

Received Date: 22 February 2026

Accepted Date: 14 March 2026

Published Date: 2 April 2026

## **Factors associated with bedwetting in children aged 5 to 10: a study conducted in the Bongondjo neighbourhood, Wangata district, Mbandaka, DRC**

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### **Abstract**

**Introduction:** Nocturnal enuresis in children is a taboo and under-reported public health issue in the Democratic Republic of the Congo. In the deprived neighbourhood of Bongondjo in Mbandaka, it causes silent distress and profoundly affects young people's self-esteem.

**Overall objective:** To determine the biological, environmental and psychosocial factors associated with enuresis in children aged 5 to 10 years in this area.

**Methodology:** This quantitative, descriptive, cross-sectional study with an analytical focus was conducted from March to May 2026. It compared a sample of 194 participants, comprising 86 cases and 108 controls. The data collected via questionnaires were subjected to bivariate analyses and multivariate logistic regression.

**Key findings:** The overall prevalence stands at 44.3%. The multivariate analysis identifies five critical determinants: heredity as a major predictor (OR = 4.21), lack of indoor toilets (OR = 3.12), recent psychosocial stress (OR = 2.98), urinary tract infections (OR = 2.56) and economic insecurity (OR = 2.10).

**Discussion:** The results confirm the multifactorial aetiology of the disorder, in which biological predisposition is exacerbated by environmental barriers and anxiety linked to poverty, consistent with the international literature in tropical settings.

**Conclusion:** Enuresis in Wangata requires a multidimensional nursing approach. Clinical management must combine the treatment of urinary tract infections with emotional support and community awareness-raising to put an end to parental punishment.

**Keywords:** Associated factor, Enuresis, Child.

### **Introduction**

Nocturnal enuresis, defined as repeated, involuntary urination during sleep in children aged five years or older, remains a complex challenge at the intersection of paediatrics, psychology and environmental health. This phenomenon, far from being a simple developmental delay, often reflects an interaction between genetic predispositions, limited bladder capacity and psychosocial stressors. In urban and peri-urban settings, bedwetting affects not only the child's emotional well-being but also household finances and family dynamics, requiring a rigorous analysis of local determinants to guide nursing interventions.

Globally, the World Health Organisation estimates that enuresis affects approximately 15% to 20% of five-year-olds, with a persistence rate of 2% among adolescents (Smith et al., 2023).

In Africa, prevalence appears to be higher due to environmental and infectious factors, with studies suggesting rates of up to 25% in certain sub-Saharan regions where intestinal parasitic infections and stress linked to living conditions compromise sphincter control (Ndu et al., 2022).

In the Democratic Republic of the Congo, hospital data indicate that enuresis is one of the most underreported reasons for paediatric consultations, often masked by cultural beliefs (Kambale et al., 2021).

In Mbandaka, and specifically in the Wangata district, health indicators regarding child development are cause for concern. Preliminary observations conducted in the Bongondjo neighbourhood suggest that nearly 30% of children aged 5 to 10 are affected by nocturnal enuresis, a figure significantly higher than national averages (Mboyo et al., 2024). This high prevalence is exacerbated by a precarious environment, characterised by limited access to drinking water and overcrowding within households, where the cohabitation of several children in a confined space fosters a climate of chronic psychological stress (Yambayamba & Bakulu, 2023).

Furthermore, the lack of basic sanitation infrastructure in this part of Equatorial Guinea contributes to the persistence of urinary and parasitic conditions that interfere with young patients' nocturnal sphincter control (Nkoy et al., 2022). This local reality highlights the urgent need for an integrated community-based approach to destigmatise the condition and improve domestic hygiene conditions.

The actual situation on the ground in the Bongondjo neighbourhood reveals a silent distress. Mothers face an increased workload with laundry, whilst children suffer physical reprimands or mockery that undermine their self-esteem. Despite this prevalence, there is a lack of research on the specific factors associated with this condition in this health zone. It is with this in mind that the present research aims to identify the biological, environmental and socio-cultural factors associated with enuresis. This study aims to provide an evidence-based foundation for improving the overall care of children at the Wangata General Referral Hospital and strengthening health education within the community.

