

Prevalence of Nocturnal Enuresis and Factors Associated with Wet-Night Frequency among Children Attending Four Pediatric Hospitals in Baghdad, 2025

Dhuha Qassim Mohammed Salih¹, Sahar A. Esa Al-Shatari² , Hassan Mahmoud Salman³

¹M.B.Ch.B., Iraqi Ministry of Health, Baghdad, Iraq

²M.B.Ch.B., FICMS, Retired from the Iraqi Ministry of Health, Baghdad, Iraq

³M.B.Ch.B., Al-Yarmouk Teaching Hospital, Baghdad, Iraq

Email: dahoshkassim@gmail.com, saharissa2020@gmail.com, Hasan7mahmood@gmail.com

How to cite this paper: Salih, D.Q.M., Al-Shatari, S.A.E. and Salman, H.M. (2026) Prevalence of Nocturnal Enuresis and Factors Associated with Wet-Night Frequency among Children Attending Four Pediatric Hospitals in Baghdad, 2025. *Journal of Biosciences and Medicines*, **14**, 315-337.
<https://doi.org/10.4236/jbm.2026.148027>

Received: July 14, 2026

Accepted: August 24, 2026

Published: August 27, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Nocturnal enuresis has multifactorial etiologies and exerts significant psychological and social burdens on affected children and their families. **Objectives:** To estimate the prevalence of nocturnal enuresis among children aged 5 - 15 years attending selected pediatric clinics and to identify demographic, sociodemographic, medical, and psychosocial factors associated with wet-night frequency among affected children. **Subjects and Methods:** A hospital-based cross-sectional analytic study was conducted from 2 January to 31 August 2025 in four major pediatric hospitals in Baghdad. Caregivers of children aged 5 - 15 years were approached consecutively during clinic sessions. Each caregiver represented one unique child, repeat visits were excluded by matching names during data collection, and no eligible caregiver declined participation. Children with nocturnal enuresis were assessed through face-to-face caregiver interviews using a semi-structured, expert-validated questionnaire. Diagnosis and exclusion of medical causes were confirmed by a specialist pediatrician or pediatric neurologist. **Results:** Of 1087 children screened, 252 had nocturnal enuresis, giving a clinic-attender prevalence of 23.18% (95% CI, 20.77% - 25.78%). The mean age of affected children was 8.9 ± 3.0 years, and 127 (50.4%) were male. A positive family history was reported in 150 (59.5%). Every-night wetting was reported in 139 (55.2%). Based on the dry-period history, 232 (92.1%) had primary and 20 (7.9%) had secondary enuresis. Wetting occurred only at night in 222 (88.1%) and during both day and night in 30 (11.9%). Only 77 (30.6%) families had sought medical consultation. In adjusted multinomial

regression, having four or more siblings was associated with wetting on more than two nights versus two or fewer nights per week (adjusted odds ratio [aOR], 3.96; 95% CI, 1.61 - 9.74). Maternal primary education, compared with secondary education or higher, was associated with every-night wetting versus two or fewer nights per week (aOR, 3.86; 95% CI, 1.24 - 12.02). Other adjusted associations were not statistically significant. **Conclusion:** Nocturnal enuresis was common among children attending the selected pediatric clinics, but this hospital-based estimate should not be generalized to all children in Baghdad. Wet-night frequency was independently associated with sibling number and maternal educational level in the adjusted analysis. The condition was accompanied by substantial family burden and low use of professional care.

Keywords

Nocturnal Enuresis, Caregiver, Prevalence, Associated Factors, Baghdad, Iraq

1. Introduction

Nocturnal enuresis (NE), commonly known as bedwetting, affects children and adolescents worldwide [1]. It may impair emotional well-being, self-esteem, social participation, academic functioning, and quality of life, while also placing stress on families [2]. Enuresis refers to repeated voiding into bed or clothes in a child who has reached an age at which bladder control is developmentally expected [3]. For research purposes, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) requires a developmental age of at least five years, clinically significant distress or impairment or a frequency of at least twice weekly for three consecutive months, and exclusion of substance effects or another medical condition [4].

Enuresis is often underreported, and many parents do not perceive it as a condition requiring medical care [5]. Prevalence estimates vary according to age, study design, diagnostic definition, and cultural context. Approximately 10% - 20% of five-year-old children may be affected, with prevalence decreasing to about 1% - 3% by adolescence [3] [6]. Some studies report higher prevalence among boys, particularly at younger ages [3].

NE is multifactorial. Reported associated factors include age, sex, family history, urinary tract infection, stressful events, constipation, sleep problems, socioeconomic conditions, and behavioral or emotional difficulties [3] [6] [7].

Regional estimates also vary, including 10.2% in Iran [8], 18% in Egypt [9], and 30.5% in a referral continence clinic in Abu Dhabi [10]. Local hospital-based estimates may help clinicians recognize the burden among children attending care, although they cannot provide a population estimate for all children in Baghdad.

2. Aim of the Study

This study aimed to estimate the prevalence of nocturnal enuresis among children aged 5 - 15 years attending selected pediatric clinics and to identify factors associated with wet-night frequency among affected children.

3. Objectives of the Study

- 1) To estimate the prevalence of nocturnal enuresis among children aged 5 - 15 years attending the selected pediatric clinics.
- 2) To identify the demographic and sociodemographic profile of patients with nocturnal enuresis.
- 3) To evaluate medical and physiological factors, including family history and underlying health conditions, and psychological and behavioral factors, such as stress, anxiety, and sleep patterns, linked to nocturnal enuresis.
- 4) To evaluate factors associated with wet-night frequency among children with nocturnal enuresis.

4. Patients and Methods

4.1. Study Design and Settings

A hospital-based cross-sectional study with an analytic component was conducted from 2 January to 31 August 2025. Data were obtained from caregivers of children aged 5 - 15 years attending four high-volume pediatric hospitals in Baghdad. Two hospitals were in Al-Rusafa: Children Welfare Teaching Hospital/Medical City and Ibn Al-Balady Children and Maternity Hospital. Two were in Al-Karkh: Al-Kadhimiya Hospital for Children and the Central Teaching Hospital of Pediatrics.

4.2. Ethical Issues

Following approval by the Ethical and Scientific Council of the Arab Board of Health Specializations in Iraq, the study was conducted in compliance with established ethical standards. All required permissions were secured, and informed consent was obtained from caregivers before face-to-face interviews. Consent was given verbally. A note on all data collection forms explained the significance of the study, the voluntary nature of participation, and the confidentiality of participant information.

4.3. Study Population

The screened population consisted of caregivers of children aged 5 - 15 years attending pediatric, psychiatric, and urological consultation clinics at the four selected hospitals. Each caregiver represented one unique child.

4.4. Sampling Technique

A non-probability, consecutive clinic-based sampling method was used. During eligible clinic sessions, caregivers were approached consecutively and screened for

nocturnal enuresis. Repeat visits were identified and excluded by matching the child's name in the data-collection record. No eligible caregiver declined participation. Detailed questionnaire data were collected only for children meeting the nocturnal-enuresis criteria; therefore, analyses of associated factors concern wet-night frequency among cases rather than the occurrence of enuresis.

4.4.1. Inclusion Criteria

All consecutively approached caregivers of children aged 5 - 15 years were asked whether the child experienced nocturnal enuresis. In total, 1087 unique children were screened, and 252 met the study criteria. No eligible caregiver declined screening or participation. Face-to-face interviews were then conducted with the caregivers of affected children.

