Original Article

Relationship Between Urination Disorders and Anxiety Level in School Children Aged 5-12 Years with Enuresis: A Descriptive Study

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Abstract

Introduction: Enuresis and urination disorders are a common problem in school-age children. When untreated, they can persist into adolescence or even adulthood.

Aims: This study aimed to determine the relationship between urination disorders and anxiety level in 5- to 12-year-old school children diagnosed as having enuresis.

Methods: Data pertaining to 238 children with enuresis were collected using a sociodemographic form, the Dysfunctional Voiding and Incontinence Symptoms Score (DVISS) Questionnaire, and the Sources of Anxiety in School-Aged Children with Enuresis (SACE) Questionnaire. The data were analyzed using independent samples t-test, one-way analysis of variance, Pearson correlation analysis, and multiple linear regression analysis.

Results: We determined that 71.4% of the children wet mostly at night and 63.4% had not received any previous treatment. The mean (SD) DVISS total score of the children was 13.41 (6.34) and the mean (SD) SACE total score was 59.28 (16.33). Scores in the SACE disease-related anxiety subscale positively correlated with DVISS total and symptom scores ($P < .05$).

Conclusions: This study suggests that urination disorders may be associated with anxiety levels in 5- to 12-year-old school children diagnosed as having enuresis.

Keywords: anxiety; enuresis; urination disorder; dysfunctional voiding and incontinence symptoms score; school-age.

Introduction

Urination disorders are a common problem in school-aged children (Palmer, 2016). Urinary incontinence and urinary tract infection are the most common pediatric urination disorders (Conkar & Mir, 2018; Palmer, 2016). Enuresis is the voluntary or involuntary voiding of urine into bed or clothing during the day and/or night for at least 3 consecutive months in children older than 5 years of age (Moffat, 1995). Enuresis is a common childhood health problem worldwide and in Turkey (Austin et al., 2016; Dolgun et al., 2012). The reported incidence is between 5% and 22% internationally and ranges from 12.4% to 25.5% in Turkey (Austin et al., 2016; Dolgun et al., 2012; Oge & Kocak, 2001). When untreated, enuresis can persist into adolescence and even adulthood (Mohammadi et al., 2019).

Children diagnosed as having enuresis more frequently express feelings such as anger, shame, and loneliness. These emotions can lead to various psychiatric problems later in life, and it can become a serious health problem due to the adverse psychosocial effects experienced when the child starts school (Dolgun et al., 2012; Palmer, 2016). In some studies, it was determined that families tend to try to solve the problem of enuresis by

punishing the child, but the actions they consider a solution may have an adverse effect on the child's ego (Bansal& Goyal, 2020; Karratlı & Adana, 2018; Yalaki et al., 2019). In some studies, it was also observed that despite these attitudes, families may disregard medical treatment as a solution to their child's problem (Karratlı & Adana, 2018; Palmer, 2016).

Enuresis can be a source of anxiety for the child due to its negative effects on them and their family. Health professionals who serve high-anxiety enuretic children and their families should be able to provide psychological support to both child and family (Palmer, 2016; Salehi et al., 2016). Health care services should include education and counseling services to determine child and family anxiety levels, the disease process, care and treatment, and hospital routines (Austin et al., 2016). Studies have shown that active inclusion of the family in the treatment of enuresis reduces the family's stress level and has a favorable impact on the child's treatment process (Karratlı & Adana, 2018; Mohammadi et al., 2019; Yalaki et al., 2019; Surmeli Doven, 2020).

In our literature search, we found no studies investigating the relationship between anxiety levels and urination disorders in school-aged children diagnosed as having enuresis. There are a few studies in the literature examining anxiety level in school-aged children with enuresis (Salehi et al., 2016; Surmeli Doven, 2020; Yalaki et al., 2019). In most of these studies, enuretic children were found to have problems such as worry, anxiety, and lower academic achievement (Bilal et al., 2020; Yalaki et al., 2019). Based on these data, the present study aimed to determine the relationship between anxiety level and urination disorders in 5- to 12-year-old school children with enuresis.

