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The Value of a Questionnaire in Identifying Children Presenting with Obstructive Sleep Apnoea at Risk of Enuresis

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THE VALUE OF A QUESTIONNAIRE IN IDENTIFYING CHILDREN PRESENTING WITH OBSTRUCTIVE SLEEP APNOEA AT RISK OF ENURESIS



Sebenele Precious Maseko

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in Otorhinolaryngology

August 2025

DECLARATION

I, **Sebenele Precious Maseko**, declare that this research report is my unaided work. It is being submitted for the Master of Medicine (MMed) degree at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.



August 2025

DEDICATION

To my loving mother for her endless support, sacrifice and prayers throughout my career.

My children Yandisa, Siyanda and Sisanda for being my constant and stay.

My siblings and father for never giving up on me, your encouragement and your constant support.

None of this would have been possible without you.

I thank you.

ABSTRACT

Background: Obstructive sleep apnoea (OSA), nocturia, and enuresis are all associated with disrupted sleep. Emerging evidence suggests OSA may be an underlying cause of enuresis in children. This study aimed to explore the correlation between OSA and enuresis and assess the utility of a questionnaire in identifying at-risk children in a South African setting.

Methods: This prospective clinical study was conducted over 12 weeks at the University of the Witwatersrand (WITS) teaching hospitals' Ear, Nose, and Throat (ENT) department. Children aged 5 to 13 years presenting with symptoms suggestive of OSA were screened using sleep pulse oximetry and videotaping. Parents of children diagnosed with OSA completed a questionnaire designed to assess the presence and impact of enuresis. Descriptive and inferential statistics were used to analyse the data.

Results: Sixty-three children were enrolled, with a mean age of 6.3 years; 57.1% were female. Most (82.5%) were receiving ENT treatment. Daytime sleepiness was reported in 46% of children, and 39.9% were underperforming at school. Enuresis was reported in 31.8% of children, with 44.4% experiencing bedwetting in the past six months. The correlation between OSA and enuresis was weak ($R = 0.105$, $p = 0.41$). Risk scores varied significantly by gender ($p = 0.04$) but not by age ($p = 0.77$).

Conclusion: While no significant association between OSA and enuresis was found, enuresis remains prevalent in children with OSA. Male children showed higher risk scores,

suggesting gender-specific vulnerability. A follow-up study with a control group and a more diverse population is recommended.

Key words: Obstructive sleep apnoea, enuresis, questionnaire, screening, children

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LIST OF ABBREVIATIONS

ADH	Anti-diuretic hormone
ANP	Atrial natriuretic peptide
ENT	Ear, nose and throat
IQR	Interquartile ranges
OSA	Obstructive sleep apnoea
OSD	Obstructive sleep disorders
RDI	Respiratory disturbance index
UAO	Upper airway obstruction

JOURNAL COVER LETTER

15 June 2025

The Editor

ANZ Journal of Surgery

I am pleased to submit our manuscript entitled **"Exploring the Correlation Between Obstructive Sleep Apnoea and Enuresis in Children: A South African Clinical Study"** for consideration for publication in the ANZ Journal of Surgery.

This prospective clinical study investigates the potential correlation between obstructive sleep apnoea (OSA) and enuresis among children aged 5 to 13 years in a South African clinical setting. While existing literature has proposed a possible link between sleep-disordered breathing and bedwetting in children, there is limited data from African populations. Our study aimed to fill this gap by assessing children with OSA using sleep pulse oximetry and parental questionnaires, to understand the prevalence and patterns of enuresis in this group.

Our findings showed that although no significant statistical association was observed between OSA and enuresis, the latter remains common among children with sleep-disordered breathing. Interestingly, male children demonstrated higher risk scores, indicating possible gender-related differences that warrant further exploration.

We believe our research adds to the limited body of knowledge on paediatric sleep disorders in the African context and underscores the importance of comprehensive evaluation in children presenting with nocturnal symptoms. The study also suggests that targeted screening tools may aid in identifying at-risk subgroups for early intervention.

The primary author is a surgeon in training. The Wits Human Research Ethics Committee has approved this research study. This manuscript has not been published elsewhere and is not under consideration by another journal. All authors have read and approved the final version of the manuscript, and there are no conflicts of interest to declare.

Thank you for considering our work for publication. We look forward to your response.

Yours sincerely,

Dr Sebenele Precious Maseko (On behalf of the co-authors)

MANUSCRIPT TITLE PAGE

Full title: The value of a questionnaire in identifying children presenting with obstructive sleep apnoea at risk of enuresis

Short title: Questionnaire to identify Sleep Apnoea and Enuresis Risk

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INTRODUCTION

Enuresis is the loss of bladder control during sleep in children five years and older. It represents a challenging issue in paediatric urology. With a prevalence of 5-10% among seven-year-olds and a self-regression rate of 15% annually, it is a condition that warrants further examination and understanding (1). Defined as monosymptomatic when unaccompanied by a history of bladder dysfunction and urinary tract infections, nocturnal enuresis manifests as a multifaceted disorder (2).

Obstructive sleep disorders (OSD), characterised by stertor and increased effort to breathe due to upper airway obstruction (UAO), are common among paediatric populations. UAO is a common concern, affecting about 27% of children, often attributed to nasal or oropharyngeal pathologies (3). Adeno-tonsillar hypertrophy is the most frequent cause of UAO, while other contributors encompass craniofacial malformations, septal deviation, and allergic rhinitis (4). Within this context, obstructive sleep apnoea (OSA) emerges as a common presentation in children with adeno-tonsillar hypertrophy, further complicating the clinical landscape (5-7). Enuresis is categorised as either primary or secondary, depending on the child's history of bladder function. Primary enuresis is characterised by a persistent lack of night-time bladder control, whereas secondary enuresis denotes a recurrence of accidental incontinence after at least six months of nocturnal clearness. The aetiology of enuresis in children is invariably multifactorial, involving physiological, developmental, and psychosocial components (8).

OSA represents the graver manifestation of sleep-disordered breathing, resulting in a compound array of physiological disturbances. These include anoxia, hypercapnia, acidosis, episodic bursts of sympathetic breathing, and negative abdominal breathing. Prolonged exposure to OSA disrupts normal homeostasis, perpetuating adverse consequences on health (8, 9). The hypoxia and hypercapnia associated with OSA activate the sympathetic nervous system, increasing left ventricular pressure. The ensuing physiological alterations can have profound and far-reaching effects on overall health (10). Enuresis and OSA are marked by nocturnal voiding, making them integral to the spectrum of sleep-disordered breathing. Studies have described the association between OSA and nocturnal enuresis, with both conditions sharing an underlying sleep disorder marked by altered stimulation responses and fragmented sleep patterns (1). This interplay is rooted in the pathophysiological mechanisms at play, leading to increased pressure in the abdomen and a change in blood pressure, which induces natriuresis and diuresis by affecting levels of anti-diuretic hormone, atrial, and brain natriuretic peptides (11).