4.4.2. Exclusion Criteria

- 1) Children with severe behavioral or cognitive disorders.
- 2) Children with neurological conditions, including cerebral palsy, or congenital bladder abnormalities.
- 3) Children with bladder or urethral abnormalities requiring surgical intervention.

4.4.3. Diagnosis of Nocturnal Enuresis

The diagnosis was operationalized using the DSM-5-TR framework [4]. The questionnaire confirmed that the child was at least five years old, that involuntary urination occurred during sleep, that the symptom frequency was at least twice weekly or caused clinically relevant concern, and that symptoms had persisted for at least three consecutive months. The interview also recorded wet nights per week, overall symptom duration, daytime wetting, and the duration of any previous dry period. Diagnosis and exclusion of neurological, congenital urological, or other relevant medical causes were confirmed by a specialist pediatrician or pediatric neurologist.

Primary enuresis was defined as no previous dry period lasting at least six months. Secondary enuresis was defined as recurrence after a dry period of at least six months, according to ICCS terminology [6]. Children were also described as having night-only or combined day-and-night wetting. A complete ICCS daytime lower urinary tract symptom inventory was not included in the questionnaire; therefore, reliable classification as monosymptomatic or non-monosymptomatic enuresis was not possible.

4.5. The Questionnaire

The study questionnaire was developed by the researcher following a comprehensive review of relevant literature and previous research. Its content was refined with input from eight specialists: Dr. Riyadh Al-Jubouri and Dr. Iman Adnan Falah (community physicians); Dr. Lujain Anwar and Dr. Lamyaa Ali (family physicians); Dr. Naseef Jassim and Dr. Mushtaq Talib (psychiatrists); Dr. Nariman Fahmi (pediatric nephrologist); and Dr. Taha Kareem (urologist). The question-

naire consisted of five domains.

4.5.1. Demographic and Sociological Characteristics of the Family

This domain included 10 questions: caregiver, caregiver age, caregiver occupation, parents' living status, number of siblings, father's educational level, mother's educational level, presence of a younger sibling born after the involved child, family history of the problem and its relationship, and parental consanguinity.

4.5.2. Information about the Child and Associated Factors

This domain included 10 questions: the child's age, sex, birth order, chronic disease, drug history, congenital anomalies, pinworm infestation, chronic constipation, previous surgery, and attention-deficit/hyperactivity disorder (ADHD).

4.5.3. Features of the Complaint: Physiological and Medical Factors

This domain included questions about recurrent urinary tract infections, nighttime consumption of fluids or juicy foods, daytime thirst, excessive daytime urination, number of wet nights per week, timing of involuntary urination, period of dryness, and duration of the problem. Frequency responses were always, most of the time, sometimes, rarely, or never, where applicable.

4.5.4. Impact on the Child and Family: Psychological and Behavioral Factors

This domain included sleep regularity, sleep continuity, nightmares, school enrollment, school bullying, school performance, the child's emotional reactions, and effects on parents and family. Possible child reactions included calmness, nervousness, anxiety, hesitation, aggression, hyperactivity, antisocial behavior, shyness, sadness, and fear. Family effects included physical exhaustion, psychological impact, financial impact, or no effect.

Sleep continuity referred to continuous or intermittent sleep. Sleep regularity measured consistency of sleep and waking times from day to day. Psychological stress referred to family feelings related to the child's sadness, anxiety, fear, or embarrassment. Physical exhaustion referred to caregiver fatigue from washing clothes and bedding, changing clothes, and bathing the child after each episode.

4.5.5. Family Approach to Management

This domain included whether the family had visited a doctor, reduced fluid intake before sleep, awakened the child every two hours to urinate, used a urination alarm, or used medical treatment and the type of treatment. Families were also asked how they dealt with the problem, including punishment, reassurance, motivation, or no specific response.

4.6. Outcome Assessment

4.6.1. Prevalence of Nocturnal Enuresis

The proportion of children within the specified age range who experienced nocturnal enuresis, as reported by parents during face-to-face interviews, among all children attending the clinic on the relevant day.

4.6.2. Associated Factors

Identification of demographic, sociological, and medical factors associated with wet-night frequency among children with nocturnal enuresis.

4.6.3. Impact on Children and Families

Evaluation of how nocturnal enuresis affected the child's well-being and daily life, including psychological and social consequences, and the emotional and practical effects on the family.

4.6.4. Coping Mechanisms

Assessment of how families managed and responded to nocturnal enuresis, including treatments or interventions attempted and their perceived effectiveness.

4.7. Pilot Study

A pilot study was conducted from 1 to 15 February to assess the reliability of the study instrument. It involved 25 parents from the Central Teaching Hospital of Pediatrics, who were excluded from the main study sample. Their children met the same eligibility criteria as the original sample. Questionnaire reliability was evaluated through a test-retest procedure. The pilot assessed the clarity and adequacy of the study instrument, estimated the time needed to answer the questions, which was no more than 15 minutes, and assessed instrument reliability.

4.8. Statistical Analysis

Continuous variables were summarized as means and standard deviations, while categorical variables were summarized as frequencies and percentages. Group differences were examined using one-way analysis of variance, Pearson's chi-square test, or Fisher's exact test with Monte Carlo estimation when expected cell counts were small. The prevalence estimate was reported with a 95% Wilson confidence interval.

Wet-night frequency was categorized as two or fewer nights per week, more than two nights per week but not every night, or every night. Adjusted associations were assessed using multinomial logistic regression, with two or fewer wet nights as the reference outcome. The prespecified covariates were child age, caregiver age, sibling number, paternal education, maternal education, and ADHD. Because only five mothers had completed secondary school, secondary education and college/institution education or higher were combined. Sibling number was entered as four or more versus fewer than four. Adjusted odds ratios (aORs), 95% confidence intervals, and P values were reported. Statistical significance was defined as $P < 0.05$. IBM SPSS Statistics version 26 was used for the initial analyses, and the adjusted analysis and independent validation were conducted in Python using reproducible maximum-likelihood estimation.

5. Results

A total of 1087 caregivers, each representing one unique child, were screened. No eli-

gible caregiver declined participation, and duplicate visits were excluded. Of the screened children, 252 had nocturnal enuresis, giving a prevalence of 23.18% (95% CI, 20.77% - 25.78%) among children attending the selected pediatric clinics (**Figure 1**).

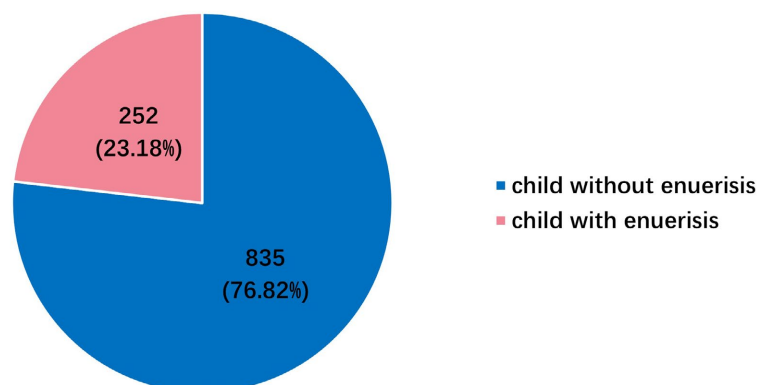


Figure 1. Prevalence of nocturnal enuresis among children aged 5 - 15 years attending the selected pediatric clinics (N = 1087).

