

Evaluating the risk of obstructive sleep apnea at a urology clinic: A single-center experience

Jainik Shah¹, Connor Roque¹, Sahand Malek Marzban¹, Maximilian G. Fidel¹
Yool Ko¹, Harliv Dhillon², Avinash Sarcar², Rachele Molyneaux², Premal Patel^{2,3}

¹Max Rady College of Medicine, University of Manitoba, Winnipeg, MB, Canada; ²Men's Health Clinic Manitoba, Winnipeg, MB, Canada; ³Section of Urology, Department of Surgery, University of Manitoba, Winnipeg, MB, Canada

Cite as: Shah J, Roque C, Marzban SM, et al. Evaluating the risk of obstructive sleep apnea at a urology clinic: A single-center experience. *Can Urol Assoc J* 2026 October 19; Epub ahead of print <http://dx.doi.org/10.5489/cuaj.9695>

Published online October 19, 2026

Corresponding author: Dr. Premal Patel, Section of Urology, Department of Surgery, University of Manitoba, Winnipeg, MB, Canada; ppatel5@hsc.mb.ca

ABSTRACT

Introduction: Obstructive sleep apnea (OSA) is a common condition marked by recurrent upper airway obstruction, affecting 2–4% of middle-aged adults. Its prevalence increases with age, body mass index (BMI), and central adiposity. Beyond its respiratory consequences, OSA is linked to several urologic conditions, including benign prostatic hyperplasia, erectile dysfunction, and low testosterone. This study evaluated the prevalence of OSA screen-positivity among men attending a specialized urology clinic and explored their access to and experiences with primary care providers (PCP).

KEY MESSAGES

- A large proportion of men attending a urology clinic are at intermediate or high risk for OSA, suggesting substantial under-recognized disease burden in this population.
- Despite high reported access to primary care, discussions surrounding OSA remain infrequent, representing a missed opportunity for early identification and intervention.
- Increasing BMI is an independent predictor of higher OSA screen-positivity, although these associations should be interpreted as exploratory given that both variables are constituent items of the STOP-Bang score.
- The STOP-Bang questionnaire demonstrates practical utility as a rapid screening tool in specialty clinic settings.
- Integrating routine OSA screening into urology clinics may help reduce diagnostic gaps and improve downstream cardiometabolic and urologic outcomes.

Methods: A cross-sectional survey was administered to consecutive male patients aged 18 years or older presenting between September 2024 and May 2025. Demographic and clinical data were collected, and OSA risk was assessed using the STOP-Bang questionnaire, stratifying participants into risk categories. Statistical comparisons included Chi-squared/Fisher's exact and Kruskal-Wallis tests.

Results: Among 140 respondents (median age 64 years, body mass index [BMI] 28.5 kg/m²), 72.9% (n=102) were at intermediate-to-high risk for OSA, yet only 19.8% (n=26) had ever discussed the condition with their PCP. Higher BMI was independently associated with elevated OSA screen-positivity, while age showed a non-significant trend; smoking, alcohol use, and ethnicity were not predictive.

Conclusions: These findings underscore a missed opportunity for early identification of OSA and support the integration of screening within urology clinics to improve timely diagnosis and management.

INTRODUCTION

Obstructive Sleep Apnea (OSA) is a common disorder characterized by recurrent episodes of partial and complete upper airway obstruction.¹ These episodes result in apnea or hypopnea with intermittent hypoxia and sleep fragmentation, often accompanied by daytime sleepiness and altered cardiopulmonary function, including intermittent hypoxemia, hypertension, and arrhythmias.¹ The pathogenesis of this condition is influenced by narrowing or closure at the velopharynx, oropharynx, or hypopharynx. This occurs most often during rapid-eye-movement (REM) sleep, when pharyngeal dilator muscle tone is reduced and state-dependent protective airway reflexes, including the genioglossus negative pressure reflex, are attenuated.² Imaging studies have shown that individuals with OSA have a significantly reduced retropalatal airway, particularly in the lateral dimension, secondary to thickening of the lateral pharyngeal walls.³