Research questions

- What is the degree of urination disorder symptoms in children diagnosed as having enuresis?
- What is the level of anxiety in children diagnosed as having enuresis?
- Is there a relationship between the severity of urination disorder symptoms and anxiety levels of children diagnosed as having enuresis?

Methods

Study sample: This descriptive study was conducted in the pediatric ward of a private hospital in Istanbul between December 2019 and February 2020. The study was approved by the Okan University Noninterventional Clinical Research Ethics Committee (dated 11 December 2019, number 116) and institutional permission was obtained. In addition, the parents of the children included in the study were informed about the study and they provided written informed consent. This study was conducted in accordance with the Declaration of Helsinki.

The universe of the study comprised school children aged 5 to 12 years who presented to a private hospital and were diagnosed as having enuresis. An average of 1450 children present annually to the department in which the study was conducted. Using this figure as the universe, the minimum sample number with a 95% confidence interval ±5% sampling error was calculated as 210.

Inclusion criteria were age between 5 and 12 years, a diagnosis of enuresis, and parental consent to participate in the study. Exclusion criteria were any diagnosed mental illness, drug or substance addiction, and communication problems (not being able to speak and understand Turkish; any sensory or speech/comprehension problem). A total of 238 children meeting these selection criteria were included in the study sample.

Data collection and instruments: Data were collected via face-to-face interviews conducted by the researchers between 23 December 2019 and 28 February 2020. The data collection forms were completed after explaining the study and obtaining parental consent. Data collection was carried out in a separate area in order to encourage open communication and promote concentration and attention while answering the questions.

Data were collected using a child sociodemographic form, the Dysfunctional Voiding and Incontinence Symptoms Score (DVISS) Questionnaire, and the Sources of Anxiety in School-Aged Children with Enuresis (SACE) Questionnaire.

Child Sociodemographic Form: This form was prepared by the researchers based on the relevant literature (Bansal & Goyal, 2020; Karratlı & Adana, 2018; Moffat, 1995; Oge & Kocak, 2001; Yalaki et al., 2019) and includes

20 questions about sociodemographic characteristics such as the child's age, sex, number of siblings, family structure, and 10 questions related to the child's toilet, disease, and daytime incontinence/bedwetting.

Dysfunctional Voiding and Incontinence Symptoms Score (DVISS) Questionnaire: This tool was developed by Akbal et al. (2005) to grade the symptoms of individuals with urination problems (Akbal et al., 2005).[14] It includes 13 items to identify dysfunctional voiding symptoms, and item 14 assesses the impact of these symptoms on the child's quality of life. The total score varies between 0 and 35, with higher scores indicating more severe symptoms related to urination disorder. As in previous studies, Cronbach's alpha values for this tool could not be calculated, as not all of the items are Likert-type questions. Permission to use the DVISS in this study was obtained.

Sources of Anxiety in School-Aged Children with Enuresis (SACE) Questionnaire: This 34-item tool was developed by Gov (2009). It can be completed by a practitioner, the child, or his/her family. The items are rated and scored according to the child's level of anxiety using a 4-point Likert-type scale with the following response options: not at all anxious (0 points), a little anxious (1 point), anxious (2 points), and very anxious (3 points). High total score indicates more severe anxiety. The internal consistency coefficient of the scale was reported as 0.96. Permission was obtained to use the scale in this study and the internal consistency coefficient for the entire scale was calculated as 0.91.

Statistical analysis: Data analysis was performed using SPSS for Windows version 21.0 (IBM Corp, Armonk, NY) package software. Descriptive analysis was performed for all the variables. Independent samples t-test and one-way analysis of variance were used to compare sources of anxiety and urination disorder according to sociodemographic characteristics, while Pearson correlation analysis and multiple linear regression analysis were used to examine the relationship between variables. The results were evaluated within a 95% confidence interval and P values $\leq .05$ were considered statistically significant.

