

ORIGINAL RESEARCH

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The association between primary nonmonosymptomatic nocturnal enuresis and the presence of specific phobia: a case–control study

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Abstract

Background: Nocturnal enuresis (NE) is a common childhood condition characterized by recurrent bedwetting in children with normal bladder control over 5 years old. The pathogenesis of this condition is unknown, but it is believed to have a complex etiology. NE is primary or secondary, monosymptomatic or nonmonosymptomatic (NMNE). MNE children do not have lower urinary tract (LUT) impairment, and their voided volumes are generally normal. NMNE is linked to malfunction of the LUT, with or without daytime incontinence. Several investigations have discovered significant associations between psychiatric problems, especially anxiety disorders and NMNE. Specific phobia is the most common lifelong anxiety disorder, characterized by extreme anxiety when a stimulus is encountered or expected. This study investigated the association between specific phobia and primary NMNE.

Methods: A total of 204 children were studied, including 102 children with primary NMNE and 102 children in the control group. Girls with an FSS-II score greater than 75 and boys with a score greater than 78 were considered to have specific phobia disorder. The groups were compared using SPSS software version 23 and descriptive statistical methods.

Results: The results of the recent study showed that the mean age of the children in the case and control groups was 7.69 and 7.19 years, respectively (p -value = 0.063). The male to female ratio was 49–53 in the case group and 43–59 in the control group (p -value = 0.399). In the study, the frequency of specific phobia in the case group was 12.7% and in the control group was 9.8% (p -value = 0.507).

Conclusions: Despite the strong impacts of anxiety on children's NMNE, there is likely no significant association between specific phobia and primary NMNE.

Keywords: Nonmonosymptomatic nocturnal enuresis, Incontinence, Lower urinary tract symptoms, Specific phobia, Anxiety disorders

1 Background

Urinary incontinence or enuresis is defined as frequent urination in clothing or bed, voluntarily or involuntarily. This behavior should occur twice a week. To be subject to diagnostic criteria, it must occur for at least 3 months and cause discomfort and a loss of function. Even if the frequency is less than that, as long as it causes significant distress or interferes with social, intellectual, or

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occupational functioning, it meets the diagnostic criteria. Urinary incontinence is diagnosed only if a medical condition does not cause the behavior [1]. The Diagnostic and Statistical Manual of Mental disorders, 5th edition (DSM-5) and International Classification of Diseases, 10th edition (ICD-10), two of the most widely used diagnostic tools, classify this condition into three types: nocturnal (nighttime) only, diurnal (daytime) only, and nocturnal and diurnal [1, 2].

Nocturnal enuresis (NE) is a common childhood disorder that refers to frequent intentional or unintentional bedwetting in children with normal bladder control and without certain physical abnormalities. Given that most children have regular day and nighttime urine control by 3–4 years, the appropriate age to diagnose enuresis is 5 years old [3]. NE is categorized as primary and secondary, monosymptomatic (MNE) and nonmonosymptomatic (NMNE). Lower urinary tract (LUT) impairment is not observed in children with MNE, and their voided volumes are often within the normal range. Children with NMNE display a variety of LUT symptoms, including daytime incontinence, urgency, decreased or increased voiding frequency, voiding delay, and holding maneuvers [4–6].

Children with NE are 2–6 times more likely than the global population to experience psychiatric problems. Children who suffer from NE are subjected to a great deal of emotional and physical stress in their families. Due to a lack of awareness of this disease, parents frequently experience anxiety and rage and may blame and punish children. They may also cause major psychological harm to the child [7]. The etiology of this disease is not entirely understood, and it is likely to have a multifactorial etiology [8]. This disorder is strongly associated with encopresis [9]. Small bladder volume, psychological and behavioral issues, sleep disorders, and delayed central nervous system function maturation are among the etiologies considered [10, 11].