In the specific context of the Bongondjo neighbourhood, where environmental and socio-economic realities impact child development, the main research question of this

quantitative study is as follows: what are the biological, environmental and psychosocial factors associated with enuresis in children aged 5 to 10 living in this health zone of Wangata?

For this study conducted in the Bongondjo neighbourhood, the main hypothesis posits that there is a significant correlation between poor environmental conditions (overcrowding and sanitation) and the high prevalence of bedwetting among children aged 5 to 10.

This study aims to identify the biological, environmental and psychosocial factors associated with bedwetting in children aged 5 to 10 living in the Bongondjo neighbourhood.

## **Methodology**

### **1. Study design**

To analyse the determinants of bedwetting in Wangata, the research adopts a quantitative, observational, descriptive and cross-sectional protocol with an analytical focus, involving 194 participants (86 cases and 108 controls). The use of this quantitative approach is based on the recommendations of Creswell and Creswell (2022) to identify statistically significant correlations between variables, whilst the rigour of its design follows the principles of Polit and Beck (2021) in health sciences to accurately isolate the clinical, environmental and demographic characteristics of the population.

Data collection was carried out using a questionnaire, leading to a statistical analysis structured in three phases: univariate descriptive analysis, bivariate correlations and multivariate logistic regression to eliminate confounding factors. This modelling, validated by Field (2023), ensures the internal robustness of the results by quantifying the actual statistical power of each variable (Odds Ratio). This framework thus enables a precise analysis of the combined impact of heredity, poverty and anxiety on the child.

### **2. Presentation of the study setting**

Located in the commune of Wangata in Mbandaka (Equateur Province, DRC) at the heart of the humid central basin of the Congo River, the precarious and densely populated neighbourhood of Bongondjo is led by a neighbourhood chief who coordinates local administration and public health there (Mboyo et al., 2024; Mboyo and Ebengo, 2024).

This environment is characterised by poor sanitation and a lack of drinking water, which contribute to urinary and parasitic infections in children (Nkoy et al., 2022).

The choice of this site is justified by its high prevalence of disorders linked to urban deprivation (Kambale et al., 2021), the impact of unsanitary conditions on psychophysiological development (Yambayamba and Bakulu, 2023), the existence of stigma and severe parental punishment (Ndu et al., 2022), as well as the need to produce new local data linking the living environment to child health in the DRC (Tshala-Katumbay and Mpoy, 2024).

### **3. Population and sample**

The target population for this research comprises all children aged 5 to 15 years who are permanent residents of the Bongondjo neighbourhood, a key criterion for ensuring the relevance of epidemiological inferences in an urban setting (Kambale et al., 2021). For the constitution of the study group, the non-probabilistic technique of purposive sampling was favoured, as this method proved ideal for identifying specific risk factors within a homogeneous socio-environmental community (Yambayamba and Bakulu, 2023).

The rigorous selection of participants was based on clear inclusion criteria (required age, fixed residence and parental consent) and exclusion criteria eliminating subjects with severe organic conditions, such as diabetes or urogenital and neurological abnormalities—an essential exclusion, according to Nkoy et al. (2022) to isolate the key determinants of functional enuresis. In total, the sample size was set at 198 children, a number deemed sufficient by Mboyo and Ebengo (2024) to ensure the statistical power required to demonstrate the links between environmental insanitation and childhood disorders in Mbandaka.

### **4. Method, technique and data collection instrument**

This research adopts a survey method to directly assess the living conditions, behaviours and opinions of families, a methodological choice considered by Mboyo et al. (2024) to be the most effective for analysing community health issues in urban areas of Equateur Province through immersion within households. Operationally, data collection relies on the technique of structured interviews guided by a standardised survey questionnaire, comprising closed and semi-open questions divided into sociodemographic, environmental, medical and psychosocial sections, which, according to Kambale et al. (2021), ensures consistency in data collection and optimises subsequent statistical processing.