Among the 252 participants, the mean caregiver age was 34.5 ± 7.0 years. The largest age group was 30 - 39 years, including 129 (51.2%) caregivers. Most caregivers were mothers, 198 (78.6%), and 175 (69.4%) were housewives. Most children lived with both parents in the same household, 230 (91.3%), and 146 (57.9%) had 1 - 3 siblings. Among fathers, 113 (44.8%) had completed primary education; among mothers, 116 (46.0%) had completed primary education. Most families reported no consanguinity, 139 (55.2%), as shown in **Table 1**.

Table 1. Sociodemographic characteristics of affected children and their families (N = 252).

Characteristic	Category	n	%
Caregiver	Mother	198	78.6
	Father	51	20.2
	Other relative	3	1.2
Caregiver age, years Mean 34.5 ± 7.0	<30	62	24.6
	30 - 39	129	51.2
	40 - 49	55	21.8
	≥ 50	6	2.4
Caregiver occupation	Housewife	175	69.4
	Government employee	44	17.5
	Private employee	2	0.8
	Retired	3	1.2
	Business owner	2	0.8
	Unemployed	1	0.4
	Other/not reported	25	9.9

Continued

Living status	Both parents	230	91.3
	One parent; other deceased	12	4.8
	One parent; separated	10	4.0
Number of siblings	None	8	3.2
	1 - 3	146	57.9
	≥4	98	38.9
Father's education	Illiterate	74	29.4
	Primary	113	44.8
	Secondary	18	7.1
	College/institution or higher	47	18.7
Mother's education	Illiterate	98	38.9
	Primary	116	46.0
	Secondary	5	2.0
	College/institution or higher	33	13.1
Consanguinity	None	139	55.2
	First-degree relative	47	18.7
	Second-degree relative	44	17.5
	Distant relative	22	8.7

A family history of enuresis was reported in 150 (59.5%) children. The most common family history was on the father's side, 49 (19.4%), followed by siblings, 42 (16.7%). A history in both parental families was reported in only nine (3.6%), as shown in **Figure 2** and **Figure 3**.

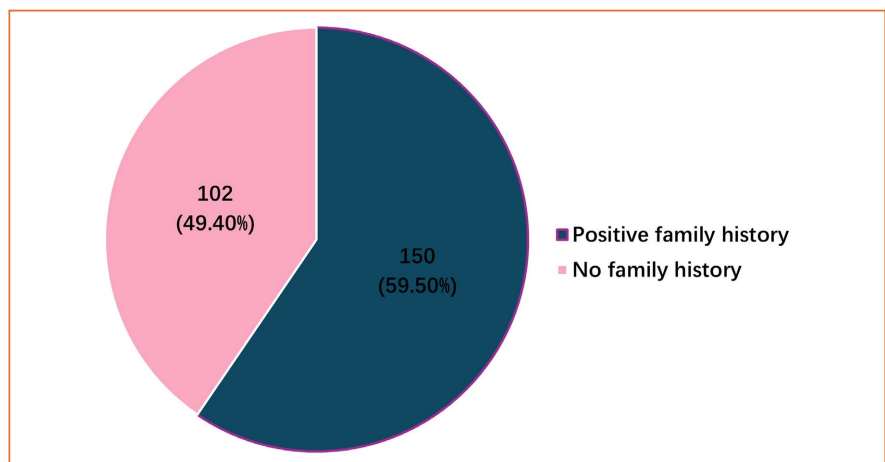


Figure 2. Reported family history of nocturnal enuresis among affected children (N = 252).

Among the 252 children, the mean age was 8.9 ± 3.0 years. Males accounted for 127 (50.4%) and females for 125 (49.6%). The largest proportion was first-born children, 69 (27.4%). A younger sibling born after the involved child was present

in 147 (58.3%), as shown in **Table 2**.

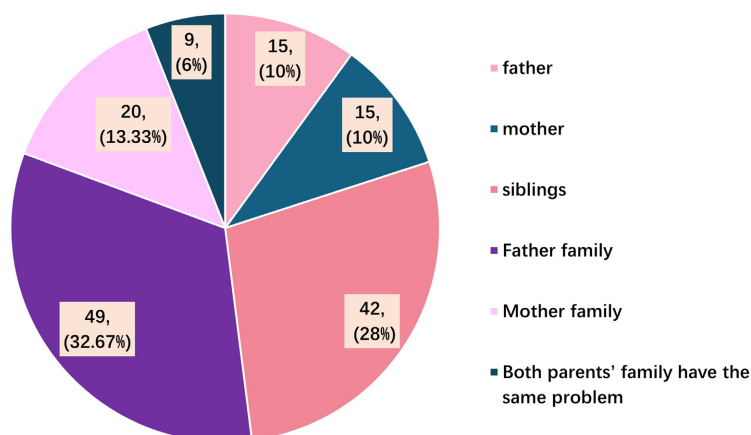


Figure 3. Family members reported to have had nocturnal enuresis among children with a positive family history (N = 150).

Table 2. Demographic characteristics of children with nocturnal enuresis (N = 252).

Characteristic	Category	n	%
Child age, years Mean 8.9 ± 3.0	5 - 8	127	50.4
	9 - 12	87	34.5
	13 - 15	38	15.1
Sex	Male	127	50.4
	Female	125	49.6
Birth order	First	69	27.4
	Second	61	24.2
	Third	59	23.4
	Fourth or later	63	25.0
Younger sibling born within 5 years	Present	147	58.3
	Not present	105	41.7

Most children were free from chronic illness, 224 (88.88%), and 231 (91.7%) were not taking medications that might affect the urinary system. Congenital anomalies were identified in 12 children (4.8%), including inguinal hernia (0.8%), atrial septal defect (0.4%), blindness (0.4%), and other unspecified anomalies (2.7%).

Pinworm infestation was present in 49 children (19.4%), while chronic constipation was noted in 27 (10.7%). Twenty-seven children had undergone previous surgery. The most frequently reported procedures included tonsillectomy (1.6%), bilateral orchiopexy (0.8%), cystocele repair (0.8%), hernia repair (0.8%), and ton-

sillectomy with adenoidectomy (0.8%), with other procedures reported in 5.1%. ADHD was reported in nine children (3.6%), as shown in **Table 3**.

Table 3. Medical and surgical characteristics of children with nocturnal enuresis (N = 252).

Characteristic	Present, n (%)	Absent, n (%)
History of chronic disease	28 (11.1%)	224 (88.9%)
Medication affecting the urinary system	21 (8.3%)	231 (91.7%)
Congenital anomaly	12 (4.8%)	240 (95.2%)
Pinworm infestation	49 (19.4%)	203 (80.6%)
Chronic constipation	27 (10.7%)	225 (89.3%)
Previous surgery	27 (10.7%)	225 (89.3%)
ADHD	9 (3.6%)	243 (96.4%)

Regarding wet nights per week, 139 (55.2%) children experienced enuresis every night, 60 (23.8%) had more than two wet nights but not every night, and 53 (21.0%) had two or fewer wet nights. Involuntary urination occurred only at night in 222 (88.1%), while 30 (11.9%) had both daytime and nighttime wetting. A total of 219 (86.9%) had never achieved dryness, 13 (5.2%) had previously been dry for less than six months, and 20 (7.9%) had been dry for at least six months. Accordingly, 232 (92.1%) were classified as primary and 20 (7.9%) as secondary enuresis. Eighty-nine (35.3%) never had recurrent urinary tract infections. Nighttime fluid intake was common, with 101 (40.1%) always consuming fluids at night. Daytime thirst occurred most of the time in 84 (33.3%), while excessive daytime urination occurred most of the time in 61 (24.2%). Symptoms had lasted more than four years in 131 (52.0%), as shown in **Table 4**.