Oscar Sans Capdevilla et al.(2) conducted a study involving 17,646 children, revealing that habitual snorers, constituting 26.9% of the sample, exhibited a higher prevalence of enuresis, predominantly among boys. Non-snorers displayed a lower incidence of enuresis at 11.6%. Additionally, children with enuresis exhibited elevated brain natriuretic peptide levels, with marginal increases observed among children with OSA (2). This research underscores the strong association between enuresis and sleep disarray, emphasising the need for a comprehensive understanding of their interrelation. Evidence suggests that children with a respiratory disturbance index (RDI) exceeding one are at a significantly increased risk of enuresis (12). This association might be attributed to the sequelae of OSA on

stimulation responses, bladder pressure, and urinary voiding, further substantiating the complex relationship between these conditions (13, 14). The study by Karakas et al.(5) posits the significance of evaluating the upper airway in children presenting with nocturnal enuresis, highlighting the potential benefits of an otorhinolaryngological assessment as an integral component of the diagnostic and treatment process (5). The aetiological factors contributing to nocturnal enuresis are multifaceted, encompassing the intricate interplay linking UAO and the complex pathophysiology of OSD (1, 5). While the exact mechanisms remain a subject of ongoing investigation, it is apparent that the efficacious treatment of enuresis necessitates a comprehensive approach that considers potential UAOs (15). Enuresis and OSA share the commonality of being common sleep-related problems in children, sparking significant interest in exploring their potential relationship.

Although multiple studies have explored the relationship between OSA and nocturnal enuresis, particularly in developed nations, there remains limited literature from developing countries, including South Africa (16). This study sought to contribute South African data to address this knowledge gap by exploring the link between OSA and nocturnal enuresis and developing a screening questionnaire to identify at-risk children.

METHODOLOGY

Study design and setting

This prospective, quantitative clinical study was conducted at the Ear, Nose, and Throat (ENT) outpatient departments and inpatient wards of the University of the Witwatersrand (WITS) teaching hospitals.

Study population

The study population consisted of children aged 5 to 18 years who presented to the ENT outpatient department with a clinical history suggestive of OSA. Eligible participants were identified and recruited by trained nursing staff and senior registrars.

Inclusion and exclusion criteria

Children were eligible for inclusion if they were between the ages of 5 and 18 years of either sex, and fully toilet-trained. These criteria ensured the study focused on school-aged children and adolescents with the developmental capacity for bladder control, which is essential for assessing enuresis. Participants were excluded if they had known urogenital malformations, a history of urogenital surgery, or any psychiatric impairments. Additionally, children with diabetes mellitus or other medical conditions known to predispose them to polyuria were excluded to avoid confounding factors that could influence the presence of enuresis independently of OSA.

Data collection

Participants were screened daily at the ENT outpatient department (OPD). The diagnosis of OSA was confirmed using a combination of clinical history, video recordings during sleep (for inpatients), and pulse oximetry readings. Following screening, a structured five-minute questionnaire was administered to either the patient or their caregiver to assess symptoms and relevant clinical history. The questionnaire had six questions related to OSA and four questions pertaining to

enuresis. All collected data were anonymised, and unique study identification numbers were assigned to maintain participant confidentiality.

Statistical analysis

Descriptive statistics were used to summarise the data. Continuous variables were presented as means with standard deviations and as medians with interquartile ranges (IQR) and ranges. Categorical variables were reported as frequencies and percentages. OSA and enuresis risk scores were computed by allocating a point of one to each question that was answered correctly. Thereafter, the total risk score was calculated by summing up each participant's OSA and enuresis scores. Associations between OSA and enuresis were assessed using scatter plots with fitted regression lines. Chi-squared tests were employed to examine relationships between total risk score, gender, and age categories (younger [0-6 years] versus older [7-13 years] older children). All statistical analyses were performed using **STATA version 15**. A p-value of ≤ 0.05 was considered statistically significant.

RESULTS

Study population

A total of 63 children were enrolled into the study. The median (IQR) age in years was six (5-7). The youngest and oldest participants were aged 5 and 13 years, respectively. The majority of the participants (57.1%, 36/63) were female, with the remainder (42.9%, 27/63) being male.

Obstructive sleep apnoea and related morbidity

All 63 children reported snoring and episodes of apnoea during sleep. Most participants (98.4%, 62/63) reported breathing through the mouth whilst asleep, and 82.5% (52/63) had sought ENT treatment for snoring. Almost half of the participants (46.0%, 29/63) were sleeping a lot during the day, and 39.9% (22/63) were not progressing well in their school (**Table 1**).

Enuresis and associated morbidity

The prevalence of frequently wetting the bed at night in this study population was 31.8% (20/63). A quarter of the patients with frequent bedwetting (5/20) reported at least five episodes of bedwetting per week. The bedwetting affected 14.3% (9/63) of the families, and a similar percentage of parents (14.3%, 9/63) were worried about their child's behaviour around peers and at school. Among the nine parents who reported being affected by their child's bedwetting, 44.4% (4/9) reported emotionally being affected, with a similar proportion (44.4%, 4/9) feeling burdened by the need to change the child's linen (Table 2) frequently. The total risk score ranged from 3 to 9, with 43.0% of the study participants scoring more than 5 (**Table 3**).

Relationship between obstructive sleep apnoea, enuresis and associated factors

Figure 1 shows the fitted regression line in red (**whose equation is Enuresis score =-0.11 x OSA core +4.89**), suggesting an inverse linear relationship between OSA and enuresis scores. However, this was not statistically significant (p-value=0.41). **Figure 2** shows that there was a significantly higher proportion of male children with high-risk scores (34.8%) compared to female children (7.1%) (p-value =0.04).

However, **Figure 3** illustrates that there was no significant relationship between total risk score and age of the participants.

DISCUSSION

This study explored the potential association between OSA and enuresis in a cohort of South African children, emphasising two demographic modifiers, age and sex. While all children reported symptoms of OSA, including snoring, mouth breathing during sleep, and apnoeic episodes, a significant proportion (31.8%) also experienced frequent nocturnal enuresis.

Most families found it easy to use and understand, it addressed some of the questions they wouldn't necessarily be addressed on a routine follow up visit. They found answering the questions quick and easy . This questionnaire can be utilised even at a primary level health centre as it is easy to use and understand.

Despite this overlap, our findings revealed no statistically significant correlation between OSA severity and enuresis scores ($p = 0.41$), suggesting that while the conditions may co-exist, they do not necessarily demonstrate a direct or causal relationship. The fitted regression line indicated an inverse trend, but this was not strong enough to be clinically or statistically conclusive, supporting earlier studies that have identified the multifactorial nature of enuresis in children with OSA (17, 18).

One important observation was the gender disparity in OSA-related enuresis risk, with male children showing significantly higher risk scores than females (34.8% vs.

7.1%, p = 0.04). This aligns with literature that has reported higher rates of enuresis in boys, potentially due to delayed maturation of the central nervous system, hormonal influences, or anatomical differences in airway structure (17-19). The role of hormonal regulation, particularly sex hormones, warrants deeper investigation, as these may influence bladder control and arousal thresholds during sleep. Clinically, this gender-based difference should prompt paediatric practitioners to consider more targeted screening and counselling strategies for boys presenting with OSA symptoms.

Interestingly, no statistically significant relationship was found between participant age and enuresis risk. This suggests that enuresis in children with OSA may not follow the typical age-related decline often seen in the general population (p = 0.77). This finding contrasts with prior studies that report enuresis prevalence decreasing with age and may reflect the confounding influence of OSA-related neurohormonal disturbances in this group (20, 21).