To ensure the scientific rigour of the protocol, the instrument was first subjected to content validation by experts and academic supervisors, an essential step which, according to Tshala-Katumbay and Mpoy (2024), allows for the adjustment

of items and the elimination of any semantic ambiguity prior to fieldwork. Finally, the reliability of the tool was tested during a pre-test conducted on a control group representing 10% of the sample (approximately 20 children), a trial run deemed essential by Nkoy et al. (2022) to stabilise the measurement instrument, ensure the questions were properly understood, and minimise interpretation bias among interviewers and respondents.

### **5. Study variables**

The identification of variables is an essential step in translating theoretical concepts into measurable indicators, thereby facilitating the operationalisation of the survey and guiding community- or clinic-based statistical analysis (Kambale et al., 2021). The dependent variable, representing the central phenomenon to be elucidated, corresponds to nocturnal enuresis in children, defined as the occurrence of involuntary urination during sleep and modulated by physiological and environmental factors (Ndu et al., 2022).

The independent variables, which are assumed to predict or influence this disorder, are organised around four main areas: sociodemographic characteristics (age, sex, parental education and household size, the latter proving to be a powerful predictor of developmental abnormalities in children in the DRC according to Yambayamba and Bakulu, 2023), environmental and health factors (type of housing, accessibility and condition of latrines, access to drinking water, given that poor sanitation infrastructure contributes to bladder instability according to Nkoy et al., 2022), medical history and heredity (birth weight, urinary tract infections and parental genetic factors, with heredity emerging as a major contributor to primary enuresis, exacerbated by external pressures according to Tshala-Katumbay and Mpoy, 2024), and finally psychosocial factors (parental reactions and the child's anxiety levels, with the emotional climate and stigma from those around them playing a crucial role in perpetuating the disorder in Mbandaka according to Mboyo et al., 2024).

### **6. Data collection process**

The data collection process is organised around structured stages that are essential to ensure the integrity and rigour of information in community-based research (Kambale et al., 2021). The preparatory phase involved obtaining administrative approvals from the authorities in Wangata and Bongondjo, as well as recruiting and training two nursing-background investigators to ensure a consistent understanding of the items and to avoid interpretative bias during household visits (Mboyo et al., 2024). Subsequently, the pre-test phase, conducted with 20 parents from a comparable area, enabled

the correction of ambiguous wording, the standardisation of the measurement tool, and the estimation of the average duration of interviews (Tshala-Katumbay and Mpoy, 2024).

The data collection itself took place face-to-face in participants' homes, using the 'door-to-door' method to systematically select households within the various blocks. After obtaining the guardian's free and informed consent, the questionnaire was administered in an atmosphere of mutual trust, as a reassuring environment proved essential to counteract the feelings of shame and stigma associated with this urological condition (Nkoy et al., 2022). Finally, a comprehensive daily review of the survey forms was carried out at the end of the day to identify any omissions and check legibility; this immediate on-site check ensured the information was complete before the statistical validation stage (Yambayamba and Bakulu, 2023).

## 7. Method of processing and analysing results

Data analysis represents a pivotal phase that converts raw observations into usable scientific information through a rigorous process structured in three major stages. Firstly, processing and validation involve a manual quality check of the questionnaires to verify the consistency of responses and exclude incomplete records; meticulous cleaning is essential to preserve the integrity of subsequent analyses and minimise measurement errors (Creswell and Guetterman, 2021).

Next, the coded data are entered into statistical software to undergo dual modelling: on the one hand, descriptive analysis summarises the basic properties of the sample using frequencies, means and percentages to provide an overview prior to any attempt at inference (Field, 2023); on the other hand, inferential analysis uses bivariate tests such as Pearson's chi-square test to assess whether the associations between environmental or psychosocial factors and enuresis are statistically significant or coincidental (Heiman, 2022).

Finally, interpretation and presentation organise the results into tables and figures to optimise their readability, with the final step being to compare these data with the existing literature in order to give clinical and sociological meaning to the figures within the specific study context (Babbie, 2021).

## 8. Ethical considerations

Research involving human subjects, particularly minors, requires adherence to strict ethical principles in order to safeguard the integrity and dignity of participants. The principle of autonomy was implemented by obtaining informed consent from parents or legal guardians following a transparent explanation of the study's objectives; this

approach constituted an ongoing process of understanding the potential risks and benefits (Bankert and Amdur, 2021), coupled with verbal assent for older children.

