

Clinical Profile of Patients with Benign Prostatic Hyperplasia Attending a Tertiary Hospital in Nepal: A Descriptive Cross-Sectional Study

Bikalpa Khanal¹, Eva Maden²

¹Department of Urology/Surgery, PAHS, Lalitpur, Nepal

²Shahid Gangalal National Heart Centre, Kathmandu, Nepal

Corresponding Author: Dr. Bikalpa Khanal

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ABSTRACT

Background: Benign prostatic hyperplasia (BPH) is a leading cause of lower urinary tract symptoms (LUTS) in ageing men and imposes a growing clinical burden in low- and middle-income settings such as Nepal, where hospital-based data on the clinical spectrum of the disease remain limited. This study describes the sociodemographic, clinical, and investigational profile of men presenting with BPH at a tertiary hospital in Nepal.

Methods: A hospital-based, descriptive cross-sectional study was conducted in the Department of Urology/Surgery of a tertiary care hospital in Nepal over a 12-month period (January 2025 to December 2025). Ninety-seven men aged ≥ 45 years with clinically or sonographically diagnosed BPH were enrolled by consecutive sampling. Data on sociodemographic characteristics, comorbidities, International Prostate Symptom Score (IPSS) with quality-of-life (QoL) index, digital rectal examination (DRE) grade, prostate volume, post-void residual urine (PVR), maximum flow rate (Qmax), serum PSA, creatinine, haemoglobin, complications, and definitive management were recorded and analysed in SPSS. Continuous variables were summarised as mean $\pm$ SD or median (range)

per Shapiro–Wilk normality; associations were assessed using the Chi-square/Fisher's exact test and ANOVA/Kruskal–Wallis test, with $p < 0.05$ considered significant.

Results: The mean age was 65.5 ± 8.0 years; 51.5% resided in rural areas. Moderate (56.7%) and severe (39.2%) IPSS categories predominated (mean IPSS 17.8 ± 6.7). Mean prostate volume was 52.8 ± 19.8 mL and mean PSA was 2.74 ng/mL (median). Acute urinary retention occurred in 27.8% and urinary tract infection in 23.7%. Definitive management was TURP in 45.4%, medical therapy in 43.3%, open prostatectomy in 7.2%, and watchful waiting in 4.1%. IPSS severity was significantly associated with age, prostate volume, PVR, Qmax, PSA, and symptom duration (all $p < 0.05$), and with acute urinary retention ($p < 0.001$). Prostate volume correlated positively with PSA ($r = 0.55$, $p < 0.001$) and PVR ($r = 0.47$, $p < 0.001$), and negatively with Qmax ($r = -0.53$, $p < 0.001$).

Conclusion: Men presenting with BPH at this tertiary centre had a substantial burden of moderate-to-severe symptoms and disease-related complications, with clinical and investigational parameters closely tracking IPSS severity and the choice of definitive management. These findings support early recognition and structured evaluation of

LUTS in ageing men in similar hospital settings in Nepal.

Keywords: Benign prostatic hyperplasia; International Prostate Symptom Score; Nepal; lower urinary tract symptoms; transurethral resection of prostate; cross-sectional study.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the most common urological conditions affecting ageing men and is a principal cause of lower urinary tract symptoms (LUTS), including frequency, urgency, weak stream, incomplete emptying, and nocturia.^[1] As life expectancy rises globally and in South Asia, the clinical and health-system burden attributable to BPH is expected to grow, and lifestyle factors such as smoking, alcohol use, and physical inactivity have been implicated as modifiable determinants of disease development and severity.^[1]

Local, hospital-based data from Nepal on the clinical profile of BPH remain relatively sparse. Existing Nepalese studies have examined complementary aspects of the disease: the correlation of symptom scoring tools with uroflowmetry parameters in men with LUTS,^[2] the morbidity and short-term outcomes of transurethral resection of the prostate (TURP) as the standard surgical treatment,^[3] and the histopathological spectrum of BPH specimens in relation to age and co-morbid prostatic changes.^[4] However, an integrated description linking sociodemographic characteristics, symptom severity, investigational findings (prostate volume, PSA, uroflowmetry), complications, and definitive management in a single cohort of Nepalese patients is limited, motivating the present study.