From a pathophysiological standpoint, one hypothesis involves the role of Atrial Natriuretic Peptide (ANP), which is released in response to increased atrial stretch during apnoeic episodes. Elevated ANP levels may promote diuresis and contribute to nocturnal enuresis in children with OSA (13, 22-24). However, despite the plausible biological link, the current study did not directly measure ANP levels, limiting our ability to confirm this pathway. The intricate relationship between ANP, OSA, and enuresis remains a promising avenue for future biomarker-based studies, especially within resource-constrained settings where clinical tools for sleep assessment may be limited (16, 22, 25).

Limitations

This was a small cross-sectional study. Therefore, any associations reported in this study should be interpreted with caution, as association does not necessarily imply causality. We could not access the influence of ethnicity on the total risk score in this study. Larger, multi-centre studies involving more ethnically diverse cohorts could better explore this relationship's potential socio-cultural or genetic modifiers.

Conclusion

This study highlights the complex interplay between paediatric OSA and enuresis and reinforces the importance of a comprehensive, multifactorial approach to diagnosis and management. Although a statistically significant correlation between OSA severity and enuresis was not established, the observed trends, particularly the gender differences, suggest potential underlying mechanisms that merit further investigation. The high burden of both conditions in this study population indicates a need for routine screening for enuresis in children with OSA symptoms and vice versa. Future research should utilise larger, more diverse populations, objective sleep diagnostics such as polysomnography, and biochemical assessments of hormones like ANP and anti-diuretic hormone (ADH) to unravel the pathophysiological links further. Such efforts could enhance the development of tailored interventions, particularly in resource-limited settings where both conditions are underdiagnosed and undertreated.

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We are grateful to Admire Chikandiwa for assisting with data analysis.

Disclosure statement

The authors of this manuscript have no conflicts of interest to disclose.

Figure legends

Figure 1: Blue dots: risk score; red line: fitted regression line

Figure 2: Blue bars: male; red bars: female

Figure 3: Blue bars: young (0-6 years); red bars: old (7-13 years)

Tables

Table 1: Prevalence of obstructive sleep apnoea and related comorbidities (N=63)

Description	n (%)
Stops breathing whilst sleeping	63 (100.0)
Snores whilst sleeping	63 (100.0)
Breathing through the mouth whilst sleeping	62 (98.4)
ENT treatment for snoring	52 (82.5)
The child is not progressing and not passing all	22 (39.9)
Sleeps a lot during the day	29 (46.0)
This sleeping affects daily activities (n=29)	21 (72.2)
OSA score	
3	4 (6.4)
4	22 (34.9)
5	18 (28.6)
6	19 (30.2)

Table 2: Prevalence of enuresis and associated comorbidities (N=63)

Description	n (%)
Frequently wets the bed at night	20 (31.8)
Times of bed wetting per week (n=20)	
2	3 (15.0)
3	7 (35.0)
4	5 (25.0)
5	4 (20.0)
6	1 (5.0)
Consulted HCW for enuresis	2 (3.17)
Worried about the child's behaviour around peers, at school	9 (14.3)
Bedwetting affects the family	9 (14.3)
Effects of bedwetting on family (n=9)	
Emotionally	4 (44.4)
Frequent bed changing	4 (44.4)
Waking the child at night	1 (11.2)
Enuresis risk score	
0	36 (58.1)
1	15 (24.2)
2	8 (12.9)
3	2 (3.2)
4	1 (1.6)

Table 3: Total risk score (N=63)

Description	n (%)
3	2 (3.9)
4	14 (27.5)
5	13 (25.5)
6	12 (23.5)
7	7 (13.7)
8	2 (3.9)
9	1 (1.9)