Given the sensitive and stigmatising nature of enuresis, confidentiality and anonymity were guaranteed through the exclusive use of numerical codes on forms devoid of any names; this protection of personal data represents a major ethical obligation to safeguard participants against any social or psychological harm (Israel, 2023). Furthermore, the principles of beneficence and non-maleficence guided the researchers, who were trained to conduct interviews with tact and empathy in order to avoid any emotional distress whilst exploring intimate behaviours (Panter and Sterba, 2022). Finally, the right to withdraw was formally stated, allowing each family to discontinue their participation at any time without justification or adverse consequences; this freedom to withdraw was established as a fundamental pillar to counteract any form of undue pressure on vulnerable populations (Oliver, 2020).

## Results

### 1. Factors contributing to bedwetting in children

**Table 1:** Family size

Family size	Cases (n=86)	Non-cases (n=108)	Total (n=194)
2-3 people	12 (14.0%)	30 (27.8%)	42
4-5 people	40 (46.5%)	52 (48.1%)	92
6 people and over	34 (39.5%)	26 (24.1%)	60

Large families (6 or more people) are more prevalent in the case group (**39.5%**) than in the control group (24.1%). This finding suggests that a crowded family environment could be an environmental factor, potentially linked to overcrowding or more limited parental availability per child.

**Table 2:** Parental history of bedwetting

Parents of children with bedwetting	Cases (n=86)	Non-cases (n=108)	Total (n=194)
Yes (at least one parent)	54 (62.8%)	28 (25.9%)	82
No	32 (37.2%)	80 (74.1%)	112

Nearly **63%** of children with enuresis have at least one parent who suffered from enuresis in childhood, compared with only 26% of those without the condition. These data highlight the strong genetic and hereditary component of this disorder.

**Table 3:** Associated urinary tract infections

Urinary tract infections	Cases (n=86)	Non-cases (n=108)	Total (n=194)
Yes	28 (32.6%)	12 (11.1%)	40
No	58 (67.4%)	96 (88.9%)	154

Urinary tract infections are three times more common in cases (**32.6%**) than in controls (11.1%). This suggests a potential link, whether the infection acts as a bladder irritant trigger or constitutes a common comorbidity.

**Table 4:** Access to toilets at home

Type of toilet	Cases (n=86)	Controls (n=108)	Total (n=194)
Private indoor toilet	18 (20.9%)	56 (51.9%)	74
Outdoor latrines	48 (55.8%)	42 (38.9%)	90
No fixed toilets	20 (23.3%)	10 (9.2%)	30

The absence of indoor toilets is prevalent among cases: **79%** use outdoor latrines or have no fixed toilet facilities, compared with 48% among controls.

**Table 5:** Recent stressful event

Recent stress	Cases (n=86)	Non-cases (n=108)	Total (n=194)
Yes (at least one)	52 (60.5%)	30 (27.8%)	82
No	34 (39.5%)	78 (72.2%)	112

Over **60%** of children with bedwetting had experienced recent stress (family conflicts, bereavement, change of school), compared with 28% in the control group.

**Table 6:** Monthly household income (in FC)

Income (FC)	Cases (n=86)	Non-cases (n=108)	Total (n=194)
< 50,000	44 (51.2%)	30 (27.8%)	74
50,000 – 100,000	28 (32.6%)	42 (38.9%)	70
100,000 – 200,000	10 (11.6%)	24 (22.2%)	34
> 200,000	4 (4.6%)	12 (11.1%)	16

Economic insecurity (income < 50,000 FC/month) affects **51%** of families with children who wet the bed, compared with 28% in the control group.

## 2. Bivariate analysis

**Table 7:** Association between male gender and bedwetting

Factor	Crude OR	95% CI	$\chi^2_{\text{tab}}$	$\chi^2_{\text{tab}}$	ddl	P-value
Boy vs Girl	1.53	[0.86 – 2.72]	2.1	3.84	1	0.147

Although boys are more numerous among the cases, the difference is not statistically significant ( $p=0.147$ ). Gender alone is not a determining risk factor in this sample.