Results

Sociodemographic characteristics

The mean (SD) age of the children in the study was 7.95 (1.90) years and 52.9% were boys. In terms of parental education and employment status, 40.3% of the mothers and 47.9% of the fathers were high school graduates and 49.6% of the mothers and 94.5% of the fathers were working. It was determined that 78.6% of the children had a nuclear family, 46.3% were first-born, 38.7% had 1 sibling, and 38.2% lived in a 4-person household (Table 1).

Regarding the children's toileting habits and clinical characteristics, 72.3% of them used squat toilets, 71.4% wet mostly at night, and 63.4% had not received any previous treatment. The parents of bedwetting children reported using fluid restriction and night awakening (44.5%), tracking and rewarding (25.2%), and bladder exercises (22.3%) as treatment methods.

Child and family anxiety about the urination disorder was reported in 53.8% of the cases; 42.4% of the children had no family history of urination disorder, 92.9% had no known diseases, and 97.1% had no urological disease. In addition, 71.8% of the children were found to have no other elimination problems and 54.2% were reported to postpone voiding due to play (Table 2).

Urination Disorder Symptoms

When the DVISS total and subscale scores were examined, the mean (SD) symptom score was 11.58 (6.07), quality of life score was 1.82 (0.80), and DVISS total score was 13.41 (6.34) (Table 3).

Sources of Anxiety

The mean (SD) scores were 48.47 (28.47) on the disease-related sources of anxiety scale, 64.93 (20.20) on the school, family, and environment-related sources of anxiety scale, 62.65 (18.70) on the social activity-related source of anxiety scale, 58.31 (19.10) on the physical and psychological sources of anxiety scale, and the mean (SD) total SACE score was 59.28 (16.33) (Table 4).

Relationship between Urination Disorder Symptoms and Sources of Anxiety: Positive correlations were detected between disease-related sources of anxiety score and DVISS symptom score (r = 0.305, P < .01) and DVISS total score (r = 0.300, P < .01) (Table 5).

Table 1 Sociodemographic characteristics of the children in the study (n = 238)

		n	%
Sex	Female	112	47.1
	Male	126	52.9
Maternal education level	Elementary school	27	11.3
	Middle school	48	20.2
	High school	96	40.3
	University and higher	67	28.2
Maternal employment status	Working	118	49.6
	Not working	120	50.4
Paternal education level	Middle school or lower	43	18.0
	High school	114	48.0
	University and higher	81	34.0
Paternal employment status	Working	225	94.5
	Not working	13	5.5
Family type	Nuclear family	187	78.6
	Extended family	36	15.1
	Fragmented family	15	6.3
Birth order	First	110	46.3
	Second	81	34.0
	Third	35	14.7
	Fourth	12	5.0
Number of siblings	Only child	69	29.0
	1 sibling	92	38.7
	2 or more siblings	77	32.3
Total number of people in household	3	70	29.4
	4	91	38.2
	5	57	23.9
	6 or more	20	8.5

Table 2 Children's characteristics related to toilet used, diseases, and wetting (n = 238)

		n	%
Type of toilet	Squat	66	27.7
	Sitting	172	72.3
When is wetting most frequent	Day	30	12.6
	Night	170	71.4
	Both day and night	38	16.0
Previously sought treatment	Yes	87	36.6
	No	151	63.4
Treatment method used*	Tracking and rewarding	60	25.2
	Fluid restriction and night awakening	106	44.5
	Bladder exercises	53	22.3
	Conditioning (alarm device)	48	20.2
	Medical therapy	41	17.2
Child and family concern	Yes	128	53.8
	No	110	46.2
Family history of wetting	No	101	42.4
	Mother only	43	18.1
	Father only	36	15.1
	In one sibling	30	12.6
	In multiple siblings	28	11.8
Known disease	No	221	92.9
	Yes	17	7.1
Urological disease	No	231	97.1
	Yes	7	2.9
Other elimination problem	Yes	67	28.2
	No	171	71.8
Voiding postponement when playing	Yes	129	54.2
	No	109	45.8

Abbreviations: *More than one answer was given to this question.