Figures

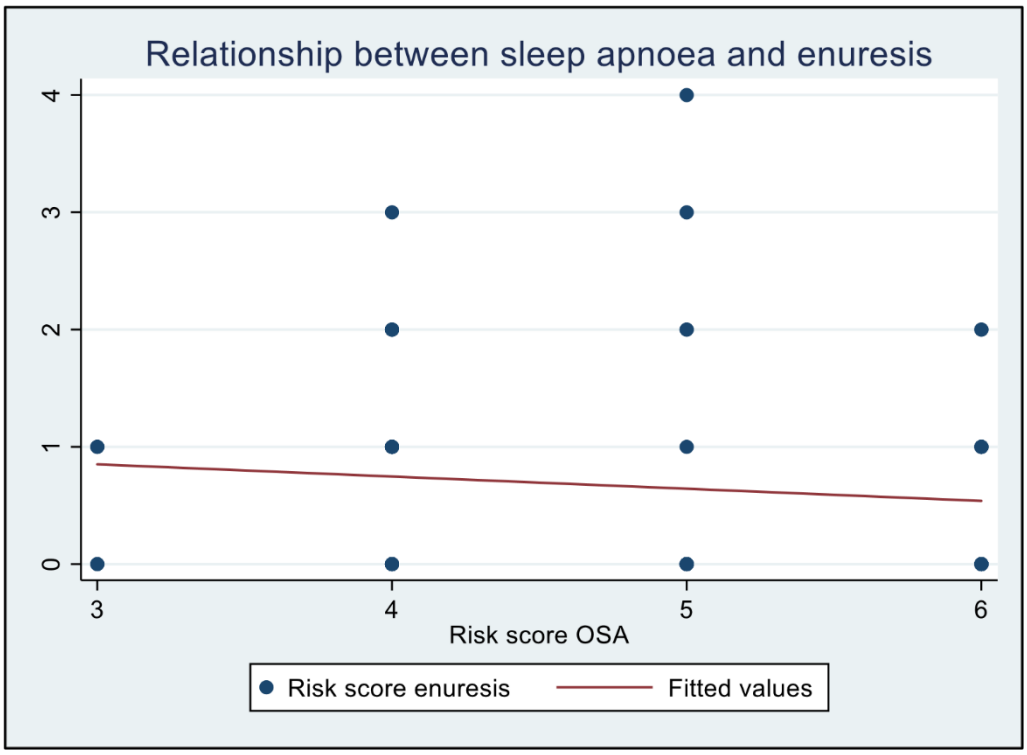


Figure 1: Relationship between sleep apnoea and enuresis

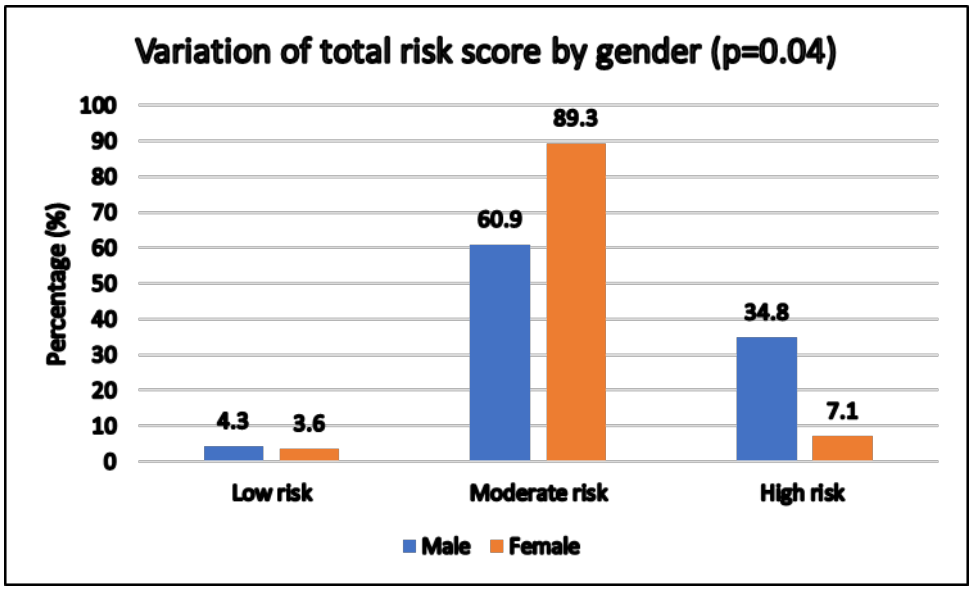


Figure 2: Variation between total risk score and gender

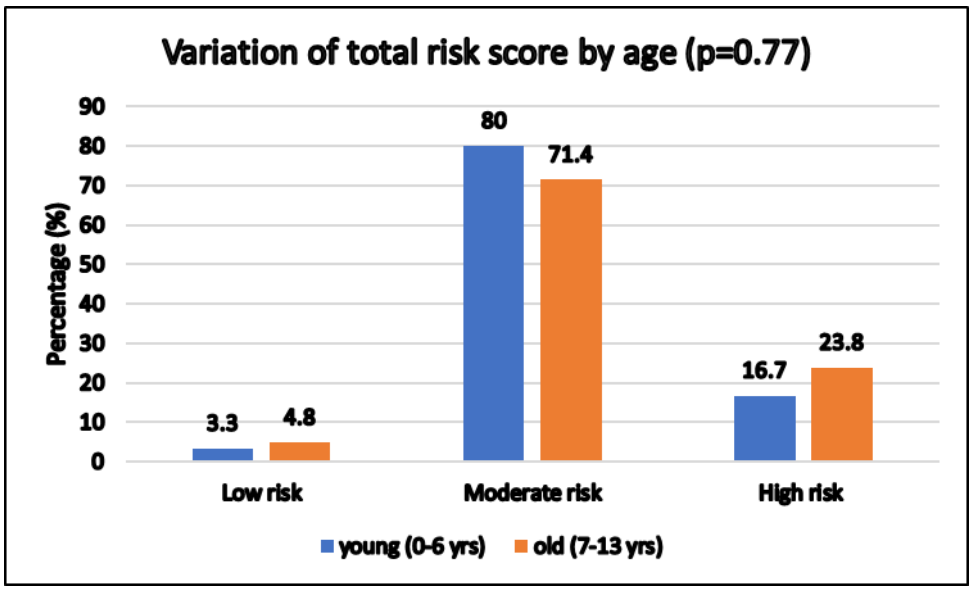


Figure 3: Relationship between total risk score and age

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APPENDICIES

Appendix A: Approved Research Protocol

University of the Witwatersrand Faculty of Health Sciences Department of Otorhinolaryngology

The value of a questionnaire in identifying children presenting with obstructive sleep apnoea at risk of enuresis

MMED Otorhinolaryngology

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Date: June 2021

Introduction

Nocturnal enuresis is the uncontrolled passage of urine while asleep in children > five years old. It has a prevalence of 5-10% at age seven, then voluntarily declines yearly at a rate of 15%.[1] Monosymptomatic enuresis is defined as bedwetting without any medical history of bladder malfunction and urinary tract infections.[2]

Obstructive sleep disorders (OSD) are a group of symptoms distinguished by stertorous breathing and increased respiratory effort as a sequelae of upper airway obstruction (UAO). UAO is typical in children presenting with nasal or oropharyngeal disorders (27%). The most usual cause of extra-thoracic obstruction is adeno-tonsillar hypertrophy; other causes include craniofacial malformations, septal deviation and allergic rhinitis.[1-3]

Obstructive sleep apnoea (OSA) is a frequent presentation in Ear, Nose and Throat (ENT) specialists, most commonly in children suffering from adeno-tonsillar hypertrophy. Enuresis is a common complaint in paediatric surgery and paediatric urology. Enuresis and OSA are both frequent sleep disorders in children.[4-6] Numerous studies have looked at the link connecting OSA and nocturnal bedwetting in developed countries, but there is a paucity in the literature from South Africa and other developing nations. The Epworth sleepiness scale and STOP-bang questionnaire are both useful commonly used screening questionnaires for OSA.

Literature review

Enuresis

Nocturnal enuresis is classified as either primary, when the child has never obtained a night without bedwetting or secondary, when there is enuresis after a period of at least six dry months. The underlying factors of enuresis in paediatrics are usually multifactorial. Physiological, developmental and psychosocial factors all contribute to the progression of enuresis in children. Potential causes of secondary enuresis include medical problems arising from the genitourinary system, urogenital system, inadequate bowel movements, poorly controlled diabetes mellitus, psychological illness and sexual assault, among others. Some other urological dysfunctions, like incontinence, early voiding with small volumes of urine in the bladder and involuntary bladder contraction, also contribute to bed wetting.[4,5]

Obstructive sleep disorders

OSA is the more severe form of sleep-disordered breathing. It leads to several complicated ailments, including hypoxia, acidosis, hypercapnia, episodic bursts of sympathetic breathing and negative abdominal breathing. Chronic OSA alters normal homeostasis. The hypoxia and hypercapnia also activate the sympathetic nervous system and elevates left ventricular afterload.[6-8]

Pathophysiology of Enuresis and Obstructive Sleep Apnoea

Although bedwetting is frequently common with urological infirmities, nocturia and enuresis are important symptoms of sleep-disordered breathing.[6] Previous research discovered that children presenting with OSA commonly have involuntary urination during sleep. These conditions have possessed a concealed sleep disturbance distinguished by a modified stimulation feedback and sleep disruption. Pathophysiology of enuresis is related to OSD, which leads to raised pressure in the abdomen and a change in blood pressure, that stimulates natriuresis and polyurea by modified levels of anti-diuretic hormone, atrial, and brain natriuresis peptides.[1]

A study by Oscar Sans Capdevilla et al surveyed 17646 children. A total of 1976 children were habitual snorers; 15670 children were non-snorers. Of the habitual snorers, 531 children (26.9%) had enuresis, with predominant representation of boys (472,87.5%). Within the non-snorers, 1821 (11.6%) children reported enuresis. Central natriuretic peptide thresholds were raised in several children with enuresis and were marginally elevated among children diagnosed with OSA.[2]

There is a high frequency of enuresis in children with suspicious sleep-disordered breathing. Children with a respiratory disturbance index (RDI) of >1 had an increased risk of enuresis compared to children with an RDI <1. This may be due to the consequences of OSA on arousal reaction, bladder pressure and urinary excretion.[5,9,10] Karakas et al looked at the importance of examining the upper airway in children with nocturnal enuresis[4]. They concluded that children with nocturnal enuresis should ideally be assessed by an Ear, Nose and Throat specialist before commencing enuresis treatment.

Potential causes of UAO should be considered as aetiological factors for nocturnal enuresis, and even though the pathophysiology is not understood correctly, the effective treatment of nocturnal enuresis includes treatment of UAO.[4,11,12]

Aim

This study aims to establish the correlation linking OSA and enuresis and develop a screening tool/ questionnaire to identify at-risk children.