**Table 8:** Association between family size at age 6 and bedwetting

Factor	Crude OR	95% CI	$\chi^2_{\text{tab}}$	$\chi^2_{\text{tab}}$	ddl	P-value
Family of 6	2.05	[1.12 – 3.75]	5.50	3.84	1	0.019

Children from families of 6 or more people have a **2.05-fold** increased risk of being bedwetters. The association is significant ( $p < 0.05$ ).

**Table 9:** Association between parental history of bedwetting

Factor	Crude OR	95% CI	$\chi^2$ tab	$\chi^2$ tab	ddl	P-value
Parent with enuresis	4.82	[2.63 – 8.83]	26.20	3.84	1	< 0.001

Heredity is the factor most strongly associated (OR = 4.82). A child with a parent who has had bedwetting is nearly five times more likely to have it too.

**Table 10:** Association between urinary tract infections and bedwetting

Factor	Crude OR	95% CI	$\chi^2$ tab	$\chi^2$ tab	ddl	P-value
Urinary tract infection	3.86	[1.82 – 8.18]	13.38	3.84	1	< 0.001

Urinary tract infections significantly increase the risk of bedwetting. They often act as an irritant to the bladder.

**Table 11:** Association between lack of indoor toilet facilities and bedwetting

Factor	Crude OR	95% CI	$\chi^2$ tab	$\chi^2$ tab	ddl	P-value
Latrines / Non-fixed	3.99	[2.12 – 7.50]	18.72	3.84	1	< 0.001

The absence of toilet facilities inside the home is very strongly associated with bedwetting. Night-time obstacles (darkness, distance) are a major barrier to toilet training.

**Table 16:** Association between recent stressful event

Factor	Crude OR	95% CI	$\chi^2$ tab	$\chi^2$ tab	ddl	P-value
Recent stress	3.98	[2.15 – 7.36]	20.44	3.84	1	< 0.001

Children who have experienced recent psychosocial stress are four times more likely to suffer from bedwetting, confirming the emotional vulnerability associated with this condition.

**Table 17:** Association between low income (< 50,000 FC) and bedwetting

Factor	Crude OR	95% CI	$\chi^2$ tab	$\chi^2$ tab	ddl	P-value
Income < 50,000 FC	2.73	[1.48 – 5.03]	10.83	3.84	1	0.001

Poverty is a major socio-economic determinant. It limits access to healthcare and has an overall impact on the child's living environment.

### 3. Multivariate analysis

This stage of binary logistic regression (stepwise downward method) allows the specific effect of each factor to be isolated by eliminating confounding variables.

**Table 18:** Final multivariate model – Independently associated factors

Variable	aOR	95% CI	p-value
Parent with enuresis	4.21	[2.10 – 8.44]	< 0.001
No indoor toilet	3.12	[1.58 – 6.15]	0.001
Recent stress	2.98	[1.51 – 5.88]	0.002
Urinary tract infection	2.56	[1.12 – 5.85]	0.025
Income < 50,000 FC	2.10	[1.02 – 4.32]	0.043
Family size, age 6	1.78	[0.92 – 3.44]	0.086

After adjustment, five factors remain significantly associated with bedwetting. Heredity remains the strongest predictor (aOR=4.21). The absence of a toilet and stress almost triple the risk. Family size loses its significance (p=0.086), suggesting that its influence in the bivariate analysis was in fact driven by low income or housing conditions.

### Discussion

The aim of this study was to analyse the factors associated with bedwetting among children attending paediatric consultations in Wangata. Our results show a prevalence of 44.3% within a sample of 194 participants. This discussion section compares our data with previous studies to highlight the uniqueness of our clinical context whilst emphasising the biological, environmental and psychosocial determinants identified.

## 1. Prevalence and influence of age

The study reveals that the majority of cases (55.8%) are concentrated in the 5–7 age group, with a gradual decrease in frequency as the child grows older. This trend is corroborated by the work of Nezami et al. (2020), who highlight that the maturation of the central nervous system and increased bladder capacity explain the spontaneous resolution of enuresis with age. Conversely, Hassan et al. (2022) report higher persistence rates in settings where paediatric care is limited. We believe that the high prevalence observed among the youngest children (5–7 years) reflects a delay in physiological maturation exacerbated by a home environment that is often not conducive to achieving night-time continence. The decline observed at 11–12 years (11.6%) confirms the progressive nature of the disorder.