Several systemic and lifestyle factors have been associated with BPH and LUTS severity in other populations, including components of the metabolic syndrome such as diabetes and hypertension,^[5] poor sleep quality,^[6] and broader socioeconomic and social-capital related disparities.^[7] Pharmacological management with alpha-

blockers, with or without 5-alpha-reductase inhibitors, remains the mainstay of medical therapy, and dose adjustment (e.g., tamsulosin) is sometimes required for adequate symptom control,^[8] while surgical intervention (TURP or open prostatectomy) is reserved for refractory symptoms, large prostate volume, or complications such as acute urinary retention (AUR), recurrent urinary tract infection (UTI), bladder stone, or hydronephrosis. Comparative data from other high-risk populations, such as renal transplant recipients requiring intervention for bladder outflow obstruction, further illustrate the substantial symptomatic and functional improvement achievable with appropriately timed medical or surgical treatment.^[9] Metabolic derangements such as elevated serum uric acid have also been reported to show a non-linear association with BPH risk in community-based cohorts.^[10]

Against this background, the present study was undertaken to describe the sociodemographic profile, symptom severity, clinical and investigational parameters, complications, and definitive management among men presenting with BPH to a tertiary hospital in Nepal, and to examine the association between IPSS severity/type of management and key clinical variables.

MATERIALS & METHODS

Study design and setting: This was a hospital-based, descriptive cross-sectional study conducted in the Department of Urology/Surgery of a tertiary care hospital in Nepal over a 12-month period from January 2025 to December 2025.

Study population: All male patients aged 45 years and above who presented with lower urinary tract symptoms (LUTS) and were clinically diagnosed with benign prostatic hyperplasia (BPH) during the study period were considered for enrolment.

Sample size and sampling technique: A total of 97 patients were enrolled using

consecutive (non-probability) sampling, based on the number of eligible patients meeting the inclusion criteria within the study period.

Inclusion criteria: (i) men aged ≥ 45 years; (ii) clinically or sonographic ally diagnosed BPH with LUTS; (iii) willing to provide informed consent.

Exclusion criteria: (i) prior prostate or bladder surgery; (ii) suspected or confirmed prostate cancer (based on DRE, PSA, or biopsy); (iii) neurogenic bladder or urethral stricture; (iv) patients on medications known to alter urinary symptoms independent of BPH (e.g., anticholinergics), unless clinically indicated for BPH.

Data collection tools and procedure: Data were collected using a pre-tested, semi-structured proforma through face-to-face interviews, clinical examination, and review of hospital records/laboratory reports. Variables recorded included sociodemographic characteristics (age, residence, province, ethnicity, education, occupation), lifestyle factors (smoking, alcohol use), comorbidities (hypertension, diabetes, COPD), and symptom duration. Symptom severity was assessed using the International Prostate Symptom Score (IPSS) along with the IPSS Quality-of-Life (QoL) index. Clinical and investigational parameters included digital rectal examination (DRE) grade, prostate volume by transabdominal ultrasonography, post-void residual urine (PVR), maximum urinary flow rate (Qmax) by uroflowmetry, serum PSA, serum creatinine, haemoglobin, and urine routine examination. Complications (acute urinary retention, UTI, haematuria, bladder stone, hydronephrosis) and the definitive management offered (watchful waiting, medical therapy, TURP, or open prostatectomy) were also recorded.

Operational definitions: IPSS severity — Mild (0–7), Moderate (8–19), Severe (20–35); Prostate volume categories — <30 mL, 30–59 mL, 60–79 mL, ≥ 80 mL; PSA categories — <4 ng/mL, 4–10 ng/mL, >10 ng/mL.

Data analysis: Data were entered and cleaned in Microsoft Excel and analysed using IBM SPSS Statistics version 26. Continuous variables (age, BMI, IPSS score, prostate volume, PVR, Qmax, PSA, creatinine, Hb) were summarised as mean $\pm$ SD or median (range) depending on distribution, assessed via the Shapiro–Wilk test. Categorical variables were summarised as frequencies and percentages. Associations between IPSS severity/management type and clinical variables were assessed using the Chi-square test or Fisher's exact test as appropriate, and comparisons of continuous variables across groups were done using independent t-test/ANOVA or their non-parametric equivalents (Kruskal–Wallis). Correlation between continuous variables was assessed using Pearson's or Spearman's correlation coefficient as appropriate. A p-value <0.05 was considered statistically significant.

RESULT

A total of 97 male patients with BPH were enrolled during the study period. The mean age was 65.5 ± 8.0 years (median 64, range 47–84), and the majority (38.1%) were aged 60–69 years. Slightly more than half of the patients (51.5%) resided in rural areas, and nearly half (47.4%) were from Bagmati Province. Brahmin/Chhetri (34.0%) was the most common ethnic group, one-third (33.0%) had only primary-level education, and agriculture was the most common occupation (38.1%). Mean BMI was 23.7 ± 3.2 kg/m². Hypertension was present in 36.1% and diabetes mellitus in 21.6% of patients; 18.6% were current smokers.

