A significance level lower than .05 was considered significant.

RESULTS

183 children and adolescents including 39 girls (21.3%) and 144 boys (78.7%) participated in this study. The mean age of participants was 8.6 ± 2.3 years, with the youngest and oldest being 5 and 18 years, respectively. The onset of NE was 5.2 ± .9 years, with a minimum and maximum of 2 and 11 years. The mean frequency of NE within the last 3 months was 27.1 ± 23.7 times. The mean frequency of NE during the last week was 2.7 ± 1.6 times.

The mean age of mothers and fathers at time of participation in the study were 35.3 ± 5.5 and 40.2 ± 6.5 years, respectively. The youngest mother was 23 and for the father it was 29 years old. The oldest counterparts were 50 and 70, respectively.

According to **Table 1**, which displays the individual and family characteristics of participants, the majority of children were firstborn in terms of birth order, and were primary school students. The siblings exhibited similar histories of NE as the majority of fathers had a history of NE. Most parents lived in urban areas and had high school diplomas as their highest level of education.

The incidence of lifelong psychiatric disorders in children and adolescents with NE was 79.23%. As shown in **Table 2**, the highest incidence rates of lifelong psychiatric disorders comorbid with NE were ADHD with 74.9%, ODD with 53%, chronic tic disorders (motor tics together with a single case of vocal tic) with 12%. The lowest incidence was related to conduct disorder, bipolar affective disorder, and PTSD with .5%. According to results from the Fisher's exact test, there was no significant difference between boys and girls in terms of psychiatric disorders incidence ($P > .05$).

DISCUSSION

According to the results, the majority of patients were primary school student boys, which corresponds to the findings of previous studies[3,8,14]).

In this study, the history of NE was more prevalent among the fathers (20.2 %). It is in contrary to a study conducted in Turkey in which the mothers were more suffering from the condition[15]. Overall, the parents and siblings may also have had the similar experiences in childhood periods[16,17].

In contrast to previous studies, the majority of children were firstborns[15]. Although the relationship between

birth order and NE cannot be well-specified, parental stress during the early life of first born children as well as rigorous disciplinary measures by parents for their firstborns might impose a stressful situation and result in NE[18].

In the present study, 74.9% of enuretic patients exhibited ADHD. In another study conducted in Iran, a 40% incidence of the same disorder was reported[7]. It has also been reported that there is a strong comorbidity between ADHD and NE[14,10,19]. The severity of NE appears to play a key role in ADHD comorbidity (20). Accordingly, enuretic children from the tertiary care samples have a much higher rate of ADHD comorbidity than those referred to non-tertiary care settings[19].

A study reported a reduction in the frequency of NE by stimulant medications[21]. Also, a number of comorbid psychiatric problems such as language disorders play a key role in developing resistance to NE treatments[22]. Therefore, considering comorbid psychiatric disorders is of great importance in therapeutic approaches[11].

A common disorder in children with NE is ODD, which corresponds to the findings of this study; albeit with a lower-than-12% incidence in previous studies[7,20]. Variations in statistical populations and geographical locations are the possible reasons behind different results. Like some studies, a significant comorbidity was found between NE, ADHD, and ODD[23], with a probable biological and neurological link between them.

No difference was observed between girls and boys in terms of psychiatric disorder incidence, which corresponds to previous studies[7]. Therefore, although boys are more vulnerable to NE, both sexes are equally affected by comorbid psychiatric disorders with NE. This points to the significance of equal attention to both genders in terms of therapeutic interventions for the purpose of dealing with comorbid psychiatric issues.

The lifelong psychiatric disorders incidence in children and adolescents with NE was 79.23%. Therefore, it is highly probable that NE could be deeply involved in psychiatric problems. In addition to chronicity of the disease, comorbidity undermines the significance of clinical interventions in dealing with other comorbid psychiatric disorders.

A small sample size and more narrow population was utilized in the study which accounts for a multi-centric study. In the present study, various subtypes of enuresis [24] have not been classified which should be considered in the future studies.

CONCLUSIONS

Comorbid psychiatric disorders with NE are common among children and adolescents which accounts for a thorough examination to figure out psychiatric disorders in cases of enuretic children.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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