Objectives

1) What is the relationship between OSA and enuresis in our population?
2) Which children are more at risk, by age, gender, ethnicity?

Materials and methods

Study design

A prospective qualitative clinical study. Patients will be identified at the WITS university teaching hospitals' ENT outpatient department (OPD) and wards. Diagnosis for OSA will be obtained via videotaping and pulse oximetry for inpatients.

Data collection

The patients or their caregivers will fill in a five-minute questionnaire.

Study period

The study will be done over a period of 12 weeks after obtaining institutional permission and ethics approval.

Study population

This will include all children in the ENT OPD with a clinical history of OSA. Patients coming to the ENT OPD are screened daily by nursing staff and the most senior doctor. Children between the ages of 5 and 18 years old with UAO who meet the inclusion criteria will be selected.

Inclusion criteria

- Males and females aged 5-18 years
- Toilet trained

Exclusion criteria

- Children with urogenital malformations

- Psychiatric impairment
- Diabetes and other medical conditions predisposing to polyurea
- Children with Urogenital surgery

Consent will be achieved from parents/ guardian or participants aged at least 18 years and assent from the minors (See appendices C, D, E and F). A screening tool in the form of a questionnaire will be provided in different local languages. Parents who cannot read or write will be assisted. Parents /Guardians will be asked to fill in the screening tool while awaiting to be seen by a doctor. All information will be kept anonymous. A study number will identify patients

The questionnaire will be as follows:

The OSA/Enuresis questionnaire

Name

Age

Gender

OSA QUESTIONS **1 point** for **yes/ 0 for NO**	**YES/NO**	**ENURESIS QUESTIONS**	**YES/NO**	**TOTAL**
1) Does your child stop breathing/pause/ disturbed breathing while sleeping at night?		1) Does your child frequently wet her/his bed at night? If yes, how many times a week?		
2) Is your child snoring while sleeping?		2) Have you consulted any healthcare professionals about your child's bedwetting?		

3) Is your child mouth breathing while sleeping at night?		3) Are you worried about your child's behaviour around his peers at school?		
4) Has your child had any ENT treatment for snoring (medical, surgical), breathing disturbance If so, have you noticed any change in his bedwetting habits?		4) Has the bedwetting affected your family? If so, how?		
5) Is your child progressing at school, passing all grades?				
6) Does your child sleep a lot during the day, and does it affect his/her daily activities?				
RISK SCORES 1-3= low risk 4-6= moderate risk 7-10= high risk				

Sample size

We aim for a sample size of at least 100 patients in this study. After 12 weeks, all data will be collected and analysed.

Data analysis

Descriptive statistics will be collected and analysed—variables such as gender, age, and number of bedwettings per week. Univariate descriptive data will be calculated using Qualrix survey software. For parametric data, the mean and standard deviation will be calculated; if data is not normally distributed or non-parametric, then the median and range will be calculated. The remainder of the data is categorical descriptive data, and percentages and ratios will be calculated for these variables: gender, clinical characteristics and associated factors.

Ethical and regulatory considerations

Ethics clearance will be established from the University of Witwatersrand Human Research Ethics Committee, preceding data collection. Consent will be obtained from parents/guardians or participants if they are at least 18 years old. Assent will be obtained from the minors. Questionnaires will not affect patient waiting time and management of patients in the clinic. Patients unwilling to participate in the study won't be discriminated against. Patient confidentiality will be highly respected. All data will be stored in a protected database, of which only the researcher can access.

Funding

Funding for printing and collecting data sheets will be the researcher's responsibility. No other funding will be required for this project.

Potential limitations

- Time: all questionnaires will be filled out during the waiting period at the clinic
- Clinic records: poor documentation of clinical signs and symptoms
- No parents/guardians available for history
- Translators may be required
- the ideal standard for diagnosing OSA is a polysomnogram, and this is not routinely done in the paediatric population.

(However, as this is meant to be a screening tool, a clinical diagnosis of OSA will suffice.)

Timing

	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB
literature review		x										
protocol preparation			x	x								

protocol assessment				x	x							
ethics application					x							
data collection						x	x					
data analysis								x				
thesis write-up									x	x		
paper writeup											x	x

References:

1) Zaffanelo M, Piancentini G, Lippi G et al. Obstructive sleep disordered breathing, enuresis and combined disorders in children: chance or related association? Swiss Med Weekly.2017;147:w14400

2) apdevila OS, Cabtree VM, Kheirandish-Gozal L et al. Increased morning brain natriuretic peptide levels in children with nocturnal enuresis and sleep- disordered breathing: a community – based study. Pediatrics. 2008;121(5):e1208-e1214

3) Wolfe-Christensen C, Larisa G, Kovacevic et al. Lower health related quality of life and psychosocial difficulties in children with monosymptomatic nocturnal enuresis-is snoring a marker of severity? The Journal of urology. 2013;190(4):1501-1504

4) Karakas HB, Mazlumoglu RM, Simsek E. The role of upper airway obstruction and snoring in the etiology of monosymptomatic nocturnal enuresis in children. European archives of otorhinolaryngology.

2017;274(7):2959-2963

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8) Alexopoulos E, Malakasioti G, Vasiliki V et al. Nocturnal enuresis as risk factor for moderate-to-severe OSA in children with snoring. European Respiratory Journal. 2014;44:4912

9) Umlauf GM, Chasens ER. Bedwetting- Not always what it seems: A sign of Sleep- Disordered Breathing in Children. Journal for Specialists in Pediatric Nursing. 2003;8(1):22-30

10) Heba HA, Lobna ME, Ahmed MB et al. Effect of adenotonsillectomy on nocturnal enuresis in children with OSA. Egyptian Journal of Chest

Disease. 3013;67(2)275-280

11) Bascom A, McMaster MA, Alexander TR. Nocturnal enuresis in children is associated with differences in autonomic control. Sleep journal. 2018;1-6

12) Sun C, Xu Y, Luo C et al. Relationship between enuresis and obstructive sleep apnoea-hypopnea syndrome in children. Journal of international Medical research. 2020;48:12

13) Al-Hadi M, Bo Mayer F, Al-Sulaiman N et al. The relationship between adenoid hypertrophy and primary enuresis among children in Al-Hasa population, Saudi Arabia: A cross-sectional study.

International Journal of Medical and Health Research.