Table 1: Sociodemographic and lifestyle characteristics of study participants (N=97)

Variable	Category	n	%
Age group (years)	<50	1	1.0
	50–59	23	23.7
	60–69	37	38.1
	70–79	32	33.0
	≥80	4	4.1
Residence	Urban	47	48.5
	Rural	50	51.5
Ethnicity	Brahmin/Chhetri	33	34.0
	Janajati	22	22.7
	Newar	17	17.5
	Madhesi	13	13.4
	Dalit	7	7.2
	Others	5	5.2
Education	Illiterate	21	21.6
	Primary	32	33.0
	Secondary	24	24.7
	Higher secondary	15	15.5
	Bachelor and above	5	5.2
Occupation	Agriculture	37	38.1
	Retired	20	20.6
	Business	15	15.5
	Service	12	12.4
	Labour	6	6.2
	Unemployed	7	7.2
Smoking status	Never	45	46.4
	Former	34	35.1
	Current	18	18.6
Hypertension	Yes	35	36.1
Diabetes mellitus	Yes	21	21.6

Mean duration of LUTS prior to presentation was 22.7 ± 15.0 months (median 20, range 2–73). The mean IPSS total score was 17.8 ± 6.7 (median 17, range 3–30); IPSS severity was moderate in 56.7% and severe in 39.2% of

patients, with only 4.1% classified as mild. The mean IPSS quality-of-life (bother) score was 3.0 ± 1.3 . On digital rectal examination, Grade II (29.9%) and Grade III (26.8%) enlargement were most common.

Table 2: Symptom severity (IPSS) and digital rectal examination findings

Variable	Category / Statistic	Value
IPSS total score (mean±SD)	—	17.8 ± 6.7 (median 17, range 3–30)
IPSS severity	Mild (0–7)	4 (4.1%)
	Moderate (8–19)	55 (56.7%)
	Severe (20–35)	38 (39.2%)
IPSS QoL/bother score (mean±SD)	—	3.0 ± 1.3 (median 3, range 0–6)
Duration of LUTS, months (mean±SD)	—	22.7 ± 15.0 (median 20, range 2–73)
DRE grade	Grade I	18 (18.6%)
	Grade II	29 (29.9%)
	Grade III	26 (26.8%)
	Grade IV	24 (24.7%)

Mean prostate volume on transabdominal ultrasonography was 52.8 ± 19.8 mL (median 49.7, range 24.1–100.1); the majority (55.7%) had a volume in the 30–59 mL range. Mean PVR was 101.5 ± 57.2 mL, and

mean Qmax was 11.3 ± 4.2 mL/s. Serum PSA had a median of 2.74 ng/mL (range 0.65–12.74); 71.1% of patients had PSA <4 ng/mL, 25.8% had 4–10 ng/mL, and 3.1% had PSA >10 ng/mL. Mean serum creatinine

was 1.25 ± 0.25 mg/dL and mean patients; pus cells were noted in 24.7% and haemoglobin was 13.3 ± 1.5 g/dL. Urine RBCs in 8.2%. routine examination was normal in 62.9% of

Table 3: Investigational parameters

Variable	Category / Statistic	Value
Prostate volume, mL (mean $\pm$ SD)	—	52.8 ± 19.8 (median 49.7, range 24.1–100.1)
Prostate volume category	<30 mL	10 (10.3%)
	30–59 mL	54 (55.7%)
	60–79 mL	20 (20.6%)
	≥ 80 mL	13 (13.4%)
Post-void residual urine, mL (mean $\pm$ SD)	—	101.5 ± 57.2 (median 105, range 0–250)
Qmax, mL/s (mean $\pm$ SD)	—	11.3 ± 4.2 (median 11.8, range 3.0–20.1)
Serum PSA, ng/mL (median, range)	—	2.74 (0.65–12.74)
PSA category	<4 ng/mL	69 (71.1%)
	4–10 ng/mL	25 (25.8%)
	>10 ng/mL	3 (3.1%)
PSA density, ng/mL/cc (mean $\pm$ SD)	—	0.06 ± 0.03
Serum creatinine, mg/dL (mean $\pm$ SD)	—	1.25 ± 0.25
Haemoglobin, g/dL (mean $\pm$ SD)	—	13.3 ± 1.5
Urine routine examination	Normal	61 (62.9%)
	Pus cells	24 (24.7%)
	RBCs	8 (8.2%)
	Pus cells + RBCs	4 (4.1%)

Regarding complications, acute urinary retention (AUR) occurred in 27.8% of patients, UTI in 23.7%, haematuria in 12.4%, bladder stone in 11.3%, and hydronephrosis in 7.2%; 32.0% presented with an indwelling catheter. The most frequently prescribed medical therapy was a combination of tamsulosin and dutasteride (41.2%), followed by tamsulosin monotherapy

(40.2%). Definitive management was TURP in 45.4% of patients, medical therapy alone in 43.3%, open prostatectomy in 7.2%, and watchful waiting in 4.1%. Among patients undergoing surgical management (TURP or open prostatectomy, $n=51$), the mean length of hospital stay was 4.0 ± 1.7 days (median 4, range 2–10).

