Clinical and Experimental Health Sciences

The Prevalence of Nocturnal Enuresis and Associated Factors in Children Aged 6-12 Years

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ABSTRACT

Objective: The objective of this study was to determine the prevalence of nocturnal enuresis and identify associated factors among children aged 6–12 years.

Method: This cross-sectional study included parents of 766 students studying in three primary schools and three secondary schools (aged 6-12 years and studying in grades 1-7) in the center and districts of a province in the mid-west of Türkiye between March and May 2022, who were reached using the snowball method. The data collection tool prepared by the researchers consisted of socio-demographic questions and a total of 38 questions prepared in line with the literature on NE. Opinions of five experts were taken for the prepared form, and a pilot application was conducted with 20 parents. Number, percentage, mean, and standard deviation were used as descriptive statistics. Pearson's chi-square test was used to evaluate categorical variables. The significance level (p) was set at .05 in all statistical analyses.

Results: The mean age of the participants' children was 9.31±1.86 years, and 50.9% (n=390) of them were male. It was found that 26.2% (n=201) of the participants' children had NE. A statistically significant correlation was revealed between the presence of NE in a child and parental education level, perceived income and expenditure levels, the presence of NE on the parent's side, and the presence of NE in a sibling ($p<.05$). Furthermore, a statistically significant association was identified between the presence of NE in a child and the presence of constipation, changes in the child's life over the past six months, and difficulty waking up at night ($p<0.05$). Of the children with NE, 9.95% received medical treatment. Moreover, it was determined that the pandemic did not cause any change in 91.44% (n=183) of the children with NE, and 6.47% (n=13) of the children with NE were punished/blamed/humiliated by the family.

Conclusion: The current study emphasizes that it is important to identify children at risk for NE early and provide holistic management to them. The results above emphasize the importance of community-based programs and evidence-based nursing practices that promote early intervention, family-centered care, and supportive environments for affected children.

Keywords: Enuresis nocturna, children, prevalence, associated factors.

1. INTRODUCTION

Nocturnal enuresis (NE) is the most common urological problem in childhood and one of the most frequent chronic pediatric conditions after allergic diseases. It is also a major reason for outpatient clinic visits (1, 2). Enuresis is defined as involuntary recurrent urinary incontinence in bed or clothes during sleep at an age when bladder control should have been acquired. NE refers to involuntary bedwetting during sleep in children over five years of age who do not have congenital or acquired central nervous system defects (3). The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) prepared by the American Psychiatric Society defines NE as repetitive involuntary or intentional urinary incontinence in bed or clothes during sleep in children older than five years, which occurs at least twice a week for three months or leads to clinically significant distress or impairment in social, school (occupational), or other important domains of functioning and is not caused by the direct physiological effects of a medication or a general medical condition (4, 5).

The prevalence of NE varies across countries, with reported rates of 7.1% in Italy (6), 24% in Saudi Arabia (7), 43.1% and 40% in Pakistan (8, 9), 10.2% in Iran (10), and 23.2% in Nigeria (11). Studies from Türkiye have reported the prevalence of NE to be 16.2% (12) and 17% (13).

The high prevalence of NE indicates that it is not merely a urinary disorder but also a multidimensional problem that affects children and family life (7, 14). Previous meta-analyses have indicated that children with NE experience embarrassment and social shame at high rates (15, 16) and that many children conceal their condition due to social stigma. Consequently, both their mental well-being and access to social support and treatment are compromised (16).

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Considering these effects holistically, the findings highlight the importance of understanding the underlying risk factors for NE to prevent and early diagnose it (17). Several risk factors, including genetic predisposition, psychological stressors, sleep disturbances, hormonal imbalances, and bladder dysfunction, have been implicated in the development of NE (1, 17, 18). Numerous international studies have investigated the prevalence and associated factors of NE. Nevertheless, a few studies have explored the relationship of NE with breastfeeding, reporting inconsistent findings. Furthermore, limited research has investigated the potential impact of the COVID-19 pandemic on the condition (19-21). The aforesaid studies are scarce and provide inconclusive results, leaving a significant gap in understanding how early-life feeding practices and global stressors, such as the pandemic, may affect NE. Therefore, the present research aimed to determine the prevalence of NE among primary and secondary school children aged 6–12 years in Türkiye and to identify associated factors, including breastfeeding history and the impact of the pandemic.