While OSA has a genetic component, epidemiologic studies demonstrate higher prevalence with increasing age, body mass index (BMI), neck circumference, and central adiposity.⁴ Additionally, skeletal or soft-tissue abnormalities, dysmorphisms, and nasal obstruction are all known to exacerbate the condition.⁴ Given these risk factors, clinicians commonly use the "STOP-Bang" questionnaire, which has been validated for use in multiple settings and takes approximately 1-2 minutes to complete.⁵⁻⁷ It utilizes four binaries (S: Snoring, T: Tiredness, O: Observed Apnea, P: High Blood Pressure), and four questions regarding demographics/anthropometry (B: BMI, A: Age, N: Neck Circumference, G: Gender). Utilizing the intended cutoff score of ≥ 3 has demonstrated high sensitivities in detecting both moderate-severe and severe OSA.

Epidemiologic studies estimate that OSA affects between 2-4% of all middle-aged adults, with men affected more frequently than women.⁸ Although symptoms may overlap between

sexes, men often present with more hallmark symptoms such as snoring, witnessed apneas, and daytime sleepiness at earlier intervals, when compared to women.⁹ The relevance of OSA to men's health care is underscored by its associations with common urological conditions. For example, treatment of benign prostatic hyperplasia (BPH) has been linked to improved sleep quality.¹⁰ Additionally, men diagnosed with erectile dysfunction are more likely to have an increased risk for OSA, and concomitant treatment of OSA has been shown to improve ED symptoms. OSA has also been associated with low testosterone, which may further compound urological and sexual health concerns in affected men.^{11,12, 13}

Given these overlaps, primary care providers (PCP) at a urology clinic may be in a unique position to identify patients at risk of undiagnosed OSA. Currently, 1 in 6 Canadians report not having a PCP, and less than half of Canadians can see their PCP within a reasonable time frame.¹⁴ As a result, many patients may never discuss their sleep health with a clinician, and for men who are already less likely to seek preventive care, this gap can lead to undiagnosed OSA or a delay in its treatment.

Accordingly, this study aims to (1) quantify the prevalence of men at risk for OSA attending a urology clinic and (2) evaluate their prior access to and engagement with PCPs for sleep-related health concerns. We hypothesize a priori that $\geq 30\%$ of men attending a urology clinic will be screen-positive for increased OSA risk (STOP-Bang ≥ 3), and that a high OSA score will be associated with limited engagement with their PCP regarding sleep health.

METHODS

Study design and patient population

A cross-sectional observational study was conducted at the Men's Health Clinic; a specialized center in Winnipeg, Manitoba, providing care for a broad range of men's health-related urological concerns. Eligible patients included consecutive male patients, aged 18 years and older, who presented for an appointment between September 2024 and May 2025. The study protocol was reviewed and approved by the University of Manitoba Research Ethics Board (REB; file number HS26573). Eligible participants were invited to complete an anonymous survey at the time of their check-in. An information sheet outlining the study purpose and consent process was attached to the survey and explained by study personnel.

Data collection

Participation was voluntary, and informed consent was taken alongside survey completion. The survey included questions on demographic and clinical characteristics (primary reason for visit, self-reported ethnicity, Charlson Comorbidity Index [CCI], history of hypertension, alcohol use and smoking using Likert scales), OSA risk assessed through the STOP-Bang questionnaire, and information regarding PCP access and engagement.

Outcomes and data analysis

The primary outcome was the prevalence of participants categorized into low, moderate, and

high risk for OSA based on STOP-Bang scores, with prevalence estimates reported with 95% confidence intervals (CIs). Secondary outcomes included the proportion of men who reported having a PCP, frequency of engagement with their PCP, and whether OSA had been formally diagnosed or discussed with their provider. Descriptive statistics were used to summarize demographic and clinical variables. Continuous variables were assessed for normality using visual inspection and the Shapiro–Wilk test; non-normally distributed variables are summarized as median (IQR; 25th–75th percentiles). When assumptions were met (expected cell counts ≥ 5 in at least 80% of cells), chi-squared tests were applied to compare the frequency of OSA-related discussions across risk categories; Fisher’s exact test was used when chi-squared assumptions were violated. Associations between clinical/demographic variables and OSA risk were assessed using the Kruskal–Wallis test. A p-value < 0.05 was deemed statistically significant. Logistic regression analyses should be considered exploratory and interpreted with caution, as several predictor variables (age, BMI, neck circumference, sex, and hypertension) are constituent items of the STOP-Bang score itself. Associations between these variables and STOP-Bang-derived risk categories are therefore partly tautological and should not be interpreted as fully independent external predictors of OSA.

