



The Relationship between Toilet Training Experiences and Nocturnal Enuresis in Children Aged 6-15 Years

6-15 Yaş Arası Çocuklarda Tuvalet Eğitimi Deneyimleri ile Nocturnal Enürezis Arasındaki İlişki

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ABSTRACT

Aim: This study aimed to determine the relationship between toilet training experiences and the development of primary monosymptomatic nocturnal enuresis (PMNE) in children aged 6-15 years, and to evaluate the potential protective effect of child-oriented approaches.

Materials and Methods: This retrospective and analytical study included 357 children (165 with PMNE and 192 controls) who were admitted to the Child Health Surveillance Outpatient Clinics of Tekirdağ Namık Kemal University between January 2022 and March 2025 and had complete medical records. Data were obtained through a retrospective review of patient files and follow-up records and were transferred into a structured data collection form including demographic characteristics, toilet training history, and factors associated with enuresis. For statistical analysis, Student's t-test was used for continuous variables and the chi-square test for categorical variables. Multivariable logistic regression analysis was performed to identify independent risk factors. Statistical significance was set at $p < 0.05$.

Results: Children with enuresis started toilet training earlier (19.5 ± 5.4 months) and were more frequently subjected to parent-directed methods ($p < 0.001$). The child-oriented approach showed an independent protective effect against PMNE [odds ratio (OR)=0.42; 95% confidence interval (CI): 0.25-0.70; $p < 0.001$], while starting toilet training before 18 months increased the risk (OR=1.89; 95% CI: 1.10-3.27; $p = 0.021$). Family history of enuresis, constipation, and difficulty initiating sleep were also significantly associated with PMNE ($p < 0.05$).

Conclusion: Supportive, developmentally appropriate, and non-punitive toilet training methods reduce the risk of PMNE, whereas early, coercive, or parent-centered approaches increase it. These findings highlight the importance of addressing toilet training as a biopsychosocial process and underscore the need for parental education in this context.

Keywords: Toilet training, nocturnal enuresis, child-oriented approach, parental attitude, child development

ÖZ

Amaç: Bu çalışmada, 6-15 yaş arası çocuklarda tuvalet eğitimi deneyimleri ile primer monosemptomatik nocturnal enürezis (PMNE) gelişimi arasındaki ilişkinin belirlenmesi ve çocuk odaklı yaklaşımların potansiyel koruyucu etkisinin değerlendirilmesi amaçlandı.

Gereç ve Yöntem: Bu retrospektif ve analitik çalışmaya, Ocak 2022-Mart 2025 tarihleri arasında Tekirdağ Namık Kemal Üniversitesi Çocuk Sağlığı İzlem Poliklinikleri'ne başvuran ve tıbbi kayıtları eksiksiz olan 357 çocuk (165 PMNE'li ve 192 kontrol) dahil edildi. Veriler, hasta dosyaları ve takip kayıtlarının retrospektif olarak incelenmesiyle elde edildi ve demografik özellikler, tuvalet eğitimi öyküsü ve enürezis ile ilişkili faktörleri içeren yapılandırılmış bir veri toplama formuna aktarıldı. İstatistiksel analizde sürekli değişkenler için Student t-testi, kategorik değişkenler için ki-kare testi kullanıldı. Bağımsız risk faktörlerini belirlemek amacıyla çok değişkenli lojistik regresyon analizi yapıldı. İstatistiksel anlamlılık düzeyi $p < 0,05$ olarak kabul edildi.

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Bulgular: Enürezisi olan çocukların tuvalet eğitimine daha erken başladığı ($19,5 \pm 5,4$ ay) ve ebeveyn yönlendirmeli yöntemlere daha sık maruz kaldığı belirlendi ($p < 0,001$). Çocuk odaklı yaklaşımın PMNE'ye karşı bağımsız koruyucu etki gösterdiği [olasılık oranı (OR)=0,42; %95 güven aralığı (GA): 0,25-0,70; $p < 0,001$], tuvalet eğitimine 18 aydan önce başlanmasının ise riski artırdığı saptandı (OR=1,89; %95 GA: 1,10-3,27; $p = 0,021$). Ailede enürezis öyküsü, kabızlık ve uykuya dalmada güçlük de PMNE ile anlamlı düzeyde ilişkili bulundu ($p < 0,05$).