Table 4. Clinical presentation and timing of nocturnal enuresis (N = 252).

Characteristic	Category	n	%
Wet nights per week	Every night	139	55.2
	>2 nights, not every night	60	23.8
	≤2 nights	53	21.0
Timing of wetting	Night only	222	88.1
	Day and night	30	11.9
Previous dry period	Never dry	219	86.9
	<6 months	13	5.2
	≥6 months	20	7.9
Enuresis type by dry-period history	Primary	232	92.1
	Secondary	20	7.9
Recurrent urinary tract infection	Always	9	3.6
	Most of the time	60	23.8
	Sometimes	32	12.7
	Rarely	62	24.6
	Never	89	35.3

Continued

Nighttime fluid intake	Always	101	40.1
	Most of the time	73	29.0
	Sometimes	29	11.5
	Rarely	42	16.7
	Never	7	2.8
Daytime thirst	Always	56	22.2
	Most of the time	84	33.3
	Sometimes	59	23.4
	Rarely	41	16.3
	Never	12	4.8
Excessive daytime urination	Always	56	22.2
	Most of the time	61	24.2
	Sometimes	37	14.7
	Rarely	58	23.0
	Never	40	15.9
Duration of enuresis	<6 months	21	8.3
	6 months - 1 year	35	13.9
	>1 - 2 years	28	11.1
	>2 - 4 years	37	14.7
	>4 years	131	52.0

Among the children, 64 (25.4%) were younger than six years. Of 188 school-aged children, 180 (95.7%) were enrolled in school and eight (4.3%) were not. Among the 180 enrolled children, 99 (55.0%) had good, 56 (31.1%) intermediate, and 25 (13.9%) poor academic performance. Bullying responses were valid for 178 enrolled children; 23 (12.9%) reported bullying and 155 (87.1%) did not. Two bullying entries contained inapplicable response categories and were excluded from that percentage calculation (**Table 5**).

Table 5. School enrollment, performance, and bullying among affected children.

Characteristic	Category	n	%
School enrollment among school-aged children (N = 188)	Enrolled	180	95.7
	Not enrolled	8	4.3
Academic performance among enrolled children (N = 180)	Good	99	55.0
	Intermediate	56	31.1
	Poor	25	13.9
Bullying among valid responses (N = 178)	Yes	23	12.9
	No	155	87.1

Regarding sleep regularity, 121 (48.0%) had regular sleep most of the time. Continuous sleep was always reported in 109 (43.3%), whereas only nine (3.6%) rarely

had continuous sleep. Most children, 171 (67.9%), never experienced nightmares, as shown in **Table 6**.

Table 6. Sleep characteristics of children with nocturnal enuresis (N = 252).

Characteristic	Category	n	%
Sleep regularity	Always regular	57	22.6
	Regular most of the time	121	48.0
	Sometimes regular	15	6.0
	Rarely regular	27	10.7
	Irregular	32	12.7
Sleep continuity	Always continuous	109	43.3
	Continuous most of the time	99	39.3
	Sometimes continuous	15	6.0
	Rarely continuous	9	3.6
	Intermittent	20	7.9
Nightmares	Always	4	1.6
	Most of the time	18	7.1
	Sometimes	25	9.9
	Rarely	34	13.5
	Never	171	67.9

The behavioral responses of the 252 children with enuresis were diverse. **Figure 4** presents the frequency spectrum of emotional states among children coping with enuresis.

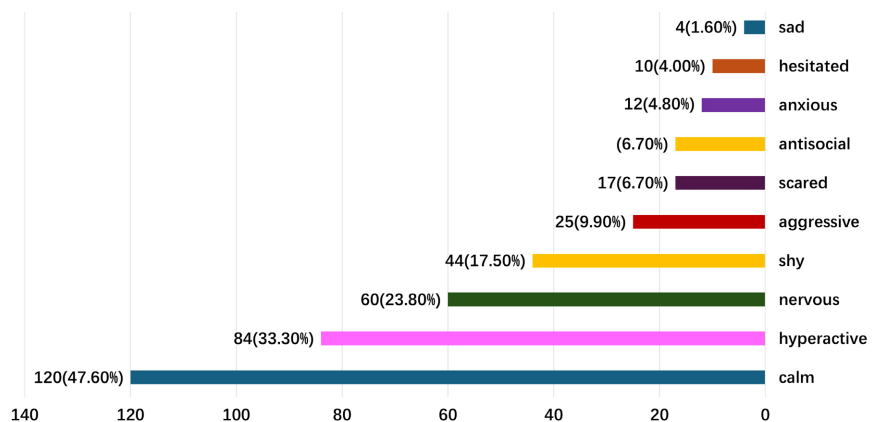


Figure 4. Emotional reactions of children to enuresis (N = 252); children may have had more than one emotional reaction.

The impact of enuresis on parents and family dynamics was substantial. Psychological stress was reported by 133 (52.8%) families, while nine (3.6%) reported financial effects, as shown in **Figure 5**.

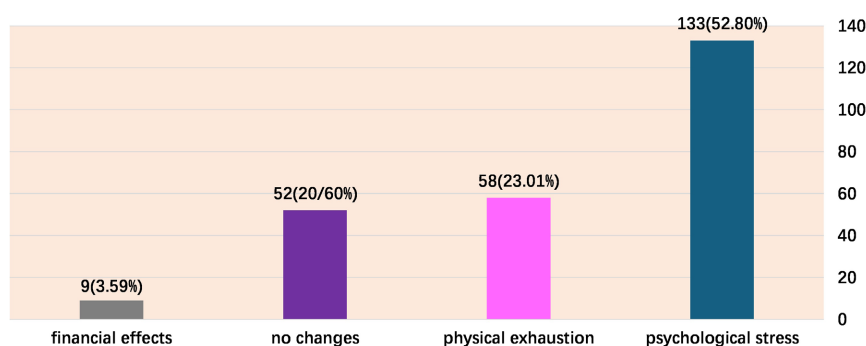


Figure 5. Effects of nocturnal enuresis on parents and families (N = 252).

Family reactions to wet nights varied. Most families, 145 (57.5%), reassured the child. However, 40 (15.9%) reported verbal punishment and eight (3.2%) used physical punishment. Motivational strategies were reported by 14 (5.6%), while 45 (17.9%) reported no specific response, as shown in **Figure 6**.