RESULTS

A total of 140 men completed the survey between September 2024 and May 2025. The median age of participants (IQR; 25th–75th percentiles), accounting for non-normal distribution, was 64.0 (IQR 19.3), with a median BMI of 28.5 kg/m² (IQR 6.2). The majority of respondents self-identified as Caucasian (78.6%, n=110), with smaller proportions identifying as Indigenous (5.0%, n=7), Black (5.0%, n=7), and South Asian (4.3%, n=6) (Table 1). The most common reasons for clinic presentation were enlarged prostate (49.3%, n=69), testicular pain (5.7%, n=8), and prostate cancer screening or follow-up (5.7%, n=8). Several patients also reported miscellaneous concerns. (13.6%, n=19).

STOP-Bang scoring stratified participants into three risk categories: low risk (0–2; 27.1%, n=38; 95% CI 20.5%–35.0%), intermediate risk (3–4; 51.4%, n=72; 95% CI 43.2%–59.6%), and high risk (≥ 5 ; 21.4%, n=30; 95% CI 15.4%–28.9%). Patient demographics, smoking status, and alcohol use stratified by OSA risk category are summarized in Table 2.

Regarding PCP access, 93.6% (n=131) reported having a PCP, and 56.5% (n=74) of those patients reported being able to see their PCP more than once per year (Table 3). Among participants with a PCP, 19.8% (n=26) reported ever discussing OSA with their provider. When stratified by OSA risk category among those with a PCP, this included 3.1% (1/32) in the low-risk group, 17.1% (12/70) in the intermediate-risk group, and 44.8% (13/29) in the high-risk group.

Inferential analyses were conducted to assess associations between participant characteristics and OSA risk. As shown in Table 4, the Kruskal–Wallis test identified a significant difference in BMI across STOP-Bang categories ($H = 23.95$, $p < 0.0001$). Post hoc Dunn’s tests confirmed that men in the high-risk group had significantly higher BMI than both

the low-risk ($p < 0.0001$) and intermediate-risk ($p = 0.001$) groups, whereas no significant difference was observed between the low- and intermediate-risk groups ($p = 0.1382$). In contrast, there was no significant difference in age across STOP-Bang categories ($H = 4.95$, $p = 0.0844$).

Exploratory logistic regression confirmed that BMI (OR = 1.18, 95% CI 1.08–1.30, $p = 0.0004$) was independently associated with increased odds of high OSA risk. Age showed a trend toward association (OR = 1.04, 95% CI 1.00–1.08, $p = 0.0512$) but did not reach statistical significance; smoking history, alcohol consumption, PCP access, and ethnicity were also not significant predictors. The model demonstrated good discriminatory ability (AUC = 0.78, 95% CI 0.69–0.87, $p < 0.0001$), with an overall classification accuracy of 81.9% and strong negative predictive value. These results are shown in Table 5.

Fisher's exact test demonstrated a significant association between ethnicity and STOP-Bang risk ($p = 0.0312$). Black men were overrepresented in the high-risk category (residual = +2.06) and South Asian men were underrepresented (residual = -2.12). However, STOP-Bang risk was not associated with frequency of PCP visits ($\chi^2 = 0.47$, $df = 2$, $p = 0.7892$).