Sonuç: Destekleyici, gelişimsel olarak uygun ve cezalandırıcı olmayan tuvalet eğitimi yöntemleri PMNE riskini azaltırken, erken, zorlayıcı veya ebeveyn merkezli yaklaşımlar riski artırmaktadır. Bu bulgular, tuvalet eğitiminin biyopsikososyal bir süreç olarak ele alınmasının önemini ortaya koymakta ve bu bağlamda ebeveyn eğitiminin gerekliliğini vurgulamaktadır.

Anahtar Kelimeler: Tuvalet eğitimi, nokturnal enürezis, çocuk odaklı yaklaşım, ebeveyn tutumu, çocuk gelişimi

INTRODUCTION

Toilet training represents a complex developmental transition that extends beyond the acquisition of bladder and bowel control. It involves the integration of neurological maturation, cognitive awareness, emotional regulation, and the quality of parent-child interaction. Although often perceived as a routine milestone, the process varies widely depending on cultural expectations, parental attitudes, and individual child readiness. These variations may shape early voiding behaviors and potentially influence later continence outcomes¹.

When toilet training is initiated in alignment with a child's developmental signals and conducted in a supportive, non-coercive manner, it may promote adaptive recognition of bladder and bowel cues and facilitate healthy toileting habits. In contrast, approaches characterized by premature initiation, rigid scheduling, or punitive responses may generate stress and negative toileting experiences. Such experiences have been hypothesized to interfere with the child's ability to develop consistent voluntary control, possibly contributing to subsequent urinary control difficulties^{2,3}.

Nocturnal enuresis is defined as involuntary urinary incontinence during sleep in children aged five years and older. Primary monosymptomatic nocturnal enuresis (PMNE) refers to bedwetting in the absence of daytime lower urinary tract symptoms, anatomical abnormalities, or underlying neurological conditions². Although the prevalence of PMNE declines with age, it remains a common pediatric concern and is reported more frequently in boys. Beyond its clinical presentation, PMNE may impose a substantial psychosocial burden, affecting children's self-esteem, emotional well-being, and family dynamics³.

The pathophysiology of PMNE is considered multifaceted, involving the interplay of genetic susceptibility, nocturnal urine production, functional bladder capacity, arousal mechanisms during sleep, and hormonal regulation. In addition to these biological factors, environmental and behavioral influences have gained increasing attention⁴⁻⁶. Toilet training characteristics—including the age at initiation, training approach, parental responses, and the emotional context of the training process—have therefore been proposed as modifiable factors that may

contribute to continence development. Potential mechanisms include stress-induced alterations in voiding behavior, reduced interoceptive awareness of bladder sensations, and the establishment of maladaptive toileting patterns in response to coercive practices⁷.

Contemporary pediatric guidance emphasizes the importance of a child-oriented toilet training approach that respects individual developmental readiness and discourages punitive strategies⁸. However, despite these recommendations, considerable heterogeneity persists in both parental practices and research findings. Existing studies differ in their definitions of toilet training methods, assessment tools, and cultural contexts, limiting the comparability of results and the generalizability of conclusions⁹.

In this context, the present study aimed to evaluate the association between toilet training characteristics—specifically the timing of initiation, training approach, parental attitudes, and selected training-related experiences—and PMNE in children aged 6–15 years. This age range allows assessment beyond the expected period of continence acquisition and provides an opportunity to examine long-term associations. In addition, we sought to describe accompanying clinical and familial factors relevant to routine pediatric follow-up and preventive counseling.

MATERIALS AND METHODS

Study Design and Setting

This investigation was conducted using a retrospective analytical cross-sectional design to evaluate the association between toilet training practices and PMNE in school-aged children.

The study was carried out at the Child Health Surveillance Outpatient Clinics Tekirdağ Namık Kemal University between January 2022 and March 2025. Medical records of children aged 6–15 years who attended routine pediatric follow-up visits during the study period were retrospectively reviewed.

Selecting children within this age range allowed evaluation beyond the expected age of physiological continence acquisition.