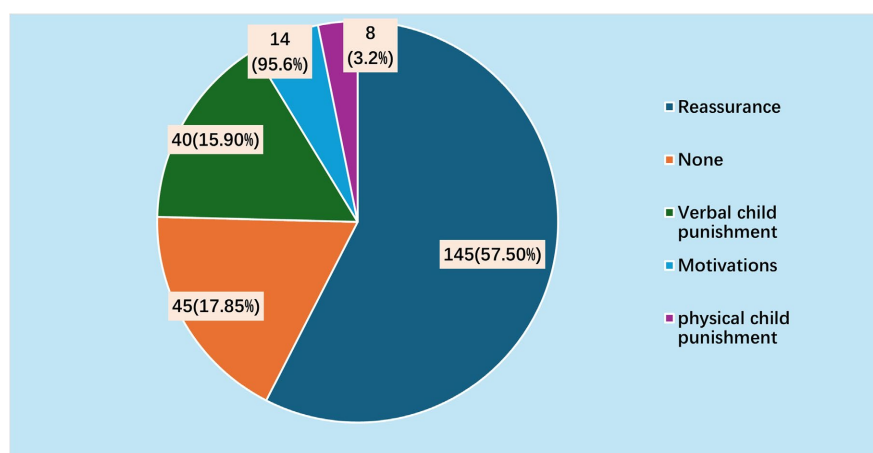


Figure 6. Family reactions to children's wet nights (N = 252).

Table 7. Family management of nocturnal enuresis (N = 252).

Family management approach	Yes/recalled	No/not recalled
Sought medical consultation	77 (30.6%)	175 (69.4%)
Reduced fluids before bedtime	141 (56.0%)	111 (44.0%)
Awakened child to urinate	115 (45.6%)	137 (54.4%)
Used an enuresis alarm	3 (1.2%)	249 (98.8%)
Used medical treatment	29 (11.5%)	223 (88.5%)
Specific medication recalled among treated children (N = 29)	6 (20.7%)	23 (79.3%)
Reported medications	Tofranil, n = 3; amitriptyline, n = 1; desmopressin tablet, n = 1; desmopressin nasal spray, n = 1	

Regarding management, 175 (69.4%) families did not seek medical consulta-

tion. Behavioral interventions were common: 141 (56.0%) reduced the child's fluid intake before bedtime, and 115 (45.6%) regularly awakened the child at night to urinate. Enuresis alarms were used by only three families (1.2%). Medical treatment was used in 29 (11.5%), although 23 (9.1%) could not recall the specific medication. Reported treatments included Tofranil in three (1.2%), amitriptyline in one (0.4%), desmopressin tablets in one (0.4%), and desmopressin nasal spray in one (0.4%), as shown in **Table 7**.

Table 8. Sociodemographic and familial characteristics by wet-night frequency (N = 252).

Characteristic	Category	>2 nights N = 60	≤2 nights N = 53	Every night N = 139	P value
Caregiver	Mother	45 (22.7%)	41 (20.7%)	112 (56.6%)	0.502
	Father	13 (25.5%)	12 (23.5%)	26 (51.0%)	
	Other relative	2 (66.7%)	0 (0.0%)	1 (33.3%)	
Caregiver age, years		37.6 ± 8.6	34.2 ± 6.9	33.3 ± 5.7	<0.001
Living status	Both parents	52 (22.6%)	50 (21.7%)	128 (55.7%)	0.260
	One parent; other deceased	6 (50.0%)	2 (16.7%)	4 (33.3%)	
	One parent; separated	2 (20.0%)	1 (10.0%)	7 (70.0%)	
Number of siblings	None	3 (37.5%)	3 (37.5%)	2 (25.0%)	<0.001
	1 - 3	23 (15.8%)	38 (26.0%)	85 (58.2%)	
	≥4	34 (34.7%)	12 (12.2%)	52 (53.1%)	
Consanguinity	None	37 (26.6%)	33 (23.7%)	69 (49.6%)	0.273
	First-degree	7 (14.9%)	9 (19.1%)	31 (66.0%)	
	Second-degree	13 (29.5%)	8 (18.2%)	23 (52.3%)	
	Distant	3 (13.6%)	3 (13.6%)	16 (72.7%)	
Father's education	Illiterate	17 (23.0%)	10 (13.5%)	47 (63.5%)	0.024
	Primary	21 (18.6%)	25 (22.1%)	67 (59.3%)	
	Secondary	4 (22.2%)	5 (27.8%)	9 (50.0%)	
	College/institution or higher	18 (38.3%)	13 (27.7%)	16 (34.0%)	
Mother's education	Illiterate	23 (23.5%)	17 (17.3%)	58 (59.2%)	0.017
	Primary	25 (21.6%)	22 (19.0%)	69 (59.5%)	
	Secondary	0 (0.0%)	2 (40.0%)	3 (60.0%)	
	College/institution or higher	12 (36.4%)	12 (36.4%)	9 (27.3%)	

Values are n (row %) unless otherwise indicated. P values were obtained using one-way ANOVA, Pearson's chi-square test, or Fisher's exact test with Monte Carlo estimation, as appropriate.

In unadjusted analyses, most caregivers in all wet-night frequency groups were mothers, and caregiver type was not associated with frequency (P = 0.503). Care-

giver age differed among groups ($P < 0.001$), with the highest mean age in the group with more than two wet nights per week (37.6 ± 8.6 years) and the lowest in the every-night group (33.3 ± 5.7 years). Parents' living status was not associated with wet-night frequency ($P = 0.262$).

Sibling number was associated with wet-night frequency in the unadjusted analysis ($P < 0.001$). Consanguinity was not associated with frequency ($P = 0.273$). Paternal and maternal education also differed across frequency groups ($P = 0.023$ and $P = 0.017$, respectively), as shown in **Table 8**. These comparisons are bivariate and do not account for confounding.

Child age differed across frequency groups in the unadjusted analysis ($P = 0.044$). Children in the group with more than two wet nights per week were oldest, 9.7 ± 3.1 years, while the every-night group was the youngest, 8.5 ± 2.9 years. Sex was not associated with frequency ($P = 0.139$). Birth order, chronic disease, medication use, pinworm infestation, chronic constipation, and previous surgery were also not associated with frequency (all $P > 0.05$). Congenital anomalies were more frequent in the every-night group, although the association was not statistically significant ($P = 0.100$).

Table 9. Child demographic and clinical characteristics by wet-night frequency (N = 252).

Characteristic	Category	>2 nights N = 60	≤2 nights N = 53	Every night N = 139	P value
Child age, years		9.7 ± 3.1	8.9 ± 3.1	8.5 ± 2.9	0.044
Sex	Male	27 (21.3%)	33 (26.0%)	67 (52.8%)	0.139
	Female	33 (26.4%)	20 (16.0%)	72 (57.6%)	
Birth order	First	21 (30.4%)	15 (21.7%)	33 (47.8%)	0.257
	Second	8 (13.1%)	14 (23.0%)	39 (63.9%)	
	Third	12 (20.3%)	12 (20.3%)	35 (59.3%)	
	Fourth or later	19 (30.2%)	12 (19.0%)	32 (50.8%)	
Chronic disease	Present	5 (17.9%)	7 (25.0%)	16 (57.1%)	0.695
Medication affecting urinary system	Present	4 (19.0%)	5 (23.8%)	12 (57.1%)	0.908
Chronic constipation	Present	5 (18.5%)	7 (25.9%)	15 (55.6%)	0.704
Congenital anomaly	Present	2 (16.7%)	0 (0.0%)	10 (83.3%)	0.100
Pinworm infestation	Present	13 (26.5%)	9 (18.4%)	27 (55.1%)	0.821
Previous surgery	Present	5 (18.5%)	4 (14.8%)	18 (66.7%)	0.441
ADHD	Present	6 (66.7%)	1 (11.1%)	2 (22.2%)	0.016
Duration of enuresis	<6 months	3 (14.3%)	5 (23.8%)	13 (61.9%)	0.136
	6 months - 1 year	5 (14.3%)	9 (25.7%)	21 (60.0%)	
	>1 - 2 years	7 (25.0%)	6 (21.4%)	15 (53.6%)	
	>2 - 4 years	4 (10.8%)	6 (16.2%)	27 (73.0%)	
	>4 years	41 (31.3%)	27 (20.6%)	63 (48.1%)	

Values are n (row %) unless otherwise indicated. P values were obtained using one-way ANOVA, Pearson's chi-square test, or Fisher's exact test with Monte Carlo estimation, as appropriate.