DISCUSSION

In this cross-sectional study of 140 men attending a urology clinic, nearly three-quarters of participants (72.9%, $n = 102$) were at either intermediate or high risk for OSA based on STOP-Bang scoring, with 21.4% ($n = 30$) categorized as high risk. Despite the high burden, only 19.8% ($n=26$) men with a PCP reported ever discussing OSA with them. Consistent with prior studies, exploratory logistic regression demonstrated that BMI was an independent predictor of increased OSA risk in this cohort, while age showed a non-significant trend ($p = 0.0512$); smoking history, alcohol use, ethnicity, and PCP access were not significant. These findings should be interpreted as exploratory, however, given that age and BMI are direct components of the STOP-Bang score; their association with a STOP-Bang-derived outcome is therefore partly circular and does not reflect fully independent prediction.⁴ Although the per-year odds ratio for age suggests a modest effect size, it may still contribute meaningfully to risk stratification at a population level when combined with other clinical factors. The final regression model showed acceptable discrimination (AUC 0.78), highlighting the practicality of STOP-Bang as a screening tool in urology clinic settings.

The proportion of men screen-positive for elevated OSA risk in this study (21.4%, $n=30$) aligns with recent Canadian data reporting that 21.9% of Canadian men exhibit high-risk OSA features.¹⁵ This is in stark contrast to data that demonstrates only 1.2% of Canadian men aged 45-85 have a formal diagnosis of OSA.¹⁶ This discrepancy suggests that urology clinics, which often serve patients with overlapping urological and metabolic concerns, may represent an underutilized but strategic setting for opportunistic OSA screening.

Notably, while ethnicity was not an independently significant risk factor in regression modelling in this study, exploratory analysis revealed an overrepresentation of black men in the high-risk group, consistent with studies that highlight disproportionate OSA burden among certain ethnic groups.^{17,18} This suggests potential differences in vulnerability that should be

examined further in larger, more diverse Canadian cohorts. Conversely, smoking, alcohol use, and decreased access to PCP were not significantly associated with increased OSA risk in this study population. This does differ from evidence that places both smoking and alcohol use as lesser-known but contributory risk factors in the development and progression of OSA.¹⁹

Perhaps the most striking finding concerns the lack of engagement around sleep health in primary care settings. Although most study participants (93.6%, n=131) reported having a PCP, only 19.8% (n=26) of these men highlighted having ever had discussions surrounding OSA with them. Even among those at the highest risk, less than half (44.8%, n=13) had received counselling on OSA. This represents a missed opportunity for early interventions given the associations between OSA and cardiovascular morbidity, metabolic syndromes, and urological conditions such as erectile dysfunction and BPH. Timely screening, diagnosis, and treatment of OSA could improve both overall health and disease-specific outcomes.^{20–22}

To address the national and global shortage in PCPs and subsequent time constraints, administering the validated STOP-Bang questionnaire may be a practical way to bridge this gap in the men's health setting. The implications may extend beyond screening alone; fostering collaboration between men's health specialists and PCPs may improve identification of high-risk patients and alleviate the pressure for overburdened primary care clinics.

This study is not without its limitations. It is a single-center study, where generalizability may be limited, particularly to populations that exist outside of a specialized urology clinic. Although the sample size was adequate for a single-center exploratory study, many subgroup analyses were constrained, especially across ethnic categories. In particular, ethnicity-specific findings should be considered hypothesis-generating only, given that several subgroups had cell sizes too small for stable inference (e.g., Black, n=7; South Asian, n=6). The standardized residuals reported alongside the Fisher's exact test are not equivalent to formal post hoc contrasts and should be interpreted with caution. Due to the nature of this study, it is prone to both selection and recall bias. Lastly, the STOP-Bang only identifies information related to the risk for OSA but is unable to provide a definitive diagnosis. Nevertheless, the use of a validated screening tool to infer risk and a focus on a real-world men's health cohort can serve to strengthen the relevance of the findings.

Future studies should evaluate the feasibility and outcomes of embedding OSA screening into specialty urology clinics, including its relationship to primary diagnosis through a robust subgroup analysis. Larger multi-center cohorts would also help elucidate the impact of other demographic and behavioural factors on risk for OSA.