Table 4: Complications and definitive management

Variable	Category	n (%)
Acute urinary retention	Yes	27 (27.8%)
Urinary tract infection	Yes	23 (23.7%)
Haematuria	Yes	12 (12.4%)
Bladder stone	Yes	11 (11.3%)
Hydronephrosis	Yes	7 (7.2%)
Catheterised at presentation	Yes	31 (32.0%)
Medical therapy	Tamsulosin + Dutasteride	40 (41.2%)
	Tamsulosin	39 (40.2%)
	Silodosin	8 (8.2%)
	Tamsulosin + Finasteride	6 (6.2%)
Definitive management	Watchful waiting	4 (4.1%)
	Medical therapy	42 (43.3%)
	TURP	44 (45.4%)
	Open prostatectomy	7 (7.2%)
Hospital stay (surgical cases), days	Mean $\pm$ SD (median, range)	4.0 ± 1.7 (4, 2–10)

On bivariate analysis, IPSS severity category (ANOVA, $p < 0.001$), prostate volume was significantly associated with age (Kruskal–Wallis, $p < 0.001$), PVR (ANOVA,

$p < 0.001$), Qmax (ANOVA, $p < 0.001$), PSA (Kruskal–Wallis, $p = 0.039$), and duration of LUTS (Kruskal–Wallis, $p = 0.026$), but not with BMI ($p = 0.158$). Among categorical variables, acute urinary retention was significantly associated with IPSS severity ($\chi^2 = 33.8$, $p < 0.001$); associations with

hypertension ($p = 0.073$) and bladder stone ($p = 0.095$) approached but did not reach statistical significance, while residence, smoking, alcohol use, diabetes, UTI, and hydronephrosis showed no significant association (all $p > 0.05$).

Table 5: Association of IPSS severity with clinical and investigational variables

Variable	Test used	Statistic	p-value
Age (years)	ANOVA	F=11.15	<0.001
BMI (kg/m ²)	ANOVA	F=1.88	0.158
Duration of LUTS (months)	Kruskal–Wallis	H=7.29	0.026
Prostate volume (mL)	Kruskal–Wallis	H=26.50	<0.001
Post-void residual urine (mL)	ANOVA	F=16.53	<0.001
Qmax (mL/s)	ANOVA	F=24.59	<0.001
Serum PSA (ng/mL)	Kruskal–Wallis	H=6.49	0.039
Residence	Chi-square	—	0.591
Smoking status	Chi-square	$\chi^2 = 2.63$	0.854
Hypertension	Chi-square	$\chi^2 = 6.97$	0.073
Diabetes mellitus	Chi-square	$\chi^2 = 3.86$	0.277
Acute urinary retention	Chi-square	$\chi^2 = 33.82$	<0.001
Urinary tract infection	Chi-square	$\chi^2 = 1.90$	0.594
Bladder stone	Chi-square	$\chi^2 = 6.37$	0.095
Hydronephrosis	Chi-square	$\chi^2 = 1.44$	0.696

Type of definitive management was significantly associated with age (ANOVA, $p < 0.001$), prostate volume (Kruskal–Wallis, $p < 0.001$), PVR (ANOVA, $p < 0.001$), Qmax (ANOVA, $p < 0.001$), serum PSA (Kruskal–Wallis, $p = 0.002$), and IPSS total score (ANOVA, $p < 0.001$) — that is, patients

undergoing surgical management (TURP/open prostatectomy) tended to be older and to have larger prostate volume, higher PVR, lower Qmax, higher PSA, and higher IPSS scores than those managed conservatively or medically.