2018;4(8):46-51

14) Neshat A, Miranzadeh-Mahabadi S, Miranzadeh-Mahabadi H et al. The association between adenoid hypertrophy and enuresis in children. Journal of Comprehensive Pediatrics. 2016;7(1):e32771

Appendix B: Wits HREC Approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Dr Sebenele Precious Maseko

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M240323

NAME: (**Principal Investigator**)	Dr Sebenele Precious Maseko
DEGREE:	MMed – Otorhinolaryngology
STUDENT NUMBER:	2500580
DEPARTMENT:	Otorhinolaryngology Rahima Moosa Mother and Child Hospital
TITLE:	The value of a questionnaire in identifying children presenting with obstructive sleep apnea at risk of enuresis Rahima Moosa Mother and Child Hospital
DATE CONSIDERED:	28-Mar-2024
DECISION:	Approved unconditionally
CONDITIONS:	N/A
NOTE:	Original Online Application Number MED24-02-399. Subsequent Online Application Number M240816-A-0004.
SUPERVISORS:	Prof Shivesh Maharaj and Prof Ahmed Adam

APPROVED BY: Prof P. Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 16-Aug-2024 **EXPIRY DATE:** 15-Aug-2029

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATOR(S)

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report** in the month date of convened meeting each year until study is closed. Failure to submit annual report will result in ethics clearance certificate suspension. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. Unreported changes to the application may invalidate the clearance given by the HREC (Medical). Email a signed copy of ethics clearance certificate to HREC-Medical.ResearchOffice@wits.ac.za

Signature of Principal Investigator _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix C: Parent Information Sheet and Consent form

Consent Form

Title of Research: The value of a questionnaire in identifying children presenting with obstructive sleep apnoea at risk of enuresis

Dear Parent or Legal Guardian:

You are invited to participate in a survey as part of a research study conducted by Dr Sebenele Maseko and Dr Shivesh Maharaj who are both from the University of the Witwatersrand. Before deciding to participate, it is important for you to understand the purpose of the survey, what your involvement will entail, and how your information will be used.

Introduction and Study purpose: This survey aims to gather insights on the relationship between obstructive sleep apnoea (OSA) and enuresis (involuntary bedwetting during sleep). Further, this information will be used to develop a screening questionnaire to identify at risk children. Your participation will contribute valuable information that can help improve the quality of healthcare of children suffering from OSA and enuresis.

Procedures: If you agree to participate, you will be asked to complete a survey questionnaire. The survey will include questions about your child's behaviour during sleeping, including breathing patterns, snoring and enuresis, school performance, and any previous medical or surgical treatment that your child might have received. It is estimated to take approximately five minutes to complete. Please answer all questions as honestly as possible and return the completed questionnaires promptly.

Participant Rights and Alternatives: Your responses will be kept confidential to the extent permitted by law. No personally identifiable information will be disclosed in any publications or reports resulting from this research. All data will be stored securely, and access will be restricted to authorised personnel.

Reimbursement: There is no compensation for participating in this study.

Risks and Discomforts: Children with enuresis my experience psychological stress. Participation in this survey is entirely voluntary. You may choose not to participate or to withdraw from the survey at any time without any consequences. Your decision will not affect you or your child’s current or future healthcare.

Benefits: There will be no direct benefits to you or your child by participating in this survey. However, your participation may benefit the society at large by contributing to information will enhance the clinical care of children suffering from obstructive sleep apnoea and enuresis.

Who to contact: If you have any questions about the survey or the research study, please contact the principal investigators Dr Sebenele Maseko (Tel: 060 522 0698) and Dr Shivesh Maharaj (Tel: 076 120 4066).

If you do not get satisfactory answers, you may contact Professor P Ruff, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and their email addresses are:

Zanele.Ndlovu@wits.ac.za,

Rhulani.Mukansi@wits.ac.za,

Mapula.Ramaila@wits.ac.za

and lain.Burns@wits.ac.za

Parent/Legal Guardian consent: I have read and understood the information provided in this consent form. I have had the opportunity to ask questions and have received satisfactory answers. I voluntarily agree to participate in the survey.

Your Name (Please print): _____

Your Signature: _____

Date/Time: _____

Witness Name (Please print): _____

Witness Signature: _____

Date/Time:_____

Appendix D: Participant Information Sheet and Consent Form for 18-year-olds and above

Consent Form

Title of Research: The value of a questionnaire in identifying children presenting with obstructive sleep apnoea at risk of enuresis

Dear Participant:

You are invited to participate in a survey as part of a research study conducted by Dr Sebenele Maseko and Dr Shivesh Maharaj who are both from the University of the Witwatersrand. Before deciding to participate, it is important for you to understand the purpose of the survey, what your involvement will entail, and how your information will be used.

Introduction and Study purpose: The purpose of this survey is to gather insights on the relationship between obstructive sleep apnoea (OSA) and enuresis (involuntary bedwetting during sleep). Further this information will be used to develop a screening questionnaire to identify children at risk. Your participation will contribute valuable information that can help improve the quality of healthcare of children suffering from OSA and enuresis.

Procedures: If you agree to participate, you will be asked to complete a survey questionnaire. The survey will include questions about your behaviour during sleeping including breathing patterns, snoring and enuresis, performance at school as well history of any previous medical or surgical treatment that you might have received. It is estimated to take approximately five minutes to complete. Please answer all questions as honestly as possible and return the completed questionnaires promptly.

Participant Rights and Alternatives: Your responses will be kept confidential to the extent permitted by law. No personally identifiable information will be disclosed in any publications or reports resulting from this research. All data will be stored securely, and access will be restricted to authorised personnel.

Reimbursement: There is no compensation for participating in this study.

Risks and Discomforts: Young people with enuresis may experience psychological stress. Participation in this survey is entirely voluntary. You may choose not to

participate or to withdraw from the survey at any time without any consequences. Your decision will not affect your current or future healthcare.

Benefits: There will be no direct benefits to you by participating in this survey. However, your participation may benefit the society at large by contributing to information will enhance the clinical care of children suffering from obstructive sleep apnoea and enuresis.

Who to contact: If you have any questions about the survey or the research study, please contact the principal investigators Dr Sebenele Maseko (Tel: 060 522 0698) and Dr Shivesh Maharaj (Tel: 076 120 4066).

If you do not get satisfactory answers, you may contact Professor P Ruff, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and their email addresses are:

Zanele.Ndlovu@wits.ac.za,

Rhulani.Mukansi@wits.ac.za,

Mapula.Ramaila@wits.ac.za

and lain.Burns@wits.ac.za

Participant consent: I have read and understood the information provided in this consent form. I have had the opportunity to ask questions and have received satisfactory answers. I voluntarily agree to participate in the survey.

Your Name (Please print): _____

Your Signature: _____

Date/Time: _____

Witness Name (Please print): _____

Witness Signature: _____

Date/Time: _____

Appendix E: Participant Information Sheet and Assent Form 7-11 years olds

Information sheet

Title of Research: The value of a questionnaire in identifying children with sleep apnoea who might wet the bed

Dear patient

We want to ask your parent some questions to help us understand how sleep problems and bedwetting are related. This study is led by Dr. Sebenele Maseko and Dr. Shivesh Maharaj from the University of the Witwatersrand.

Why are we doing this study?

We want to learn if children who have trouble breathing while they sleep (called sleep apnoea) are more likely to wet the bed. Your parent's/caregiver answers will help us make a questionnaire to find out which children might need help.

What will your parent do in the study?

Your parent will answer some questions about how you sleep, if you snore, and if you wet the bed. It will also ask about your school and any medical treatments you've had. It will take your parent/caregiver about five minutes to complete the questions.

Will your answers be kept secret?

Yes, we won't share your name or any personal details. Your answers will be safe with us.

Will you get paid?

No, you won't get paid for doing this.

Are there any risks?

Some kids might feel shy if people talk about their bedwetting. Remember, your parents do not have to do this if you do not want to, and you can stop anytime. It won't affect your health care.

Are there any benefits?

You won't get any direct benefits, but your answers will help us understand more about sleep problems and bedwetting, which can help other children.

Who can you ask if you have questions?