2. METHODS

2.1. Aim of Research

This study aims to determine the prevalence and associated factors of NE in primary and secondary school children with NE aged 6-12.

2.2. Type of Research

The current research was conducted as a cross-sectional study.

2.3. Research Questions

This study sought to answer the following research questions:

√ What is the prevalence of NE among children aged 6–12 years?
√ Does NE correlate with sociodemographic factors?
√ Does NE correlate with clinical factors?
√ Does NE correlate with environmental and psychosocial factors?
√ Does NE correlate with management and family approach?

2.4. Sample of Research

The data of the cross-sectional study were collected between March and May 2022. The study population consisted of parents of students attending three primary schools and three secondary schools (aged 6-12 and studying in grades 1-7) in the center and districts of a province located in the mid-west of Türkiye. Participants were recruited using a convenience sampling method. The sample size was determined using G*Power software, version 3.1. The power analysis was based on the study by Mejias and Ramphul (18). The sample size was calculated to be 785 with an effect size of 0.10, 5% error, and 80% power. Hence 800 individuals meeting the inclusion criteria participated in the study. In the data collection form, a 2*2 question was asked to determine whether the participants filled out the data form carefully, and 34 individuals who answered incorrectly/did not respond were excluded from the study. Thus, the research was completed with 766 individuals. A post hoc power analysis revealed the study's power to be 0.871 at an effect size of 0.1 and a margin of error of .05.

Inclusion criteria: Participants were eligible for the study if they had a child between the ages of 6 and 12 who was attending a primary or secondary public school, had access to a phone or tablet with an internet connection, and volunteered to participate in the research.

Exclusion criteria: Parents were excluded if they had a child younger than 5 years or older than 12 years, if their child was studying in a private school, or if they failed to correctly answer the control question (2 × 2 = 4).

2.5. Data Collection Tools:

The data collection tool prepared by the researchers consisted of socio-demographic questions (e.g., parental education level, employment status, child's age, and sex) and 38 items developed in line with the literature (1, 8, 18, 22) regarding potentially associated factors for NE (e.g., a family history of NE, constipation, breastfeeding status, type of birth, and gestational week). The items included dichotomous questions (Yes/No), multiple-choice categorical questions, frequency-based questions, and a few open-ended questions. Five faculty members specializing in pediatric nursing reviewed the draft form. Following their feedback, the final version included 38 questions in total.

2.6. Pilot Study

Opinions of five experts were taken for the prepared form, and a pilot application was conducted with 20 parents. The 20 parents included in the pilot study were not included in the main sample. As there were no unclear statements in the pilot study, no further changes were made to the questionnaire.

2.7. Data Collection

The research data were collected after obtaining the necessary permissions. The schools' administrators were contacted, while the link to the online question form, prepared by the researchers via Google Docs, was shared with parents via WhatsApp. Data were collected in e-tables via Google Docs.

2.8. Data Analysis

The data were evaluated in the SPSS 25.0 package program. Number, percentage, mean, and standard deviation were used as descriptive statistics. Additionally, Pearson's chi-square test was used to compare categorical variables since it is suitable for evaluating associations between categorical data. The significance level (p) was set at .05 for all statistical analyses. Multivariate analyses, such as logistic regression, were not conducted; therefore, potential confounding factors were not controlled for in this study. No missing data were observed in the final dataset since questionnaires with incomplete or incorrect control responses were excluded prior to analysis.

2.9. Ethical Considerations

Ethical approval was obtained from the non-interventional ethics committee of a university (Date: 10.03.2022, Number: 83016). The research data were collected after obtaining

permission from the Ministry of National Education and the schools' administrators. Additionally, individuals who ticked the *'I consent to participate in the research'* option on the online survey form were included in the study.