ADHD differed across the frequency groups in the unadjusted analysis ($P = 0.016$), although only nine children had ADHD. Duration of enuresis was not associated with wet-night frequency ($P = 0.14$), as shown in **Table 9**.

In the adjusted multinomial model, children with four or more siblings had higher odds of wetting on more than two nights rather than two or fewer nights per week (aOR, 3.96; 95% CI, 1.61 - 9.74; $P = 0.003$). Maternal primary education, compared with secondary education or higher, was associated with every-night wetting rather than two or fewer wet nights (aOR, 3.86; 95% CI, 1.24 - 12.02; $P = 0.020$). Child age, caregiver age, paternal education, and ADHD were not statistically significant after adjustment. Estimates for ADHD were imprecise because only nine children had this diagnosis. The overall model was statistically significant (likelihood-ratio $\chi^2 = 51.97$, 16 degrees of freedom; $P < 0.001$), as shown in **Table 10**.

Table 10. Adjusted multinomial logistic regression of wet-night frequency (N = 252).

Outcome comparison	Predictor	aOR	95% CI	P value
>2 nights vs ≤2 nights	Child age, per year	1.01	0.88 - 1.16	0.912
	Caregiver age, per year	1.05	0.99 - 1.11	0.122
	ADHD, yes vs no	8.28	0.83 - 82.66	0.072
	Four or more siblings vs fewer	3.96	1.61 - 9.74	0.003
	Father primary vs secondary or higher	0.56	0.19 - 1.67	0.296
	Father illiterate vs secondary or higher	0.80	0.20 - 3.11	0.742
	Mother primary vs secondary or higher	1.92	0.52 - 7.08	0.329
	Mother illiterate vs secondary or higher	1.77	0.42 - 7.45	0.436
Every night vs ≤2 nights	Child age, per year	0.90	0.79 - 1.01	0.077
	Caregiver age, per year	0.99	0.93 - 1.04	0.610
	ADHD, yes vs no	1.78	0.14 - 22.53	0.656
	Four or more siblings vs fewer	1.84	0.83 - 4.10	0.134
	Father primary vs secondary or higher	1.14	0.44 - 2.94	0.782
	Father illiterate vs secondary or higher	1.90	0.59 - 6.14	0.281
	Mother primary vs secondary or higher	3.86	1.24 - 12.02	0.020
	Mother illiterate vs secondary or higher	3.11	0.91 - 10.62	0.070

Reference outcome: two or fewer wet nights per week. Education reference: secondary education or higher. Sibling reference: fewer than four siblings. Overall likelihood-ratio $\chi^2 = 51.97$, $df = 16$, $P < 0.001$. aOR, adjusted odds ratio; CI, confidence interval.

6. Discussion

Nocturnal enuresis, defined as involuntary urination during sleep beyond the age of expected bladder control, remains a significant pediatric concern with implications for child development, caregiver stress, and long-term psychosocial out-

comes. This study adds data from an Iraqi pediatric population and examines a broad range of demographic, familial, behavioral, and medical factors.

6.1. Prevalence and Clinical Profile

The prevalence of NE among children attending the four selected pediatric hospitals was 23.18% (95% CI, 20.77% - 25.78%). This is a clinic-attende estimate and should not be interpreted as prevalence among all children in Baghdad. It is higher than the global pooled estimate of 7.2% reported by Adisu *et al.* [3] in a meta-analysis of 128 studies involving 445,242 individuals from 39 countries. That review reported marked geographical and sociocultural variation, with estimates ranging from 2% to 75%.

Several factors may explain the discrepancy. Hospital-based studies may capture children with more severe or persistent symptoms and thereby yield a higher prevalence than community-based studies. Healthcare-seeking behavior, parental awareness, and cultural attitudes toward bedwetting may also influence reporting. Social stigma may lead to underreporting in some communities, whereas families may be more willing to discuss the problem in clinical settings.

In the context of Middle Eastern data, Alamri *et al.* [11] reported a prevalence of 24% in Saudi Arabia, close to the present estimate. Saleh and Al-Saffar [12] reported a prevalence of 29.5% in Baghdad. In Palestine, Mohammad *et al.* [13] reported a prevalence of 27.9% among primary school children and observed associations with psychosocial characteristics. Differences in sampling setting, diagnostic criteria, and population structure limit direct comparison across these studies.

The nearly equal sex distribution in the present study, 50.4% male and 49.6% female, contrasts with the male predominance reported in some Saudi data [11]. It is consistent with the Iraqi cross-sectional study by Al-Hussein and Al-Joborae, which found little sex difference [14].

6.2. Family History and Genetic Contribution

A family history of enuresis was reported in 59.5% of cases. This finding is compatible with, but does not itself establish, a genetic contribution. Sarici *et al.* [15] reported a comparable rate of 59.2% in Türkiye, while Saleh and Al-Saffar [12] reported a positive family history in 71.7% of enuretic children in Baghdad. In the meta-analysis by Adisu *et al.* [3], positive family history was associated with NE (adjusted odds ratio, 1.49; 95% CI, 1.26 - 1.71).

6.3. Consanguinity and Sociocultural Factors

In the present study, 44.8% of children came from consanguineous families, but consanguinity was not associated with wet-night frequency ($P = 0.273$). A report from Pakistan by Shah *et al.* included consanguinity among the familial factors examined in relation to NE [16]. The present case-only analysis cannot determine whether consanguinity is associated with developing NE.

6.4. Caregiver Demographics and Psychosocial Dynamics

Mothers were the primary caregivers in 78.6% of cases, consistent with findings from Iscan and Ozkayın in Türkiye [17]. This pattern may reflect local family roles in pediatric healthcare.

Both paternal and maternal education differed across wet-night groups in bivariate analyses. After adjustment, maternal primary education, compared with secondary education or higher, remained associated with every-night wetting rather than two or fewer wet nights per week. The confidence interval was wide, and the association should be interpreted cautiously. Research from Egypt indicates that parental perceptions and educational background may be related to recognition and management of enuresis [18] [19]. Health education may improve caregiver understanding and family outcomes [2].

The reported family burden was substantial. More than half reported psychological stress, and 23.0% reported physical exhaustion related to managing the condition. Huang *et al.* described emotional fatigue and social disruption among parents in western China [20]. Roccella *et al.* observed an association between parental stress and behavioral difficulties among enuretic children [21]. These findings support assessment of family well-being alongside the child's clinical symptoms.