Table 3 Dysfunctional Voiding and Incontinence Symptoms Score (DVISS) Questionnaire total and subscale scores

DVISS	Mean (SD)	Min	Max
Symptoms subscale	11.58 (6.07)	3	33
Quality of life subscale	1.82 (0.80)	0	3
Total score	13.41 (6.34)	3	36

Table 4 Sources of Anxiety in School-Aged Children with Enuresis (SACE) Questionnaire total and subscale scores

SACE	Mean (SD)	Min	Max
Related to disease	48.47 (28.47)	0	100
Related to school, family, and environment	64.93 (20.20)	0	100
Related to social activities	62.65 (18.70)	0	100
Related to physical and psychological sources	58.31 (19.10)	0	100
Total score	59.28 (16.33)	0	100

Table 5 Correlation analysis between Dysfunctional Voiding and Incontinence Symptoms Score (DVISS) Questionnaire and Sources of Anxiety in School-Aged Children with Enuresis Questionnaire (SACE) scores

	Statistics	DVISS Symptoms	DVISS Quality of Life	DVISS Total Score	SACE Disease	SACE Environment	SACE Social Activities	SACE Physical and Spiritual Sources	SACE Total Score
DVISS Symptoms	r	1.000							
	P	0.000							
DVISS Quality of Life	r	**0.286****	1.000						
	P	0.000	0.000						
DVISS Total Score	r	**0.993****	**0.401****	1.000					
	P	0.000	0.000	0.000					
SACE Disease	r	**0.305****	0.071	**0.300****	1.000				
	P	0.000	0.274	0.000	0.000				
SACE Environment	r	**-0.135***	**0.195****	-0.104	0.121	1.000			
	P	0.038	0.003	0.109	0.063	0.000			
SACE Social Activities	r	-0.106	**0.195****	-0.076	**0.344****	**0.735****	1.000		
	P	0.104	0.003	0.241	0.000	0.000	0.000		
SACE Physical and Spiritual Sources	r	**-0.135***	0.120	-0.114	**0.180****	**0.613****	**0.690****	1.000	
	P	0.037	0.065	0.079	0.005	0.000	0.000	0.000	
SACE Total Score	r	0.015	**0.192****	0.039	**0.620****	**0.779****	**0.905****	**0.726****	1.000
	P	0.820	0.003	0.553	0.000	0.000	0.000	0.000	0.000

Abbreviations: r, correlation coefficient; *P < 0.05; **P < 0.01.

Discussion

To our knowledge, there are no previous studies investigating the relationship between urination disorders and anxiety level in school-aged children with enuresis. This is the first study conducted for this purpose in Turkey. Our results showed that 5- to 12-year-old school children diagnosed as having enuresis had a high level of anxiety, and there was a significant correlation between urination disorder severity and level of anxiety related to the urination disorder.

The mean (SD) age of the children in this study was 7.95 (1.90) years. This is consistent with other studies reporting that enuresis occurs more frequently in children 5 to 7 years of age (Bansal & Goyal, 2020; Bilal et al., 2020; Mohammadi et al., 2019; Ozgurhan et al., 2013).

The majority of enuretic children in this study were boys. Similarly, the incidence of enuresis was reported in previous studies to be 1.5 to 2 times higher in males than females (Bansal & Goyal, 2020; Ismail et al., 2013; Mahmoodzadeh et al., 2013; Karratli & Adana, 2018; Ozgurhan et al., 2013). It has also been reported in the literature that enuresis is more common in boys for reasons such as later maturation, more frequent developmental delays, and more difficult adaptation to toilet training among boys (Austin et al., 2016; Conkar & Mir, 2018).