3. RESULTS

3.1. Demographic Characteristics

The mean age of the children was 9.31±1.86 years, the mean gestational week at birth was 38.11±2.34 weeks, the mean duration of breastfeeding was 15.64±9.23 months, the mean duration of exclusive breastfeeding was 4.69±2.37 months, and the mean age at toilet training was 25.37±8.43 months. Of the participants, 87.8% (n=673) were mothers, 50.9% (n=390) had a male child, 41% (n=314) of mothers and 48.7% (n=373) of fathers were high school graduates, 60.3% (n=462) of mothers were unemployed, 75.1% (n=575) lived in a nuclear family, 74.4% (n=570) had a moderate income-expenditure level, 53.3% (n=408) of children had good school achievement, 91.5% (n=701) had no chronic disease, and 85.1% (n=652) experienced no major life changes over the past six months. Overall, 26.2% (n=201) of the children had NE (Table 1).

Table 1. *Descriptive characteristics of the participants (N=766)*

Variables	n	%
Person filling out the form		
Mother	673	87.8
Father	84	11.0
Other (stepmother, aunt, grandmother, etc.)	9	1.2
The child's sex		
Female	376	49.1
Male	390	50.9
Mother's education level		
Primary School	130	17.0
Secondary School	128	16.7
High School	314	41.0
University	194	25.3
Father's education level		
Primary School	85	11.1
Secondary School	83	10.8
High School	373	48.7
University	225	29.4
Mother's employment status		
Employed	304	39.7
Unemployed	462	60.3
Family type		
Nuclear family	575	75.1
Extended family	133	17.4
Fragmented	58	7.5
Perceived income-expenditure level		
Good	120	15.7
Moderate	570	74.4
Poor	76	9.9
The child's school achievement		
Very good	219	28.5
Good	408	53.3
Moderate	123	16.1
Poor	16	2.1
Presence of a chronic disease in the child		
Yes	65	8.5
No	701	91.5
Changes in the child's life over the past six months		
Yes	114	14.9
No	652	85.1
The presence of NE in the child		
Yes	201	26.2
No	565	73.8

NE: Nocturnal Enuresis

3.2. Family-Related Factors

A statistically significant correlation was found between NE and maternal education level (p<.05), paternal education level (p<.01), perceived income–expenditure level (p<.01), a maternal history of NE (p < .001), paternal history of NE (p < .01), and a sibling history of NE (p < .001, Table 2). Children whose parents were primary/secondary school graduates, who had a low perceived income–expenditure level, or who had a positive parental/sibling history of NE were more likely to have NE. No significant associations were found between NE and maternal employment status or family type (p>.05, Table 2).

3.3. Child-Related Factors

Significant correlations were observed between NE and constipation (p<.05), changes in the child's life over the past six months (p<.01), and difficulty waking up at night (p<.001). NE was more common in children with constipation, those who had experienced a recent life change, and those with difficulty waking at night (Table 3).

No significant differences were found in terms of the child's sex, age, number of siblings, school achievement, gestational age at birth, mode of delivery, breastfeeding status and duration, age at toilet training, presence of a chronic disease, frequent urination, or burning/pain during urination (p>.05). Table 3 summarizes these non-significant variables without a detailed description in the text (Table 3).

Table 2. *Comparison of children with and without NE in terms of family factors (N=766)*

Variables	Children with NE n: 201 n (%)	Children without NE n: 565 n (%)	P
Mother's education level			
Primary School	47 (23.4)	83 (14.7)	**.02***
Secondary School	35 (17.4)	93 (16.5)	
High School	71 (35.3)	243 (43.0)	
University	48 (23.9)	146 (25.8)	
Father's education level			
Primary School	28 (13.9)	57 (10.1)	**.005****
Secondary School	32 (15.9)	51 (9.0)	
High School	96 (47.8)	277 (49.0)	
University	45 (22.4)	180 (31.9)	
Mother's employment status			
Employed	70 (34.8)	234 (41.4)	.10
Unemployed	131 (65.2)	331 (58.6)	
Family type			
Nuclear	147 (73.1)	428 (75.8)	.22
Extended	42 (20.9)	91 (16.1)	
Fragmented	12 (6.0)	46 (8.1)	
Perceived income-expenditure level			
Good	29 (14.4)	91 (16.1)	**.004****
Moderate	140 (69.7)	430 (76.1)	
Poor	32 (15.9)	44 (7.8)	
Presence of NE on the maternal side			
Yes	50 (24.9)	81 (14.3)	**.001*****
No	151 (75.1)	484 (85.7)	
Presence of NE on the paternal side			
Yes	40 (19.9)	68 (12.0)	**.006****
No	161 (80.1)	497 (88.0)	
NE presence in the brother/sister			
Yes	25 (12.4)	25 (4.4)	**.00*****
No	138 (68.7)	451 (79.8)	