Study Population and Sample Size

The study population consisted of children aged 6-15 years with complete medical records available in the hospital database during the study period.

Sample size estimation was based on previously reported prevalence rates of nocturnal enuresis, assuming a statistical power of 80% and a two-sided significance level of 0.05.

A total of 357 children who met the eligibility criteria were included in the final analysis.

- Children were excluded if they had:
- Neurodevelopmental delay
- Congenital or acquired urinary tract abnormalities
- Known neurological disorders
- Diabetes mellitus
- Chronic systemic disease
- Regular medication use that could affect bladder function

These criteria were applied to minimize confounding factors influencing bladder control.

Group Classification

Participants were categorized retrospectively into two groups based on documented clinical diagnosis and parental reports recorded in medical files:

Enuresis Group (n=165)

Children fulfilling internationally accepted criteria for PMNE, defined as recurrent involuntary urinary incontinence during sleep in children aged five years or older, without accompanying daytime lower urinary tract symptoms¹⁰.

Control Group (n=192)

Age- and sex-comparable children with no current or previous history of nocturnal enuresis according to medical records and parental reporting.

Data Collection

Data were obtained retrospectively from two sources:

1. Electronic medical records
2. Structured parental information forms recorded during clinic visits.

Where necessary, missing historical information regarding toilet training was confirmed through standardized follow-up phone interviews conducted by trained investigators.

All data were anonymized prior to statistical analysis.

Study Variables

Data collection covered three principal domains.

Sociodemographic characteristics

- Child's age and sex
- Number of siblings
- Parental education level
- Parental occupation
- Household income status

Toilet training characteristics

- Age at initiation of toilet training
- Predominant training approach (child-oriented vs. parent-directed)
- Type of toileting equipment used (potty chair, toilet seat adapter, footrest)
- Parental attitudes during training (supportive, neutral, punitive)
- Duration of toilet training process

Factors potentially associated with PMNE

- Frequency of nocturnal bedwetting episodes
- Family history of enuresis
- Sleep characteristics (deep sleep, difficulty awakening)
- History of constipation
- Habitual fluid intake patterns

Classification of Toilet Training Approach

Toilet training approaches were retrospectively categorized based on recorded parental descriptions regarding timing of initiation, presence of developmental readiness cues (e.g., communication of toileting needs, expressed interest in toilet use), and reported disciplinary strategies.

Training characterized by responsiveness to developmental readiness and non-punitive guidance was classified as child-oriented, whereas training primarily initiated according to parental scheduling or involving coercive strategies was classified as parent-directed.

Validity Procedures

Questionnaire-based variables had previously been developed following literature review and were assessed for content validity by three pediatric specialists. Prior to implementation in clinical practice, pilot testing had been conducted and minor wording adjustments were made to enhance clarity and reliability. Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Tekirdağ Namık Kemal University (approval no: 2026.17.01.17, date: 27.01.2026). Given the retrospective nature of the study, written informed consent had been obtained during routine clinical evaluations, and additional consent was secured when follow-up contact was required. The study adhered to the principles of the Declaration of Helsinki.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows (version 20.0). Normality of continuous variables was assessed using the Kolmogorov-Smirnov test. Continuous variables were expressed as mean $\pm$ standard deviation or median (minimum-maximum), while categorical variables were summarized as frequencies and percentages.

Between-group comparisons were conducted using:

- Student's t-test (normally distributed variables)
- Mann-Whitney U test (non-normal distribution)
- Chi-square or Fisher's exact test (categorical variables)

To determine independent predictors of PMNE, a multivariable

logistic regression model was constructed. Model fit was evaluated using the Hosmer-Lemeshow goodness-of-fit test.

Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A p-value <0.05 was considered statistically significant.

RESULTS

Participant Characteristics

A total of 357 children were included in the analysis, comprising 165 children in the enuresis group and 192 children in the control group. The mean age of the overall study population was 9.2 ± 2.7 years, with no statistically significant difference in age distribution between the two groups ($p > 0.05$) (Table 1).