In this study, 38.7% of the children had 1 sibling, and 32.3% had 2 or more siblings. This finding may be related to the fact that the home environment has a major impact on a child's emotional world and an important place among the causes of enuresis, and the birth of a sibling can elicit such a response (Alhifthy et al., 2020; Huang et al., 2020; Ozgurhan et al., 2013). This may also suggest that older children are more affected by domestic conflict and stressors such as family arguments, separation, illness, and financial problems, thereby resulting in enuresis (Conkar & Mir, 2018; Huang et al., 2020).

In this study, most of the children's parents were high school graduates, and 49.6% of the mothers and 94.5% of the fathers worked. Low parental education and socioeconomic status have generally been reported as significant psychosocial risk for enuresis (Mohammadi et al., 2019; Yalaki et al., 2019; Karratli & Adana, 2018; Mahmoodzadeh et al., 2013; Mishra & Mishra, 2020). The high level of both education and employment rate in this study suggests that different factors play a role in the psychosocial risk group of childhood enuresis seen in the children in our sample.

Enuresis can cause social and psychological problems if not treated (Austin et al., 2016). Nevertheless, the treatment of enuresis is generally ignored. Dallar et al. (2009) found that 9.3% of families had a negative attitude toward initiating drug therapy due to concerns about drug-related side effects (Dallar et al., 2009). In this study, 63.4% of the children had never presented for treatment. Previous studies have indicated that 70% to 80% of families accept enuresis and do not consult a physician for treatment (Gov & Gonener, 2010; Yalaki et al., 2019;). This high rate can be attributed to families' tendency to hide enuresis due to fear of being blamed, lack of concern due to their personal experience of spontaneous recovery from the condition, or false beliefs that the drugs used for treatment will cause infertility (Bilal et al., 2020; Karratli & Adana, 2018; Yalaki et al., 2019; Mahmoodzadeh et al., 2013).

In this study, 53.8% of the children and their families were found to be concerned about the urination disorder. This result can be explained by the fact that enuresis can be a source of anxiety for children due to concerns about their illness, school, family and environment, social activities, and its potential impact on their physical and mental needs (Chan & Wong, 2019; Palmer, 2016; Salehi et al., 2016).

In this study, the mean (SD) DVISS total score was 13.41 (6.34). Türkcan Aydın (2012) reported DVISS scores of 17 before urotherapy and 5.5 after treatment (Turkcan Aydın, 2012). The fact that the present study was conducted with enuretic children who presented to the hospital for treatment may have been a factor in the high DVISS score.

In our study, the highest mean score in the SACE questionnaire was in the sources of anxiety related to school, family, and environment subscale ($P < .05$). Similarly, different studies have also shown that enuretic

children had higher levels of concern related to their illness, school, family, and environment and greater social anxiety (Gov & Gonener, 2010; Karratli & Adana, 2018), while enuretic children who received pharmacological treatment showed a significant increase in self-confidence values after treatment (De et al., 2018; Paul et al., 2013). This finding may be explained by the high degree of socialization in school age and high levels of anxiety about social activities among children with enuresis due to the possibility of it causing isolation from school, family, and their environment.

Our correlation analysis revealed significant positive correlations between children's disease-related sources of anxiety score and their DVISS symptom and total scores ($P <$ .05). This demonstrates a relationship between the severity of urination disorder and sources of anxiety in children. We believe that anxiety levels will be high in school-age children with enuresis due to the increase in socialization, the development of self-image, as well as the high value assigned to the opinions of peers and adults regarding themselves and the importance of academic success during this period (Gov & Gonener, 2010; Mohammadi et al., 2019).

Conclusions

The results suggest that there may be an association between urination disorder severity and anxiety level in 5- to 12-year-old school children with enuresis. Based on our findings, we believe that symptoms of urination disorders and anxiety levels should be evaluated in school-aged children diagnosed as having enuresis, and health professionals should develop education programs to inform the public about enuresis and its treatment. Studies in larger and more comprehensive samples are needed to further investigate the association between urination disorders and anxiety levels in enuretic children.

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