Anxiety disorders, which include generalized anxiety disorder, panic disorder, agoraphobia, social phobia, and specific (simple) phobias, are among the most common psychological conditions [12]. Specific phobia is the most prevalent lifelong anxiety disorder, with a prevalence of 15, 6% in the United States and 7.7–15.3% in Europe [13]. Specific phobia is an abnormally strong and persistent fear of a specific object or condition. Specific phobia is characterized by intense anxiety that occurs when a person is exposed to a stimulus or even when they expect it. Confronting or expecting a frightening stimulus almost always results in a panic attack in the susceptible individual [14]. This disorder is associated with considerable disability, distress, and lost work days [15]. Additionally, it has been linked to an elevated risk of suicidal tendencies,

as well as the development of other mental disorders such as major depression [16].

Several studies have found considerable antecedent and future correlations between psychopathology and primary nocturnal enuresis (PNE), especially primary NMNE [17, 18]. Therefore, this study aimed to evaluate the relationship between specific phobia as a common psychiatric disorder and primary NMNE.

2 Methods

This case–control study compares the prevalence of specific phobia in children with primary NMNE and children without urinary tract issues. A total of 204 children were studied during a period of 18 months, including 102 children with primary NMNE and 102 children in the control group. The case group included children aged 5 to 15 years with primary NMNE diagnosed by a pediatric nephrologist, who did not have an underlying condition or chronic medication and were referred to Amir Kabir Hospital's pediatric clinic. Children with primary NMNE must have experienced nocturia more than twice a week (moderate to severe) and at least one LUT symptom, such as urge, increased or decreased voiding frequency, daytime incontinence, holding maneuvers, or voiding postpone. Amirkabir Hospital outpatient children aged 5 to 15 years who did not have any chronic illnesses or regular medication use were selected as the control group participants. The case and control groups were matched in terms of age and gender. Exclusion criteria included a history of chronic disease, chronic drug use, mental retardation, or lack of parental or child consent to participate in the study.

After completing a written consent, parents in both groups were questioned about demographic data, including child's age, parents' education and occupation, the number of children, and child's birth weight and birth age. Then, the children responded to the Fear survey Schedule-II (FSS-II) questionnaire questions with the assistance of their parents. This questionnaire contains 51 items, and the score ranges from 51 to 357. Based on the level of fear, the respondent assigns a rating of 1 = never to 7 = panic to each item. FSS-II contains subscales for agoraphobia (8 items), social phobia (9 items), fear of blood or injury (5 items), fear of natural events (13 items), and situational fear (5 items), etc. Girls with an FSS-II score greater than 75 and boys with an FSS-II score greater than 78 were considered to have specific phobia disorder.

Data were analyzed using SPSS software version 23 and descriptive statistical methods to assess the frequency and percentage of variables and their mean and standard deviation. The Student *t*-test and χ^2 test were

employed to examine quantitative and qualitative factors, respectively.

3 Results

The children’s age in the case group was 7.69 ± 1.91 (range 5–12), and in the control group was 7.19 ± 1.77 (range 5–13), and there was no significant difference between the ages of the two groups (p -value = 0.063). In the case group, 49 patients (48%) were male, and 53 (52%) were female, and in the control group, 43 (42.2%) were male, and 59 (57.8%) were female, and there was no significant difference between the sex distribution in the two groups (p -value = 0.399). Tables 1 and 2 contain