Male participants constituted 57% of the total sample. The proportion of boys was significantly higher in the enuresis group compared with the control group (65.5% vs. 49.0%, respectively; $p = 0.004$) (Table 1).

No significant differences were observed between groups with respect to socioeconomic variables, including parental education level, household income status, or number of siblings (all $p > 0.05$). In both groups, the majority of participants were from families with a middle socioeconomic background, and parental education levels were predominantly high school or above (Table 1).

Toilet Training Characteristics

Across the entire cohort, the mean age at initiation of toilet training was 20.8 ± 5.9 months. Children in the enuresis group began toilet training at a younger age than those in

Table 1. Demographic characteristics of the participants by study group

	Enuresis group (n=165)	Control group (n=192)	Total (n=357)	p-value
Age (years, mean $\pm$ SD)	9.3 $\pm$ 2.8	9.1 $\pm$ 2.6	9.2 $\pm$ 2.7	>0.05
Sex				
• Male, n (%)	108 (65.5)	94 (49.0)	202 (56.6)	0.004
• Female, n (%)	57 (34.5)	98 (51.0)	155 (43.4)	
Socioeconomic status				
				>0.05
• Low, n (%)	36 (21.8)	38 (19.8)	74 (20.7)	
• Middle, n (%)	104 (63.0)	122 (63.5)	226 (63.3)	
• High, n (%)	25 (15.2)	32 (16.7)	57 (16.0)	
Parental education level				
				>0.05
• Primary school or below, n (%)	41 (24.8)	47 (24.5)	88 (24.6)	
• High school, n (%)	79 (47.9)	89 (46.4)	168 (47.1)	
• University or above, n (%)	45 (27.3)	56 (29.1)	101 (28.3)	
Number of siblings (mean $\pm$ SD)	1.8 $\pm$ 0.9	1.7 $\pm$ 0.8	1.8 $\pm$ 0.8	>0.05
Data are presented as mean $\pm$ SD or percentage (%). Statistical significance was defined as $p < 0.05$, SD: Standard deviation				

the control group (19.5 ± 5.4 months vs. 21.9 ± 6.2 months; $p=0.018$) (Table 2).

The age at achievement of daytime urinary continence did not differ significantly between the enuresis and control groups (26.3 ± 8.1 months vs. 24.5 ± 6.9 months; $p=0.065$). In contrast, nighttime urinary continence was achieved at a later age among children with enuresis compared with controls (35.2 ± 9.8 months vs. 32.4 ± 8.7 months; $p=0.041$) (Table 2).

Child-oriented toilet training approaches were reported more frequently in the control group than in the enuresis group (76.6% vs. 56.4%; $p<0.001$). Conversely, parent-directed training methods were more common among children with enuresis (43.6% vs. 23.4%; $p<0.001$) (Table 2).

With respect to toileting equipment, the use of potty chairs did not differ significantly between groups (61.2% in the enuresis group vs. 68.8% in the control group; $p=0.132$). However,

toilet seat adapters or footrests were used more frequently in the control group than in the enuresis group (35.9% vs. 23.0%; $p=0.012$) (Table 2).

Association between Toilet Training Characteristics and Nocturnal Enuresis

The prevalence of nocturnal enuresis varied significantly according to toilet training approach. Among children trained using a child-oriented approach, 38.8% had nocturnal enuresis, whereas this proportion increased to 61.2% among those trained using parent-directed methods ($p<0.001$) (Table 3).

In multivariable logistic regression analysis, child-oriented toilet training was independently associated with a reduced likelihood of nocturnal enuresis (OR=0.42; 95% CI: 0.25-0.70; $p<0.001$). Initiation of toilet training before 18 months of age was independently associated with an increased likelihood of enuresis (OR=1.89; 95% CI: 1.10-3.27; $p=0.021$) (Table 3).