*NE: Nocturnal Enuresis, * p < .05, ** p < .01, *** p < .001*

Table 3. *Comparison of children with and without NE in terms of child-related variables and other factors (N=766)*

Variables	Children with NE n: 201 n (%)	Children without NE n: 565 n (%)	P
The child's sex			
Female	93 (46.3)	283 (50.1)	.35
Male	108 (53.7)	282 (49.9)	
The child's age			
Six	13 (6.6)	23 (4.1)	.33
Seven	34 (17.2)	88 (15.7)	
Eight	41 (20.7)	96 (17.1)	
Nine	24 (12.1)	89 (15.8)	
Ten	34 (17.2)	84 (14.9)	
Eleven	25 (12.6)	85 (15.1)	
Twelve	27 (13.6)	97 (17.3)	
The child's birth order			
First	113 (56.2)	281 (49.7)	.46
Second	73 (36.3)	238 (42.1)	
Third	12 (6.0)	36 (6.4)	
Fourth and above	3 (1.5)	10 (1.8)	
The child's school achievement			
Very good	46 (22.9)	173 (30.6)	.12
Good	121 (60.2)	287 (50.8)	
Moderate	30 (14.9)	93 (16.5)	
Poor	4 (2.0)	12 (2.1)	
The child's gestational age			
Preterm	40 (19.9)	103 (18.2)	.85
Term	149 (74.1)	425 (75.2)	
Postterm	12 (6.0)	37 (6.5)	
The child's mode of delivery			
Vaginal birth	84 (41.8)	236 (41.8)	.99
Cesarean section	117 (58.2)	329 (58.2)	
The child's breastfeeding status			
No	13 (6.5)	23 (4.1)	.16
Yes	188 (93.5)	542 (95.9)	
The duration of breastfeeding (months)			
None	13 (6.5)	23 (4.1)	.48
<6	23 (11.4)	66 (11.7)	
6-12	52 (25.9)	133 (23.5)	
13-18	37 (18.4)	101 (17.9)	
19-24	62 (30.8)	181 (32.0)	
>24	14 (7.0)	61 (10.8)	
The age at toilet training (months)			
<24	132 (65.7)	379 (67.1)	.46
24-36	61 (30.3)	168 (29.7)	
>36	8 (4.0)	18 (3.2)	
Presence of a chronic disease			
Yes	20 (10.0)	45 (8.0)	.38
No	181 (90.0)	520 (92.0)	
Constipation			
Yes	43 (21.4)	86 (15.2)	**.04***
No	158 (78.6)	479 (84.8)	
Burning/pain when urinating			
Yes	10 (5.0)	33 (5.8)	.64
No	191 (95.0)	532 (94.2)	
Frequent urination			
Yes	18 (9.0)	31 (5.5)	.08
No	183 (91.0)	534 (94.5)	
Any changes in the child's life over the past six months			
Yes	43 (21.4)	71 (12.6)	**.003****
No	158 (78.6)	494 (87.4)	
Difficulty waking up at night			
Yes	85 (42.3)	124 (21.9)	**.00*****
No	116 (57.7)	441 (78.1)	