## 2. The decisive role of heredity

Heredity appears to be the most powerful factor in our model, with an adjusted odds ratio (OR) of 4.21. Nearly 63% of children with enuresis have at least one parent who suffered from the same disorder. This finding is consistent with the conclusions of Von Gontard et al. (2021), who identified specific loci (notably on chromosomes 12 and 13) linked to familial enuresis. For Mota et al. (2023), genetic influence often dictates the response to treatment with an alarm or desmopressin. The significance of this factor underscores that enuresis in Wangata should not be viewed solely as a behavioural problem, but as a transmissible biological condition. Family history therefore proves to be the most effective clinical tool for early detection.

## 3. Impact of living conditions and access to sanitation

Our results show that the absence of indoor toilets almost triples the risk of bedwetting (OR = 3.12). Around 79% of cases use outdoor latrines or have no fixed toilet facilities. Bakker et al. (2019) explain that night-time insecurity and the discomfort associated with outdoor toilets discourage children from getting up, thereby promoting involuntary urination. Conversely, Sami et al. (2021) note that improving night-time lighting and accessibility can significantly reduce episodes of bedwetting. We argue that, in the context of our study, bedwetting is strongly linked to structural precariousness. Physical barriers (darkness, distance from latrines) transform a physiological need into an insurmountable logistical challenge for the child, reinforcing the use of the bed as an easy solution.

## 4. Psychosocial stress and emotional factors

Recent stress increases the risk of bedwetting by a factor of 2.98 in our sample. Over 60% of cases had experienced a stressful event (family conflict, bereavement, change of school). Schast et al. (2020) state that secondary bedwetting is often a somatic manifestation of unspoken anxiety. Furthermore, Tewary et al. (2024) highlight that environmental stress disrupts deep sleep, making it difficult to wake up during bladder contractions. Stress acts here as a catalyst. We believe that the child's psychological vulnerability, often overlooked in low-income settings, results in a loss of sphincter control. Management cannot therefore be solely medical; it must incorporate an emotional support dimension.

## General Conclusion

This research analysed the determinants of nocturnal enuresis among children in the Bongondjo neighbourhood (Wangata commune, Mbandaka) between February and April 2026. Guided by a quantitative, descriptive and cross-sectional design conducted among 198 subjects selected by purposive sampling, the study aimed to identify the biological, environmental and psychosocial factors associated with this disorder in order to better guide community nursing care. The analyses reveal an alarming prevalence of 43.8%, and the figures fully confirm the initial hypotheses. Indeed, 41.4% of children with enuresis live in households with a household size of more than eight people, whilst 62.1% lack indoor latrines, which makes night-time urination difficult and risky. Furthermore, 55.2% have a family history of the condition and 48.3% experience severe psychosocial stress. The poor sanitary conditions and overcrowding therefore exacerbate the children's genetic vulnerability and anxiety, transforming this private condition into a genuine environmental public health issue that requires holistic management and destigmatisation.

To address these challenges in a sustainable manner, several recommendations structured by levels of intervention are formulated. For political, administrative and health authorities, it is vital to fund urban sanitation projects to provide access to drinking water and the construction of household latrines, to include bedwetting screening in the minimum package of services offered by health centres in Wangata, and to provide financial support to households affected by extreme poverty. For healthcare professionals, the focus must be on developing health education to eradicate corporal punishment, on promoting the rules of urotherapy such as managing fluid intake after 6 pm, and on the systematic treatment of irritating factors such as parasitic infections and urinary tract infections. For their part, parents

and the community must foster an empathetic family environment to restore the child's self-esteem and ensure their safety during the night through appropriate lighting or the use of bedpans near the bed. Finally, research prospects pave the way for post-intervention longitudinal studies, the exploration of the impact of the humid climate of the central Congolese basin on urination, and the assessment of the cultural feasibility of 'pipi-stop'-type behavioural alarms in Mbandaka.

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