CONCLUSIONS

This study demonstrates that men attending a specialized urology clinic face a substantial and underrecognized burden of OSA risk. Despite a high rate of access to primary care in this cohort, discussions surrounding OSA remain limited, underscoring a missed opportunity for early identification and intervention. The findings in this study suggest that the integration of systematic OSA screening into urology clinics may help narrow the diagnostic gap, streamline

sleep clinic referrals, and facilitate timely treatment, all to ultimately improve broader associated health outcomes.

DRAFT

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Competing interests: Dr. Patel has been a consultant for Boston Scientific. The remaining authors do not report any competing personal or financial interests related to this work.

FIGURES AND TABLES

Table 1. Demographic characteristics of patients	
Characteristic	Value
Age, median (IQR)	64.0 years (19.25)
BMI, median (IQR)	28.5 kg/m ² (6.2)
Ethnicity	
Caucasian	78.6% (n=110)
Indigenous	5.0% (n=7)
Black	5.0% (n=7)
South Asian	4.3% (n=6)
East Asian	2.1% (n=3)
Southeast Asian	1.4% (n=2)
South American	0.7% (n=1)
Other	2.9% (n=4)
Primary reason for visit	
Enlarged prostate	49.3% (n=69)

Testicular pain	13.6% (n=19)
Prostate cancer screening	5.7% (n=8)
Blood in urine	5.7% (n=8)
Low testosterone	3.6% (n=5)
Vasectomy	3.6% (n=5)
Erectile dysfunction	2.9% (n=4)
Men's cosmetics	2.9% (n=4)
Peyronie's disease	2.9% (n=4)
Bladder cancer screening	2.1% (n=3)
Phimosis	1.4% (n=2)
Blood in sperm	0.71% (n=1)
Male infertility	0.71% (n=1)
Other	13.6% (n=19)

BMI: body mass index; IQR: interquartile range.

Table 2. Patients' demographics stratified by OSA risk category			
Variable	Low-risk (0–2)	Intermediate-risk (3–4)	High-risk (≥5)
n (%)	38	72	30
Median age (IQR)	58.0 (33)	65 (15)	64 (15.5)
Median BMI (IQR)	26.3 (4.8)	28.3 (5.3)	32.5 (10.2)
Smoking (%)	28.9% (n=11)	43.1% (n=31)	36.7% (n=11)
Alcohol use >3 drinks/week (%)	26.3% (n=10)	22.2% (n=16)	16.7% (n=5)

BMI: body mass index; IQR: interquartile range.

Table 3. Primary care provider information stratified by OSA risk category				
Variable	Low-risk (0–2)	Intermediate-risk (3–4)	High-risk (≥5)	Total
% of men with a PCP	84.2% (n=32)	97.2% (n=70)	96.7% (n=29)	93.6% (n=131)
% of men with >1 annual visit	59.4% (n=19)	55.7% (n=39)	55.2% (n=16)	56.5% (n=74)
% of men with PCP having discussion surrounding OSA	3.1% (n=1)	17.1% (n=12)	44.8% (n=13)	19.8% (n=26)

OSA: obstructive sleep apnea; PCP: primary care provider.

Table 4. Inferential analyses of participant characteristics by STOP-Bang risk category				
Variable	Test	Statistic	p-value	Post-hoc test
Age	Kruskall-Wallis	H=4.945	0.0844, ns	Ns
BMI	Kruskall-Wallis	H=23.95	<0.0001*	Dunn's: Low risk vs. high risk (p<0.0001), intermediate risk vs. high risk (p=0.001)
Ethnicity	Fisher's exact		0.0312*	Black men over-represented in high risk (residual +2.06), South Asian men under-represented (residual - 2.12)

*Significance.

Table 5. Exploratory logistic regression analysis of predictors of high STOP-Bang risk			
Variable	Odds ratio	95% CI	p
Age (per year)	1.036	1.003–1.078	0.0512
BMI (per unit)	1.178	1.083–1.299	0.0004*
Pack-year smoking	1.004	0.9766–1.028	0.7155
Drinking (binary)	0.888	0.260–2.691	0.8393
Black	1.733	0.244 – 11.13	0.5626
South Asian	3.846	0.558 – 26.81	0.1592

*Significance. BMI: body mass index.