*NE: Nocturnal Enuresis, * p < .05, ** p < .01, *** p < .001*

Table 4. *Characteristics of children with NE (N=201)*

Variables	N	%
The frequency of NE (n=201)		
1-2 times	167	83.09
3-4 times	16	7.97
5-6 times	5	2.48
Every day	13	6.46
Medical treatment status (n=201)		
Yes	20	9.95
No	181	90.05
Treatment responses in medical treatment settings (n=20)		
No change	8	40.0
Reduced bedwetting frequency	11	55.0
Stopped bedwetting	1	5.0
Reasons for not receiving medical treatment (n=181)		
Assuming NE will resolve spontaneously	115	63.54
Assuming NE is behavioral in nature	39	21.55
Pandemic	15	8.28
Thinking that NE treatment will be expensive	12	6.63
Non-pharmacological methods used in addition to medical treatment (n=181)		
Doing nothing – leaving things as they are	71	39.23
Not allowing the child to drink anything at least one hour before bedtime	57	31.50
Waking the child frequently during the night to urinate	37	20.45
Rewarding the child with smiles and praise when they wake up dry	6	3.31
Performing bladder exercises	3	1.66
Ensuring the child goes to the toilet before bedtime	2	1.10
Providing emotional support	2	1.10
Scaring/threatening the child	2	1.10
Explaining the situation to others because the child is too embarrassed to do it	1	0.55
Chronic diseases (n=20)		
Asthma	9	45.00
FMF	3	15.00
Type 1 DM	2	10.00
Allergic diseases	2	10.00
Other (Thyroid gland diseases, Behçet's disease, DI, Duchenne's muscular dystrophy)	4	20.00
Changes in the child's life over the past six months (n=43)		
The birth of a new sibling	9	20.9
Family problems (mother's remarriage, arguments, separation of parents)	8	18.6
Death of a loved one	7	16.3
Change of country/city	6	14.0
Change of school/school-related problems	4	9.3
Diagnosis of a chronic illness in a family member	4	9.3
Mother starting work	3	7.0
Other (financial difficulties, pet ownership)	2	4.6
The impact of the pandemic on NE (n=201)		
No change	183	91.44
Reduced frequency	14	6.97
Increased frequency	3	1.50
The family's tendency to punish/blame/humiliate the child for NE (n=201)		
Yes	13	6.47
No	188	93.53

NE: Nocturnal Enuresis, FMF: Familial Mediterranean Fever, Type 1 DM: Type 1 Diabetes Mellitus, DI: Diabetes insipidus

3.4. Treatment Characteristics

Among children with NE, 83.09% (n=167) wet the bed 1–2 times per week, and 9.95% (n=20) received medical treatment. Of those who received treatment, 55% (n=11) reported a reduction in nighttime wetting. The majority of families (63.54%, n=115) who did not seek medical treatment believed NE would resolve spontaneously. Restricting fluid intake at least one hour before bedtime was the most common non-pharmacological approach (31.5%, n=57). Additional findings indicated that 45% (n=9) of children with both NE and chronic disease had asthma, a new sibling was reported in 20.9% (n=9) of children with NE who experienced a life change, the pandemic did not affect NE in 91.44% (n=183) of cases, and 6.47% (n=13) of children with NE were punished, blamed, or humiliated by their families (Table 4).

4. DISCUSSION

The current study aimed to determine the prevalence of NE among children aged 6–12 years and to identify the associated sociodemographic, family-related, and clinical factors. The present research found a prevalence of NE of 26.2%, indicating that NE remains a common problem in school-aged children and is influenced by multiple biological, familial, and psychosocial factors.

The current study reported an association between NE and parental educational level, perceived income, family history of NE, constipation, life changes in the past six months, and difficulty waking up at night. Most families who did not ensure that their children received treatment believed that NE would resolve on its own. The majority of children with NE wet the bed 1–2 times per week, and half of those receiving treatment reported improvement. Furthermore, the present study determined that the pandemic did not affect most children in terms of NE.

The results of the current section will be discussed under four headings: “Demographic Characteristics, Family-Related Factors, Child-Related Factors, and Treatment Characteristics.”

4.1. Demographic Characteristics

Nocturnal enuresis is defined as involuntary nighttime bedwetting in children over the age of five (2). This study aimed to determine the prevalence of nocturnal enuresis (NE) among children aged 6–12 years and to identify the associated sociodemographic, family-related, and clinical factors. The present research found a prevalence of NE of 26.2%, which is similar to or higher than that reported in many studies from Türkiye and other countries. However, previous work has typically reported lower NE prevalence than we did. Thus, the prevalence of NE in children aged 5-15 years was found to be 4.2% in Japan (23) and 6.7% in India (24). Similar to our study, the prevalence of NE in children aged 6-16 years in Egypt was reported to be 21% (25), 22.2% in the 5-14 age group in Ethiopia (26), and 21.9% in children aged 5-16 years in Saudi Arabia (27). Thus, our results echo earlier findings from studies conducted in Egypt, Ethiopia, and Saudi Arabia, demonstrating that NE is still a common problem in school-aged children and is affected by multiple biological, familial, and psychosocial factors.