Table 1 The family information of the children in the case and control groups

Variable	Group		p-value
	Case group Frequency (%) (102 children)	Control group Frequency (%) (102 children)	
<i>Father's education</i>			
Illiterate	(0) 0	(1) 1	0.185
High school	(17.6) 18	(21.6) 22	
Diplome	(46.1) 47	(48) 49	
Associate's degree	(18.6) 19	(13.7) 14	
Bachelor's degree	(12.7) 13	(15.7) 16	
Master's degree or above	(4.9) 5	(0) 0	
<i>Mother's education</i>			
Illiterate	(1) 1	(1) 1	0.769
High school	(14.7) 15	(9.8) 10	
Diplome	(44.1) 45	(53.9) 55	
Associate's degree	(8.8) 9	(7.8) 8	
Bachelor's degree	(29.4) 30	(26.5) 27	
Master's degree or above	(2) 2	(1) 1	
<i>Father's occupation</i>			
Employee	(17.6) 18	(16.7) 17	0.785
Labor	(15.7) 16	(14.7) 15	
Freelance	(66.7) 68	(67.6) 69	
Retired	(0) 0	(1) 1	
<i>Mother's occupation</i>			
Employee	(9.8) 10	(11.8) 12	0.471
Housekeeper	(82.4) 84	(83.3) 85	
Freelance	(7.8) 8	(3.9) 4	
Retired	(0) 0	(1) 1	
<i>Place of residence</i>			
Urban	(88.2) 90	(91.2) 93	0.489
Rural	(11.8) 12	(8.8) 9	

Table 2 Information about the children in the case and control groups

Variable	Group		p-value
	Case group Frequency (%) (102 children)	Control group Frequency (%) (102 children)	
<i>Birth weight (kg)</i>			
Lower than 2.5	(7.8) 8	(2) 2	0.056
2.5 to 4	(92.2) 94	(96) 98	
More than 4	(0) 0	(2) 2	
<i>Birth age (weeks)</i>			
Lower than 37	(4.9) 5	(2) 2	0.514
37 to 42	(93.1) 95	(96) 98	
More than 42	(2) 2	(2) 2	
<i>Order of birth</i>			
First	(57.8) 59	(64.7) 66	0.729
second	(30.4) 31	(24.5) 25	
Third	(7.8) 8	(7.8) 8	
Forth	(2.9) 3	(2.9) 3	
fifth	(1) 1	(0) 0	

further information about children and their parents in two groups.

Comparing the frequency of specific phobia in children in the patient group and the control group, it was determined that there was no statistically significant difference among these children (p -value = 0.507). Table 3 provides a summary of further details in this regard.

4 Discussion

Nocturnal enuresis is a common complaint in children that can result in numerous issues for both the child and the family. This disorder might be the cause or consequence of different psychiatric problems. This study investigated the correlation between specific phobia, a prevalent psychiatric disorder, and primary NMNE. According to the results of patient questionnaires and checklists, the prevalence of specific phobia disorder in children with primary NMNE was 12.7%, while it was 9.8% in the control group, and there was no statistically

Table 3 Prevalence of specific phobia in children in the case and control groups

Group	Specific phobia		p-value
	Positive frequency (%)	Negative frequency (%)	
Case	13 (12.7)	89 (87.3)	0.507
Control	10 (9.8)	92 (90.2)	
Total	23 (11.3)	181 (88.7)	

significant difference in the prevalence of specific phobia between the two groups.

Due to the high correlation between psychiatric disorders and urinary incontinence found in various studies, it was recommended that different types of psychiatric disorders in children, including phobias, as well as different types of urinary incontinence and even fecal incontinence in children, be examined, and if any of them are approved, appropriate treatment decisions should be made during the child's main treatment process [19].

Tsai et al. demonstrated that 14.9 percent of children evaluated for enuresis had at least one psychological component [20]. In another study by Salehi et al., children with PNE had significantly higher rates of anxiety disorders like generalized anxiety disorder, panic disorder, school phobia, social anxiety, and separation anxiety than healthy children [21]. Eray et al. study revealed that social anxiety levels in adolescents with monosymptomatic PNE were significantly greater than in healthy adolescents [22]. These studies suggest that it is essential to look into the link between urinary incontinence and psychiatric diseases, particularly anxiety disorders.

In the Hu et al. study, it was discovered that children with NMNE have lower self-esteem than those with MNE and are more likely to experience depression [18]. Furthermore, von Gontard et al. found that NMNE is more significantly associated with behavioral issues than MNE [23]. On the other hand, a review research conducted by Mahjani et al. found a strong link between clinically significant anxiety and LUTS in both males and females [24]. Due to the close association between NMNE and psychiatric illnesses, particularly anxiety, this study's case group consisted of children with primary NMNE.