Table 2. Distribution of toilet training-related variables according to study group

	Enuresis group (n=165)	Control group (n=192)	p-value
Age at initiation of toilet training (months, mean $\pm$ SD)	19.5 ± 5.4	21.9 ± 6.2	0.018
Age at attainment of daytime continence (months, mean $\pm$ SD)	26.3 ± 8.1	24.5 ± 6.9	0.065
Age at attainment of nighttime continence (months, mean $\pm$ SD)	35.2 ± 9.8	32.4 ± 8.7	0.041
Child-oriented method, n (%)	93 (56.4)	147 (76.6)	<0.001
Parent-directed method, n (%)	72 (43.6)	45 (23.4)	<0.001
Use of potty chair, n (%)	101 (61.2)	132 (68.8)	0.132
Use of toilet seat adapter/footrest, n (%)	38 (23.0)	69 (35.9)	0.012

Data are presented as mean $\pm$ SD or percentage (%). Statistical significance was defined as $p<0.05$, SD: Standard deviation

Table 3. Multivariate logistic regression analysis of factors associated with nocturnal enuresis

	B (β coefficient)	OR	95% CI	p-value
Toilet training method				
• Child-oriented method	-0.87	0.42	0.25-0.70	<0.001
• Parent-directed method*	—	1.00 (reference)	—	—
Age at initiation of toilet training				
• <18 months	0.64	1.89	1.10-3.27	0.021
• ≥ 18 months* ^{>}	—	1.00 (reference)	—	—
Sex (Male)	0.48	1.61	1.02-2.55	0.039
Family history of enuresis (present)	0.53	1.70	1.04-2.78	0.033
History of constipation (present)	0.29	1.34	0.79-2.26	0.028
Socioeconomic status (middle and above)	-0.22	0.80	0.48-1.33	0.394

*Reference category, OR: Odds ratio, CI: Confidence interval

Table 4. Distribution of additional factors associated with enuresis

	Enuresis group (n=165)	Control group (n=192)	p-value
Family history of enuresis, n (%)	79 (47.9)	47 (24.5)	<0.001
History of constipation, n (%)	48 (29.1)	31 (16.1)	0.012
Difficulty falling asleep, n (%)	37 (22.4)	24 (12.5)	0.039

Data are presented as percentages (%). Statistical significance was defined as $p < 0.05$

Male sex (OR=1.61; 95% CI: 1.02-2.55; $p=0.039$), a positive family history of enuresis (OR=1.70; 95% CI: 1.04-2.78; $p=0.033$), and a history of constipation (OR=1.34; 95% CI: 0.79-2.26; $p=0.028$) were also identified as independent factors associated with nocturnal enuresis. Socioeconomic status was not independently associated with enuresis in the multivariable model (Table 3, Figure 1).

Associated Clinical and Familial Factors

A family history of nocturnal enuresis was reported in nearly half of the children in the enuresis group (47.9%), compared with 24.5% of children in the control group ($p < 0.001$) (Table 4).

Constipation was more frequently reported among children with enuresis than among controls (29.1% vs. 16.1%; $p=0.012$). In addition, difficulties initiating sleep were reported more commonly in the enuresis group than in the control group (22.4% vs. 12.5%; $p=0.039$) (Table 4).

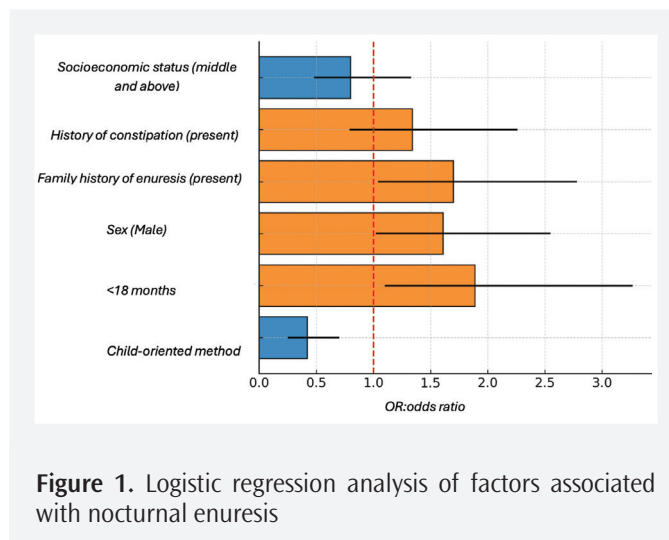
DISCUSSION

Principal Findings

In this cross-sectional study evaluating children aged 6-15 years, we found that toilet training practices were significantly associated with the presence of PMNE. Specifically, child-oriented toilet training approaches were independently associated with a lower likelihood of PMNE, whereas parent-directed and early-initiated training practices were associated with an increased likelihood¹¹. In addition, male sex, positive family history of enuresis, and constipation were more frequently observed among children with PMNE. These findings underscore the multifactorial nature of nocturnal enuresis and highlight the potential relevance of early-life behavioral experiences in continence development¹².