6.5. ADHD and Neurobehavioral Associations

ADHD differed across wet-night frequency groups in the bivariate analysis, but it was not statistically significant after adjustment. Only nine children had ADHD, producing wide confidence intervals and limited precision. A systematic review and meta-analysis by de Sena Oliveira *et al.* reported frequent co-occurrence of ADHD and NE [22], and Abd-Elmoneim *et al.* also reported an association [23]. Screening may be considered when clinically indicated, but the present study does not establish an independent association.

6.6. Sleep Patterns and Enuresis

Irregular sleep was reported in 12.7%, and 32.1% experienced nightmares with varying frequency. Ma *et al.* reported higher rates of sleep problems among children with NE than among non-enuretic children [24]. Von Gontard *et al.* also reported an association between incontinence and sleep disturbances [25]. Because the present study included no non-enuretic comparison group for detailed sleep variables, it cannot determine whether these sleep characteristics were associated with the occurrence of NE.

6.7. Academic Performance and Bullying

Among enrolled children, 13.9% had poor academic performance. Among the 178 enrolled children with valid bullying responses, 12.9% reported bullying. Ahmed *et al.* reported reduced quality of life among Egyptian schoolchildren with NE [26], while Mohammad *et al.* observed associations between NE, academic performance, and social anxiety [13]. These findings support attention to school

functioning and bullying during clinical assessment.

6.8. Family Reactions and Punishment

More than half of families provided reassurance, although verbal and physical punishment were still reported. Al-Zaben and Sehlo found that punishment for bedwetting was associated with depression and poorer quality of life [27]. Ferrara *et al.* reported adverse developmental and treatment-related outcomes associated with punishment [28]. Parent-focused education should promote supportive responses and discourage punitive practices.

6.9. Management Approaches

Despite the symptom burden, only about one-third of families sought professional care, and pharmacological treatment was uncommon. Behavioral measures, particularly fluid restriction and scheduled nighttime awakening, were more frequent. Use of enuresis alarms, a first-line treatment option, was rare. This suggests limited public and parental awareness of effective management.

Iduoriyekemwen and Nwaneri reported similar findings in Nigeria, where behavioral measures were common but alarm therapy was poorly recognized [29]. Structured parent education and wider dissemination of treatment guidance may improve the use of appropriate management and reduce punitive responses.

7. Limitations

- 1) The hospital-based, non-probability sample represents children attending selected pediatric clinics and cannot be generalized to all children in Baghdad.
- 2) Detailed associated-factor data were collected only from children with enuresis. Therefore, the study evaluates factors associated with wet-night frequency among cases, not factors associated with developing nocturnal enuresis.
- 3) The cross-sectional design does not establish temporality or causality.
- 4) Some sensitive variables, including ADHD, emotional difficulties, and punishment, were caregiver reported and may be affected by recall or social desirability bias.
- 5) Although diagnosis and exclusion of important medical causes were confirmed by a specialist pediatrician or pediatric neurologist, the questionnaire did not contain a complete ICCS daytime lower urinary tract symptom inventory. Monosymptomatic and non-monosymptomatic enuresis could therefore not be classified reliably.
- 6) ADHD was uncommon, and several educational categories were small. The resulting adjusted estimates had wide confidence intervals.
- 7) Two bullying responses among enrolled children used inapplicable categories. Bullying percentages were therefore calculated using valid responses.

8. Conclusions

- 1) Nocturnal enuresis was identified in 23.18% (95% CI, 20.77% - 25.78%) of

children aged 5 - 15 years attending the selected pediatric clinics. This estimate should not be generalized to all children in Baghdad.

2) In the adjusted model, having four or more siblings was associated with wetting on more than two nights rather than two or fewer nights per week.

3) Maternal primary education, compared with secondary education or higher, was associated with every-night wetting rather than two or fewer wet nights per week. Other adjusted associations were not statistically significant.

4) Psychological stress and physical exhaustion were commonly reported by families, while professional consultation and evidence-based treatment use were limited.

5) Most families reassured their children, but verbal and physical punishment remained present in some households.

9. Recommendations

1) Incorporate screening for nocturnal enuresis into routine primary care and preschool health assessments. Screening should address urinary control, sleep patterns, psychosocial stressors, and family history. Systematic screening may support timely intervention, reduce stigma, and guide families toward appropriate behavioral, pharmacological, or supportive treatment.

2) Implement school- and community-based awareness programs to educate caregivers about the causes and management of enuresis, reduce stigma, and encourage supportive parenting.

3) Integrate behavioral, sleep, and urological screening into primary pediatric care, particularly for children with ADHD or sleep disorders.

4) Improve access to evidence-based treatments, including enuresis alarms and desmopressin, through public health services.

5) Conduct multicenter, longitudinal, and interventional studies in Iraq to clarify cultural influences and optimize management strategies.

Author Contributions

Dhuha Qassim Mohammed Salih, data collection and writing;
Sahar A. Esa Al-Shatari, supervision, data analysis, and writing;
Hassan Mahmoud Salman, data collection and writing.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Daley, S.F., Gomez Rincon, M. and Leslie, S.W. (2025) Enuresis. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK545181/>
- [2] Liao, J., Zhu, L., Xie, D., Wang, X. and Zhou, P. (2024) Improving the Quality of Life of Children and Parents with Nocturnal Enuresis: The Role of Health Education. *Frontiers in Pediatrics*, **12**, Article ID: 1464465. <https://doi.org/10.3389/fped.2024.1464465>