Anxiety may impair the maturation of the detrusor muscle and may delay the control of the bladder sphincter [25, 26]. On the other hand, children's anxiety may be exacerbated by the catastrophic results of enuresis [17]. Numerous investigations have demonstrated that enuresis usually has severe consequences on patients and their families, resulting in significant psychological burdens and life challenges. Enuresis is believed to be particularly damaging to a child's psychological and personality development, as it lowers self-esteem and communication skills [27, 28]. Patients with PNE frequently experience anxiety, irritation, depression, and other negative emotional states [29].

However, in our study, the greater prevalence of specific phobia among children with NMNE versus healthy children was not significant.

A study conducted by Gontard et al. which evaluated mental disorders in 37 children with NE and 40 healthy children, discovered no statistically significant association between enuresis disorder and the prevalence of

specific phobia in children. In a study by Yang et al. on the relationship between psychiatric disorders and urinary incontinence, 15 children with enuresis and 38 healthy children were examined, and it was found that there was no statistically significant difference in the frequency of phobia between children with and without enuresis [30]. The results of these studies are comparable to those of the current study, which supports the absence of a clinically significant relationship between NE and the development of specific phobia in children with the difference that in our study, children also exhibited LUT symptoms in addition to NE, but there was no significant difference between the case and control groups. In this study, a specific phobia questionnaire was also utilized to improve the accuracy of this disorder's evaluation.

A study on the incidence of psychiatric problems in children with defecation disorders conducted by Carol Joinson et al. discovered that children with encopresis were considerably more likely to have specific phobia disorders [31]. Given the significant association between urinary incontinence and fecal incontinence and the contradictory results of the relationship between these two disorders and specific phobia in the studies, future research should look into the relationship between both disorders and specific phobia in children.

A limitation of our research was that it did not examine the association between each feature of specific phobia and primary NMNE, which should be considered in future studies. In addition, it is recommended that each LUT symptom in children with NMNE be compared separately with a control group as well as a group with MNE in terms of specific phobia.

5 Conclusions

In this study, there was no correlation between specific phobia and primary NMNE. Therefore, although it appears necessary to test children with NMNE for anxiety disorders, it is not as essential to examine them for the aspect of specific phobias. However, it is important to conduct more extensive research in this field about the various facets of specific phobia and the different degrees of LUT and nocturnal urinary symptoms of NMNE.

Abbreviations

NE: Nocturnal enuresis; PNE: Primary nocturnal enuresis; NMNE: Nonmonosymptomatic nocturnal enuresis; FSS-II: Fear survey schedule-II; LUT: Lower urinary tract; DSM-5: Diagnostic and statistical manual of mental disorders, 5th edition; ICD-10: International classification of diseases, 10th edition.

Author contributions

Conceptualization: PY, RS. Methodology: PY, BS. Validation: BS. Formal Analysis: DH. Investigation: MI, PY. Resources: MI. Data Curation: RS, MI. Writing—Original Draft Preparation: RS, MI. Writing—Review and Editing: RS, MI. Visualization: PY, RS. Supervision: PY, BS. Project Administration: RS. Funding Acquisition:

All authors in the article have made significant contributions, and all authors agree on the manuscript's content.

Funding

This research did not receive any funding.

Availability of data and materials

Data will be provided by the corresponding author on request.

Declarations

Ethics approval and consent to participate

The Ethics Committee of the Arak University of Medical Sciences granted legal and ethical approval. (ethical number:IR.ARAKMU.REC.1395.387). The patients' parents gave the written informed consent to participate in the study.

Consent for publication

The patients' parents have given us informed consent for publication.

Competing interests

The authors disclose no competing interest.

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Received: 24 August 2022 Accepted: 18 September 2022

Published online: 03 October 2022

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