Toilet Training Approach and PMNE

The observed association between child-oriented toilet training and a reduced likelihood of PMNE aligns with previous studies emphasizing the importance of developmental readiness and supportive parental attitudes during the toilet training process¹³. Rather than focusing solely on the timing of training initiation, our findings suggest that how toilet training is conducted may be more influential than when it is initiated. This observation is


Figure 1. Logistic regression analysis of factors associated with nocturnal enuresis

consistent with reports indicating that coercive or performance-oriented parental approaches may introduce stress and anxiety into toileting experiences, potentially interfering with adaptive voiding behaviors^{14,15}.

The child-oriented model, originally described by Brazelton, emphasizes responsiveness to the child's physiological and psychological readiness cues. Such an approach may facilitate the development of appropriate bladder awareness and voluntary control by allowing children to internalize bodily signals at their own pace^{16,17}. In contrast, parent-directed strategies may prioritize parental expectations over child readiness, which could contribute to maladaptive toileting behaviors or avoidance responses¹⁸. Although causal inference cannot be established due to the study design, the independent association observed in our multivariable analysis supports the clinical relevance of training quality in relation to continence outcomes.

Timing of Toilet Training and Developmental Readiness

In the present study, initiation of toilet training before 18 months of age was independently associated with an increased likelihood of PMNE. Early initiation may precede sufficient neurological maturation and cognitive readiness, limiting the child's capacity to consistently recognize and respond to bladder fullness. This finding is consistent with studies suggesting that premature training may be associated with later urinary control difficulties^{19,20}.

However, the literature regarding the optimal timing of toilet training remains inconsistent. Some studies have reported no adverse outcomes associated with early training, while others have suggested potential associations with dysfunctional voiding or delayed continence acquisition^{21,22}. These discrepancies likely reflect differences in cultural norms, parental expectations, and training methods across populations²³. Taken together, our findings support the notion that chronological age alone is an insufficient determinant of successful toilet training and that developmental readiness and training approach should be considered jointly.

Familial and Clinical Factors

A positive family history of nocturnal enuresis was significantly more common among children with PMNE in our cohort, consistent with previous studies demonstrating a strong familial component²⁴⁻²⁶. While genetic susceptibility is likely to play a central role, shared environmental factors and parental responses to toileting behaviors may also contribute to this association. Children raised in households where enuresis is normalized or managed with heightened anxiety may experience different toileting dynamics that influence continence outcomes²⁷.

Constipation was also more frequently reported among children with PMNE. Although constipation did not emerge as a strong independent predictor in the multivariable model, its higher prevalence suggests a potential interaction within the broader framework of bladder–bowel dysfunction^{28,29}. Rectal distension and altered pelvic floor dynamics may adversely affect bladder function, while shared behavioral and sensory factors could further complicate continence regulation^{30,31}.

Sleep-related difficulties, particularly problems initiating sleep, were more common among children with PMNE³⁰⁻³². Altered sleep patterns and increased arousal thresholds have been proposed as contributing factors in nocturnal enuresis, potentially limiting the child's ability to awaken in response to bladder signals during sleep. While causality cannot be determined, these findings reinforce the importance of considering sleep characteristics in the clinical evaluation of enuretic children.

Toileting Equipment and Environmental Factors

An interesting finding of this study was the higher use of toilet seat adapters and footrests among children without PMNE^{33,34}. Ergonomic toileting equipment may enhance postural stability and promote pelvic floor relaxation, facilitating effective bladder emptying^{35,36}. Although this association should be interpreted cautiously, as it may reflect broader parental awareness rather than a direct causal effect, it highlights a

potentially modifiable environmental factor that has received limited attention in the existing literature. Future studies are warranted to further explore the role of toileting ergonomics in continence development.