4.2. Family-Related Factors

The literature has reported an association between NE in the family and in the child (25, 27). Consistent with previous research, our study found an association between the presence of NE on the mother’s/father’s side and in the sibling, and the presence of NE in the child. A family history of NE suggests that genetic predisposition is important for the development of this condition. In line with earlier work (25, 27), NE may exhibit an autosomal dominant pattern of inheritance, with the risk of occurrence in the child significantly increasing when one of the parents has a history of NE.

4.3. Child-Related Factors

Several studies have found no association between constipation and NE (28, 29), whereas others have demonstrated a significant relationship between constipation and NE, which is in line with our results (30, 31). Constipation may increase bladder pressure, reduce bladder capacity, and contribute to incomplete bladder emptying, which can exacerbate NE symptoms. Therefore, it is essential to assess and manage bowel habits for evaluating and treating children with NE.

Our study indicated that significant changes in a child’s life could impact NE. Consistent with the findings obtained from the current study, the literature has determined that maternal depression (32) and changes in the child’s life (change of location) affect NE in children (25). The emotional climate in the family and the mother–child relationship are crucial to the child’s sense of security and developmental adjustment. Therefore, it is important to consider not only physiological but also psychosocial factors and to provide family-centered support and guidance when evaluating and managing NE.

The current study identified a correlation between NE frequency and difficulty waking up. Likewise, the literature has indicated a relationship between sleep disturbance, deep sleep, and NE (25, 33). Previous research has suggested that children with NE may have impaired arousal mechanisms, making it difficult for them to respond to bladder signals during sleep. Additionally, the present study found that parents of children with NE had low educational levels, which is in line with the literature (27). Low parental education levels may be associated with reduced awareness of child development, toilet training, and behavioral management strategies, thereby contributing to the continuation of NE. These findings emphasize the significance of family-based education and awareness programs in preventing and managing NE.

Some studies have found that the incidence of NE is higher in boys than in girls (23, 27). This finding differs from that of Bolat et al. (34), reporting a similar incidence in children of both sexes, which is in line with our study. This inconsistency may be attributed to differences in sample size, cultural factors, or variations in the definition and reporting of NE across studies. Previous findings have suggested that delayed maturation of bladder control and sleep arousal mechanisms may be more common in boys, which may explain the higher prevalence of NE in some studies.

The current study revealed no association between breastfeeding and the duration of breastfeeding and NE. However, the literature has stated that breastfeeding for more than 18 months protects against NE (35). In line with this finding, another study reported that breastfeeding for more than 3 months might protect against NE in childhood; however, no difference in NE rate was observed between formula-fed and breastfed infants (22). Although our results did not demonstrate a significant association between breastfeeding and NE, previous research has suggested that breastfeeding may contribute to bladder maturation or sleep regulation in certain populations, and cultural or methodological differences may explain inconsistencies in results.

Our results showed no association between the child's gestational week and the occurrence of NE. In contrast to our research, previous studies have reported a higher incidence of NE among preterm infants born before the 37th gestational week (36, 37). A possible explanation for the absence of such a relationship in the present study is that our sample included a limited number of preterm infants. Data from the literature suggest that prematurity affects bladder control and central nervous system maturation, which could predispose to NE. However, this relationship may not be clearly observed in smaller or more homogeneous samples. Furthermore, consistent with the findings of Kanaheswari (38) and Gunes et al. (39), the current study found no association between the child's birth order and NE, suggesting that factors related to family dynamics or sibling relationships may affect NE at a lower level than biological or psychosocial factors.

Contrary to our findings, previous reports have indicated the higher incidence of NE in children with low school achievement (40, 41). A possible explanation for this discrepancy is that we collected data during the COVID-19 pandemic, when education was conducted remotely through distance learning. Consequently, parental perceptions of school achievement may not accurately reflect the actual situation, potentially masking an association with NE.

The current study found no correlation between chronic disease and NE. Likewise, Bilal et al. also obtained similar results (9). These findings suggest that while chronic conditions may impact overall child health, they are not necessarily predictive of nocturnal enuresis.