- [3] Adisu, M.A., Habtie, T.E., Munie, M.A., Bizuayehu, M.A., Zemariam, A.B. and Derso, Y.A. (2025) Global Prevalence of Nocturnal Enuresis and Associated Factors among Children and Adolescents: A Systematic Review and Meta-Analysis. *Child and Adolescent Psychiatry and Mental Health*, **19**, Article No. 23. <https://doi.org/10.1186/s13034-025-00880-x>
- [4] American Psychiatric Association (2022) Diagnostic and Statistical Manual of Mental disorders. 5th Edition, American Psychiatric Association Publishing.
- [5] Pandey, S., Oza, H.J., Shah, H. and Vankar, G.K. (2019) Rate and Risk Factors of Nocturnal Enuresis in School Going Children. *Industrial Psychiatry Journal*, **28**, 306-311. https://doi.org/10.4103/ipj.ipj_15_18
- [6] Austin, P.F., Bauer, S.B., Bower, W., Chase, J., Franco, I., Hoebeke, P., *et al.* (2015) The Standardization of Terminology of Lower Urinary Tract Function in Children and Adolescents: Update Report from the Standardization Committee of the International Children's Continence Society. *Neurourology and Urodynamics*, **35**, 471-481. <https://doi.org/10.1002/nau.22751>
- [7] Nevéus, T., Fonseca, E., Franco, I., Kawauchi, A., Kovacevic, L., Nieuwhof-Leppink, A., *et al.* (2020) Management and Treatment of Nocturnal Enuresis—An Updated Standardization Document from the International Children's Continence Society. *Journal of Pediatric Urology*, **16**, 10-19. <https://doi.org/10.1016/j.jpuro.2019.12.020>
- [8] Mohammadi, M., VaisiRaiegani, A.A., Jalali, R., *et al.* (2019) The Prevalence of Nocturnal Enuresis among Iranian children: A Systematic Review and Meta-Analysis. *Urology Journal*, **16**, 427-432. <https://pubmed.ncbi.nlm.nih.gov/31422577/>
- [9] Hamed, A., Yousf, F. and Hussein, M.M. (2017) Prevalence of Nocturnal Enuresis and Related Risk Factors in School-Age Children in Egypt: An Epidemiological Study. *World Journal of Urology*, **35**, 459-465. <https://doi.org/10.1007/s00345-016-1879-2>
- [10] Arena, S. and Patricolo, M. (2017) Primary Monosymptomatic Nocturnal Enuresis and Associated Factors in a Referral Continence Clinic of Abu Dhabi. *La Pediatria Medica e Chirurgica*, **39**, Article No. 159. <https://doi.org/10.4081/pmc.2017.150>
- [11] Alamri, A., Singh, V.P., Alshyarba, M.H., Abdullah, A., Ogran, M., Alsuaayri, A., *et al.* (2024) Prevalence of Nocturnal Enuresis among Children of Aseer Region in Saudi Arabia. *Urology Annals*, **16**, 81-86. https://doi.org/10.4103/ua.ua_90_23
- [12] Alaa A. Saleh, and Atheer J. Al-Saffar, (2016) Nocturnal Enuresis and Its Relation to Child's Behavior in a Sample of Children from Baghdad, Iraq. *Iraqi Journal of Medical Sciences*, **13**, 7-13. <https://doi.org/10.22578/d4wz7f48>
- [13] Mohammad, G., Abualhayja, L., Maraqa, B., Maraqa, B. and Nazzal, Z. (2025) Prevalence and Factors Associated with Nocturnal Enuresis and Social Anxiety among Palestinian Primary School Children: A Cross-Sectional Study. *BMC Pediatrics*, **25**, Article No. 231. <https://doi.org/10.1186/s12887-025-05585-w>
- [14] AL-Hussein, H.M.A. and AL-Joborae, S.F.F. (2022) Association of Nocturnal Enuresis and History of Breastfeeding in Primary School Children in Hilla City. *International Journal of Health Sciences*, **6**, 3700-3715. <https://doi.org/10.53730/ijhs.v6ns7.12663>
- [15] Sarici, H., Telli, O., Ozgur, B.C., Demirbas, A., Ozgur, S. and Karagoz, M.A. (2016) Prevalence of Nocturnal Enuresis and Its Influence on Quality of Life in School-Aged Children. *Journal of Pediatric Urology*, **12**, 159.e1-159.e6. <https://doi.org/10.1016/j.jpuro.2015.11.011>
- [16] Shah, S., Jafri, R.Z., Mobin, K., Mirza, R., Nanji, K., Jahangir, F., *et al.* (2018) Frequency and Features of Nocturnal Enuresis in Pakistani Children Aged 5 to 16 Years

- Based on ICCS Criteria: A Multi-Center Cross-Sectional Study from Karachi, Pakistan. *BMC Family Practice*, **19**, Article No. 198.
<https://doi.org/10.1186/s12875-018-0876-5>
- [17] Iscan, B. and Ozkayin, N. (2020) Evaluation of Health-Related Quality of Life and Affecting Factors in Child with Enuresis. *Journal of Pediatric Urology*, **16**, 195.e1-195.e7. <https://doi.org/10.1016/j.jpuro.2019.12.018>
 - [18] Tai, T.T., Tai, B.T., Chang, Y. and Huang, K. (2021) The Importance of Understanding Parental Perception When Treating Primary Nocturnal Enuresis: A Topic Review and an Institutional Experience. *Research and Reports in Urology*, **13**, 679-690.
<https://doi.org/10.2147/rru.s323926>
 - [19] Essawy, M.A., El Sharkawy, A. and Basuony, G.M. (2018) Caregivers' Management for Their Children with Nocturnal Enuresis. *IOSR Journal of Nursing and Health Science*, **7**, 12-23.
 - [20] Huang, W., Liang, Y., Yang, Q. and Ma, X. (2022) Nocturnal Enuresis in Children: Parents' Perspectives. *Nursing Open*, **9**, 2335-2341.
<https://doi.org/10.1002/nop2.1243>
 - [21] Roccella, M., Smirni, D., Smirni, P., Precenzano, F., Operto, F.F., Lanzara, V., *et al.* (2019) Parental Stress and Parental Ratings of Behavioral Problems of Enuretic Children. *Frontiers in Neurology*, **10**, Article No. 1054.
<https://doi.org/10.3389/fneur.2019.01054>
 - [22] de Sena Oliveira, A.C., Athanasio, B.D.S., Mrad, F.C.D.C., Vasconcelos, M.M.D.A., Albuquerque, M.R., Miranda, D.M., *et al.* (2021) Attention Deficit and Hyperactivity Disorder and Nocturnal Enuresis Co-Occurrence in the Pediatric Population: A Systematic Review and Meta-Analysis. *Pediatric Nephrology*, **36**, 3547-3559.
<https://doi.org/10.1007/s00467-021-05083-y>
 - [23] Abd-Elmoneim, N., Elsheshtawy, E., Elsayed, M., Gomaa, Z. and Elwasify, M. (2020) Comorbidity between Enuresis and Attention Deficit Hyperactivity Disorder: A Case-Control Study. *Middle East Current Psychiatry*, **27**, Article No. 32.
<https://doi.org/10.1186/s43045-020-00040-1>
 - [24] Ma, J., Li, S., Jiang, F., Jin, X., Zhang, Y., Yan, C., *et al.* (2018) Relationship between Sleep Patterns, Sleep Problems, and Childhood Enuresis. *Sleep Medicine*, **50**, 14-20.
<https://doi.org/10.1016/j.sleep.2018.05.022>
 - [25] von Gontard, A., Mattheus, H., Frieze-Jaworsky, J., Moritz, A., Thome-Granz, S., Roozen, S., *et al.* (2022) Incontinence and Sleep Disturbances in Young Children: A Population-Based Study. *Neurourology and Urodynamics*, **41**, 633-642.
<https://doi.org/10.1002/nau.24866>
 - [26] Ahmed, S., Shedeed, S., Morsy, R. and Said, H. (2022) Effect of Nocturnal Enuresis on Quality of Life of Primary School Children in Sharkia Governorate. *NeuroQuantology*, **20**, 4512-4524.
https://www.researchgate.net/publication/361765301_Effect_of_Nocturnal_Enuresis_on_Quality_of_Life_of_Primary_School_Children_in_Sharkia_Governorate
 - [27] Al-Zaben, F.N. and Sehlo, M.G. (2015) Punishment for Bedwetting Is Associated with Child Depression and Reduced Quality of Life. *Child Abuse & Neglect*, **43**, 22-29.
<https://doi.org/10.1016/j.chiabu.2014.11.007>
 - [28] Ferrara, P., Di Giuseppe, M., Fabrizio, G.C., Sbordon, A., Amato, M., Cutrona, C., *et al.* (2016) Enuresis and Punishment: The Adverse Effects on Child Development and on Treatment. *Urologia Internationalis*, **97**, 410-415.
<https://doi.org/10.1159/000447496>
 - [29] Iduoriyekemwen, N.J. and Nwaneri, D.U. (2017) Treatment Options for Primary

Nocturnal Enuresis by Parents in a Nigerian Community. *Journal of Community Medicine and Primary Health Care*, **29**, 55-61.

<https://www.ajol.info/index.php/jcmphc/article/view/160832>