If you have any questions, you or your parent can ask Dr. Sebenele Maseko (Tel: 060 522 0698) or Dr. Shivesh Maharaj (Tel: 076 120 4066) who the doctors are responsible for this study.

If you or your parent still have more questions, your parent can ask Professor P Ruff, Chairperson of the Human Research Ethics Committee (Medical) at the University of the Witwatersrand. The phone numbers are 011 717 2700/1234/2656/1252 and the email addresses are:

- Zanele.Ndlovu@wits.ac.za
- Rhulani.Mukansi@wits.ac.za
- Mapula.Ramaila@wits.ac.za
- Iain.Burns@wits.ac.za

Agreement:

I have read and understood this form. I know I can ask questions. I agree to participate.

Your Name (Please print): _____

Your Signature: _____

Date/Time: _____

Witness Name (Please print): _____

Witness Signature: _____

Date/Time: _____

Appendix F: Participant Information Sheet and Assent Form 12–17-year-olds

Information sheet

Title of Research: The value of a questionnaire in identifying children presenting with obstructive sleep apnoea at risk of enuresis

Dear patient

You are invited to participate in a survey as part of a research study conducted by Dr. Sebenele Maseko and Dr. Shivesh Maharaj, who are both from the University of the Witwatersrand. Before you decide to participate, it is important for you to understand the purpose of the survey, what you will need to do, and how your information will be used.

What is the purpose of this study?

The purpose of this survey is to understand the relationship between obstructive sleep apnoea (OSA) and enuresis (involuntary bedwetting during sleep). We want to use this information to create a screening questionnaire to identify children who might be at risk. Your participation will help us gather valuable information that can improve the healthcare of children suffering from OSA and enuresis.

What will I have to do if I participate?

If you agree to participate, your parent/caregiver will be asked to complete a survey questionnaire. The survey will include questions about your behavior during sleep, such as breathing patterns, snoring, and bedwetting, your performance at school, and any previous medical or surgical treatments you might have received. It will take about five minutes to for your parent to complete.

Will my information be kept confidential?

Yes, your answers will be kept confidential as much as the law allows. No personally identifiable information will be shared in any publications or reports from this research. All data will be stored securely, and only authorised personnel will have access to it.

Will I get paid for participating?

No, there is no payment for participating in this study.

Are there any risks or discomforts?

Some children might feel uncomfortable answering questions about bedwetting. Participation in this survey is entirely voluntary. You can choose not to participate or to stop participating at any time without any consequences. Your decision will not affect your current or future healthcare.

Are there any benefits?

There will be no direct benefits to you by participating in this survey. However, your participation may help society by providing information that can improve the clinical care of children suffering from OSA and enuresis.

Who can I contact if I have questions?

If you have any questions about the survey or the research study, please contact the study doctors Dr. Sebenele Maseko (Tel: 060 522 0698) and Dr. Shivesh Maharaj (Tel: 076 120 4066).

If you do not get satisfactory answers, you may contact Professor P Ruff, Chairperson of the Human Research Ethics Committee (Medical) at the University of the Witwatersrand, via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and their email addresses are:
Zanele.Ndlovu@wits.ac.za; Rhulani.Mukansi@wits.ac.za, Mapula.Ramaila@wits.ac.za, Iain.Burns@wits.ac.za

Agreement:

I have read and understood the information provided in this consent form. I have had the opportunity to ask questions and have received satisfactory answers. I voluntarily agree to participate in the survey.

Participant Name (Please print): _____

Participant Signature: _____

Date/Time: _____

Witness Name (Please print): _____

Witness Signature: _____

Date/Time: _____

Appendix G: Format of the proposed journal

https://onlinelibrary.wiley.com/page/journal/14452197/homepage/forauthors.html

ANZ Journal of Surgery

A cover letter should be included in the 'Cover Letter Field' of the submission system. The text can be entered directly into the field or uploaded as a file. The cover letter should:

• advise whether or not the first author is a surgeon in training;

• justify the inclusion of each author if there are more than five authors;

• provide a statement that all authors are in agreement with the content of the manuscript;

• declare and explain any potential conflict of interest (refer to the section 'Disclosure Statement' for advice on what to include);

• for case reports, authors should also declare that they have obtained informed consent from the patient (or guardian/next of kin); and

• indicate that the manuscript has not been published previously and is not under consideration elsewhere.

4. PREPARATION OF THE MANUSCRIPT

Manuscript Format and Style

The journal complies with the International Committee of Medical Journal Editors' "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication" updated February 2006 (http://www.ICMJE.org). Authors are responsible for the accuracy of their work, including all statistical calculations and drug doses.

General format

Manuscripts should be submitted as Word documents (.doc, .docx; not write-protected), double-spaced. All pages should be numbered consecutively in the top right-hand corner, beginning with the title page. The file should include the abstract, the main text, references, tables and figure legends.

Spelling: the journal publishes in British English. For word usage and word division, please refer to the Oxford Concise English Dictionary.

Units of measurement: all measurements must be given in SI units (excepting blood pressures, which should be given in mmHg). Please go to the Bureau International des Poids et Mesures (BIPM) website at www.bipm.frfor more information about SI units.

Numbers: numbers under 10 are spelt out, except for measurements with a unit (8mmol/l); age (6 weeks old), or lists with other numbers (11 dogs, 9 cats, 4 gerbils).

Abbreviations: Abbreviations should only be used where they ease the reader's task by reducing repetition of long, technical terms. Initially use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation only. Abbreviations should be avoided in 'Editorials' and 'Perspectives'. Abbreviations are not to be used in article titles.

Trade names: at the first mention of a chemical substance, give the generic name only. When quoting specific materials, software, equipment and proprietary drugs the name and address of the manufacturer must be given in parentheses.

Use of inclusive language

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs of any reader; contain nothing that might imply one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, colloquialism, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she". We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health conditions unless they are relevant and valid. These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

Parts of the Manuscript

The length of papers should adhere to the guidelines outlined for each manuscript type in the ‘Manuscript Categories and Requirements’ section.

As manuscripts are single-blind reviewed, manuscript files should include both the title page and the main text. Figure files and supporting information should be supplied separately.

Manuscript files should be presented in the following order:

Title page

Abstract and keywords (only required for certain categories)

Main text (for original articles: introduction, methods, results, discussion)

Acknowledgments (if any)

Disclosure statement

References

Figure legends

List of supporting information (if any)

Tables (each table complete with title and footnotes

Figures and supporting information (if any) should be supplied as separate files. Footnotes to the text are not allowed and any such material should be incorporated into the text as parenthetical matter.

Title page

The title page should include:

The full title containing no more than 150 characters, including spaces. Avoid the use of abbreviations in titles;

A running head (short title) containing no more than 40 characters, including spaces;

The full names of the authors followed by up to two qualifications (e.g. MD, PhD, MBBS) and institutional affiliations;

An indication of whether the corresponding author is a recipient of a research scholarship; details if the paper is based on a previous communication to a society or meeting;

Details of the number of figures and tables included, and separate word counts for the abstract and the text (excluding abstract, acknowledgments, figure legends and references); and

The full name, email, postal addresses and telephone numbers of the corresponding author.

The corresponding author is responsible for the integrity of the study and for communicating with the other authors about editorial decisions and the nature of any revisions.