Study Limitations

This study has several notable strengths. First, it was conducted in a tertiary university hospital setting with a relatively large sample size, enhancing the statistical power and reliability of the findings. The inclusion of both clinical record review and structured parental data allowed comprehensive assessment of toilet training characteristics and factors associated with PMNE.

Second, strict exclusion criteria were applied to minimize confounding conditions that could independently affect bladder function, thereby increasing internal validity. Additionally, the use of multivariable logistic regression analysis enabled adjustment for potential confounders and identification of variables independently associated with PMNE.

Third, the classification of toilet training approaches was based on predefined developmental and behavioral criteria rather than solely on timing, allowing a more nuanced evaluation of training quality.

However, several limitations should be acknowledged. The retrospective design inherently limits the ability to establish causal relationships between toilet training practices and PMNE. Data regarding toilet training experiences were partly based on parental recall, which may introduce recall bias, particularly given the time interval between training and evaluation.

Furthermore, although efforts were made to verify missing data through follow-up contact, when possible, some variables may have been subject to incomplete documentation in medical records. The study was conducted in a single-center tertiary care institution, which may limit the generalizability of the findings to different sociocultural or primary care settings.

Finally, unmeasured factors such as parental psychological profiles, detailed parenting styles, and environmental stressors were not systematically evaluated and may have influenced continence outcomes.

Despite these limitations, the study provides clinically meaningful insight into the association between toilet training approaches and PMNE, highlighting the potential role of developmental readiness and supportive parental strategies in continence outcomes. Prospective longitudinal studies are warranted to clarify temporal relationships and better establish potential causal pathways between early toilet training experiences and later bladder control outcomes.

Clinical Implications

The findings of this study support a biopsychosocial perspective on PMNE. Pediatric counseling regarding toilet training should emphasize developmental readiness, supportive parental attitudes, and avoidance of punitive practices. Addressing coexisting factors such as constipation and sleep-related difficulties may further improve continence outcomes. Integrating guidance on ergonomic toileting environments into routine pediatric care may represent an additional, low-risk strategy to support healthy voiding habits.

CONCLUSION

The findings of this study indicate that toilet training practices are meaningfully associated with the presence of PMNE in children aged 6-15 years. Child-oriented approaches that respect developmental readiness and emphasize supportive parental attitudes were associated with more favorable continence outcomes, whereas early and parent-directed training practices were linked to an increased likelihood of nocturnal enuresis. These observations reinforce the concept that continence development is shaped not only by biological maturation but also by early behavioral experiences and the emotional context in which toileting skills are acquired.

In addition to toilet training characteristics, familial predisposition and coexisting factors such as constipation and sleep-related difficulties were more frequently observed among children with nocturnal enuresis, underscoring the multifactorial nature of this condition. Taken together, these findings support a holistic, biopsychosocial approach to the evaluation and management of enuretic children.

From a clinical perspective, pediatric guidance on toilet training should prioritize developmental readiness, avoid punitive strategies, and encourage positive parent-child interactions. Addressing accompanying bowel and sleep issues and promoting appropriate toileting environments may further support healthy voiding behaviors. Future longitudinal studies are warranted to clarify causal pathways and to determine whether early modifications in toilet training practices can contribute to the prevention of nocturnal enuresis.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Tekirdağ Namık Kemal University (approval no: 2026.17.01.17, date: 27.01.2026).

Informed Consent: Given the retrospective nature of the study, written informed consent had been obtained during routine clinical evaluations, and additional consent was secured when follow-up contact was required.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.N., Concept: A.N., E.T., Design: A.N., C.T., Data Collection or Processing: A.N., E.T., C.T., Analysis or Interpretation: B.N., Literature Search: E.T., C.T., Writing: A.N., B.N.

Conflict of Interest: Two authors of this article, Ayşin NALBANTOĞLU and Burçin NALBANTOĞLU, are members of the Editorial Board of the Namık Kemal Medical Journal. However, they did not involved in any stage of the editorial decision of the manuscript. The editors who evaluated this manuscript are from different institutions. The other authors declared no conflict of interest.

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