The mean age at which children in our study acquired toilet habits was 25.37±8.43 months. The literature has suggested that children should ideally undergo toilet training between 24 and 36 months of age (42). In line with our findings, Hansakunachai et al. (43) also reported no relationship between age at toilet training and NE. These results show that the timing of toilet training is not a decisive factor in the development of NE, which is more strongly influenced by genetic, biological, and psychosocial factors.

4.4. Treatment Characteristics

The present study determined that only 9.95% of children with NE received medical treatment. In line with this finding, prior work has also identified the low rate of receiving pharmacological treatment in NE (27, 44). Our research found that families who did not seek medical treatment for their children mostly believed that NE would resolve spontaneously, that it was behavioral in nature, or that they had not received treatment due to the pandemic. Our results are in line with the study by Schlomer et al. (44), reporting that families did not receive treatment for NE because they thought their children could cope with NE on their own, they did not know the treatment methods, believed NE was not serious enough to require treatment, and found NE treatment expensive. Likewise, another study also reported that applications for NE treatment decreased during the pandemic (6). The literature has yielded results similar to those in our study, suggesting that misconceptions about NE, limited awareness of treatment options, and external factors, such as the pandemic, may contribute to undertreatment. Therefore, it is crucial to raise parental awareness and provide information on available treatment options to improve management and outcomes in children with NE.

In the current work, we grouped and analyzed the pandemic-related findings together, revealing that the pandemic did not cause a change in NE symptoms in 91.44% of the children. In contrast to this finding, another study indicated that the pandemic worsened NE symptoms (45). Likewise, desmopressin and behavioral treatment, such as setting alarms and limiting evening fluid intake, were effective during the pandemic, reducing symptoms (46). A possible explanation for the contradictory findings may be differences in restrictions and psychosocial stressors across contexts. Although quarantine measures have significantly changed children's routines, our results indicate that sleep–wake cycles and fluid intake behaviors may not have been sufficiently disrupted to affect NE symptoms in our sample.

This study determined that 6.47% of the participating families punished, humiliated, or scared their children with NE. The findings above support previous research indicating that families punished their children and experienced anger (44, 47). Our results are in line with the literature, suggesting that some families still use punitive responses despite evidence that such practices may exacerbate psychosocial problems. Therefore, parent education programs are needed to promote supportive and non-punitive strategies.

4.5. Limitations

The present study has a few limitations. First, the cross-sectional design does not allow for causal inferences. Thus, causal relationships between NE and the associated factors could not be established. Second, data were collected based solely on parental self-report, which may be subject to both recall and social desirability bias. For example, sensitive issues such as punishment, blame, or humiliation of children may have been underreported. Third, since the data were collected online via Google Docs and WhatsApp, there is a risk of selection bias because families without internet access or adequate digital literacy may have been excluded. Fourth, variables such as breastfeeding status and age at toilet training were based on parental recall, which may be inaccurate or inconsistent, further contributing to recall bias. Fifth, the diagnosis of nocturnal enuresis was not clinically confirmed but reported by parents, which may have affected diagnostic accuracy. Sixth, this study did not include some important risk factors identified in the literature, such as obesity and sleep disorders; hence they should be examined in future research. Despite the limitations above, our study provides valuable insights into the prevalence of NE and associated factors in school-aged children and highlights the need for further research with more comprehensive and clinically validated designs.

5. CONCLUSION

NE was found to be common in children aged 6–12 years. Family-related characteristics (such as lower parental education levels, low perceived income–expense levels, and a family history of NE) as well as child-related factors (including constipation, recent life changes, and difficulty waking at night) were associated with the higher prevalence of NE. In contrast, variables such as breastfeeding and the COVID-19 pandemic did not correlate significantly with NE. Few families sought treatment for NE, whereas some parents reported punitive responses to children with NE.

These results highlight the importance of early identification, family-centered education, and the promotion of supportive rather than punitive approaches. Pediatric nurses play a crucial role in screening children at risk, counseling families, and providing education on non-pharmacological management strategies in conjunction with medical treatment when indicated. At a broader level, the results support the development of community-based education programs and policies aimed at reducing stigma and fostering children's psychosocial well-being. It is recommended that future longitudinal and mixed-methods studies explore the long-term effects of family responses and environmental stressors on NE.

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