The title is a concise label that allows readers to scan for relevance. The nature of the study must be clearly signposted (e.g. ‘Open versus laparoscopic adrenalectomy: a clinical trial’; ‘The evaluation of laparoscopic adrenalectomy in an animal model’). Strive for an interesting title that is also an accurate label. Avoid the use of abbreviations in titles.

Abstract and keywords

Abstracts and keywords are required for some manuscript types. For details on manuscript types that require abstracts and/or keywords and how to prepare these, please refer to the ‘Manuscript Types and Criteria’ section.

Five key words are required to index the content of articles. They should be selected from the US National Library of Medicine's Medical Subject Headings (MeSH) browser list.

References

The journal uses the Vancouver referencing style, i.e. numbered sequentially as they occur in the text and ordered numerically in the reference list

Authors are responsible for the accuracy of references.

References should be cited using superscript Arabic numerals.

Number references in their order of appearance.

References first cited in tables or figure legends must be numbered so that they will be in sequence with references in the text.

When there are six or fewer authors, list all of them: when there are seven or more authors, list the first three followed by ‘et al.’.

Avoid citing personal communications and abstracts.

References should be listed in the following form:

Journal article

Sasaki A, Nakajima J, Nitta H, Obuchi T, Baba S, Wakabayashi, G. laparoscopic cholecystectomy in patients with a history of gastrectomy. Surg. Today 2008; 38: 790-4.

Webster J, Croger S, Lister C et al. Use of face masks by non-scrubbed operating room staff: a randomized controlled trial. ANZ J. Surg. 2010: 80: 169-73.

Book

Tjandra JJ, Clunie GJA, Thomas RJS. Kaye AH, Smith JA. Textbook of Surgery, 3rd edn. Melbourne: Blackwell Science Asia, 2006.

Jones PF. Emergency Abdominal Surgery, 2nd edn. Oxford: Blackwell Science, 1987.

Chapter in a book

Alexander JP. Spinal surgery. In: Barrow DW (ed). Anaesthesia and Related Subjects in Orthopaedic Surgery. Oxford: Blackwell Science, 1982; Ch. 4

Web page

National Health and Medical Research Council. Clinical Practice Guidelines for the Management of Early Breast Cancer. Second Edition [PDF on Internet]. Canberra: Commonwealth of Australia. [Updated 6 September 2003; cited 3 March 2004]. Available from: http://www.nhmrc.gov.au/publications/synopses/cp74syn.htm.

Figure legends

Legends must be submitted for all figures and should be included at the end of the text. They should be self-explanatory and incorporate definitions of symbols. Abbreviations and units of measurement should be explained so that the figure and its legend are understandable without reference to the text. Indicate the stains used in histopathology. Identify statistical measures of variation, such as standard deviation and standard error of the mean.

Tables

Tables should be self-contained and complement, but not duplicate, the information contained in the text.

Tables should be cited consecutively in the text and should be numbered using Arabic numerals.

Each table should be presented on a separate page at the end of the main document file, with a comprehensive but concise legend above the table.

Tables should be double-spaced, and should not contain internal lines.

Do not use tabs or spaces to separate data points in tables. Each data point must be contained within a unique cell.

Column headings should be brief, with units of measurement in parentheses. All abbreviations should be defined in footnotes.

For footnotes, use the following symbols, in sequence: †, ‡, §, ||, ¶, ††, ‡‡ (*, **, *** should be reserved for P values).

Identify statistical measures of variation, such as standard deviation and standard error of the mean.

In the interest of conserving space in the journal, the Editor may request that excessively long tables be made available online only as supporting material.

Figures

All illustrations (line drawings and photographs) are classified as figures. All figures should be in colour (the journal publishes colour illustrations and photographs free of charge). Figures should be cited in consecutive order in the text using Arabic numerals. Insert easily seen arrows or letters to identify entities (they should be bold and in colour). Photomicrographs and electron micrographs must have internal scale markers

Although authors are encouraged to send the highest-quality figures possible, for peer-review purposes, a wide variety of formats, sizes, and resolutions are accepted.

Click here for the basic figure requirements for figures submitted with manuscripts for initial peer review, as well as the more detailed post-acceptance figure requirements.

Supporting Information

Supporting information is information that is not essential to the article, but provides greater depth and background. It is hosted online and appears without editing or typesetting. It may include tables, figures, videos, datasets, etc.

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Note: if data, scripts, or other artefacts used to generate the analyses presented in the paper are available via a publicly available data repository, authors should include a reference to the location of the material within their paper.

Statistics

Document the specific objectives of the study and identify the main endpoints. Explain and justify how the sample size was determined in experiments, clinical trials, case-control studies and cohort studies.

Report results to a level of precision commensurate with their scientific or clinical relevance. For example, report mean blood pressure without decimal places. Avoid over-precision by restricting the use of decimal places. Provide the numbers in the numerator and denominator when stating a percentage.

Describe the central tendency and dispersion of continuous measurements. Use the mean (standard deviation) for measurements that approximate the normal distribution; and, only use the mean (standard error of the mean) when estimating the precision of the observed mean. For other continuous measurements use the median value and percentiles - such as the inter-quartile range and the absolute range. Avoid any ambiguity about the numbers of observations.

Describe the analyses in enough detail to enable readers with access to the original data to verify the results. Ensure that the data satisfy the assumptions of the chosen statistical tests. Provide references for techniques not in common usage and include a brief explanation. Document the name and source of any commercial statistical computer packages that were used to calculate the results.

Appreciate that statistical significance tests show whether or not an effect could be due to chance and do not indicate the biological or clinical importance of any observed differences. Comment on the magnitude of the chief differences between the groups. Declare the level of statistical significance (usually P 0.05) and state whether this refers to a one- or two-sided probability. Report the value of the test statistic and the actual P value, for instance, P = 0.04, not P 0.05. Make allowance for

multiple comparisons by adjusting the P value, for instance by the Ryan-Holm stepwise Bonferroni procedure or the Benjamini-Hochberg false discovery rate. Generally, though within reason, report confidence intervals as well as P values.

Correlation coefficients provide a summary of the linear association between two quantitative variables. They measure the association between independent variables and should never be used to measure agreement (concordance): correlation coefficients must never be used when comparing different methods of measuring the same variable.

Take particular care, and consider obtaining professional advice, when performing multivariable analyses and estimating survival. Survival curves must be accompanied by a declaration of the numbers of patients involved in each analysis and should be truncated when the numbers at risk are small; that is, when they are less than one-third of the starting figure.

Qualitative Research

Qualitative research may be difficult to fit into the IMRAD (Introduction, Methods, Results and Discussion) format. It is sometimes best to present the results and discussion together for each theme, and the structured abstract can be adjusted accordingly. Incorporate direct quotes from participants into tables whenever appropriate.

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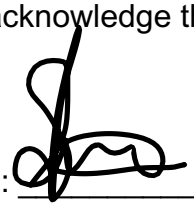
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Declaration by Students

I Sebenele Precious Maseko (Student number: 2500580) am a student registered for **MMed of Otorhinolaryngology** in the year: **2025**. I hereby declare the following:

I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
I confirm that ALL the work submitted for assessment for the above course is my own unaided work except where I have explicitly indicated otherwise.
I have followed the required conventions in referencing the thoughts and ideas of others.
I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

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