Table 6: Association of definitive management with continuous clinical variables

Variable	Test used	Statistic	p-value
Age (years)	ANOVA	F=7.76	<0.001
Prostate volume (mL)	Kruskal–Wallis	H=42.27	<0.001
Post-void residual urine (mL)	ANOVA	F=6.18	<0.001
Qmax (mL/s)	ANOVA	F=11.61	<0.001
Serum PSA (ng/mL)	Kruskal–Wallis	H=14.79	0.002
IPSS total score	ANOVA	F=27.07	<0.001

Correlation analysis showed a moderate positive correlation between prostate volume and serum PSA (Pearson $r = 0.55$, Spearman $\rho = 0.60$; both $p < 0.001$), a moderate positive correlation between IPSS total score and QoL/bother score ($r = 0.78$, $\rho = 0.77$; both

$p < 0.001$), and a moderate negative correlation between prostate volume and Qmax ($r = -0.53$, $\rho = -0.55$; both $p < 0.001$). Prostate volume also correlated positively with PVR ($r = 0.47$, $p < 0.001$) and with age ($r = 0.45$, $p < 0.001$).

Table 7: Correlation between key continuous variables

Variable pair	Pearson r	Spearman ρ	p-value
PSA vs. Prostate volume	0.55	0.60	<0.001
IPSS total vs. QoL score	0.78	0.77	<0.001
Prostate volume vs. Qmax	-0.53	-0.55	<0.001
Prostate volume vs. PVR	0.47	0.47	<0.001
Age vs. Prostate volume	0.45	0.47	<0.001

DISCUSSION

In this hospital-based cross-sectional study of 97 men with BPH attending a tertiary hospital in Nepal, the mean age at presentation (65.5 ± 8.0 years) and the predominance of moderate-to-severe IPSS categories (56.7% and 39.2%, respectively) are consistent with the expected clinical picture of BPH as a progressive, age-related condition. Because ageing itself interacts closely with lifestyle exposures such as smoking, alcohol use, diet, and physical activity in driving several age-related non-communicable conditions, the substantial proportion of current (18.6%) and former (35.1%) smokers in this cohort is a relevant modifiable factor to highlight; Nagakura et al., analysing Japanese nationwide datasets, similarly identified smoking habits as positively associated with markers of BPH prevalence at the population level, alongside a protective association with regular exercise.^[1]

The correlation observed here between IPSS total score and Qmax-related severity, and between prostate volume and PVR/Qmax, mirrors the pattern reported by Bhomi et al. in a Nepalese cohort of men with LUTS, who found a strong correlation between validated symptom scores and uroflowmetry parameters (maximum and average flow rate).^[2] Our finding that IPSS severity and management type were both significantly associated with objective investigational parameters (prostate volume, PVR, Qmax, PSA) reinforces the internal consistency of IPSS as a clinical severity marker in this population, and supports its continued use as a first-line assessment tool in resource-limited hospital settings.

Nearly half of the cohort (45.4%) ultimately required TURP, broadly comparable to surgical decision patterns described in an

earlier Nepalese series from a tertiary institute in which TURP was evaluated as the standard surgical treatment for LUTS secondary to BPH, with meticulous preoperative workup identified as key to improving outcomes.^[3] The mean hospital stay of 4.0 ± 1.7 days among our surgical patients is consistent with an uncomplicated post-TURP recovery course. The high proportion of Grade II–III enlargement on DRE and the age-related increase in glandular and stromal proliferation that underlies BPH have also been characterised histopathologically in Nepalese prostatic specimens, where co-morbid inflammatory and, less frequently, neoplastic changes were noted alongside typical hyperplastic features - a reminder that histological confirmation and PSA-based risk stratification remain important even when the clinical picture appears typical of benign disease.^[4]

Comorbid hypertension (36.1%) and diabetes mellitus (21.6%) were common in this cohort, and although their association with IPSS severity did not reach statistical significance here ($p=0.073$ and $p=0.277$, respectively), larger community-based studies have found that components of the metabolic syndrome, particularly diabetes and hypertension, are significantly associated with greater BPH/LUTS severity and worse urodynamic parameters.^[5] Poor sleep quality has similarly been linked to LUTS/BPH risk, especially among older men,^[6] and broader social and socioeconomic disparities - including occupation and marital status - have been associated with BPH symptom prevalence in large community surveys.^[7] These findings collectively suggest that BPH severity in hospital-based Nepalese cohorts should be interpreted within a wider context of comorbidity burden and social determinants

of health, which larger prospective studies in this setting could usefully explore.

Acute urinary retention, present in over a quarter of our patients, was the complication most strongly associated with IPSS severity ($p < 0.001$), underscoring AUR as a key driver of both symptom burden and the need for definitive intervention. Among patients managed medically, combination therapy with an alpha-blocker and a 5-alpha-reductase inhibitor was the most frequently used regimen (41.2%), consistent with current practice for men with larger prostate volumes; where symptom control with standard-dose alpha-blocker therapy is inadequate, dose escalation (e.g., tamsulosin 0.2 mg to 0.4 mg) has been shown to produce a further significant improvement in maximum flow rate, particularly in men with larger prostates. [8] For patients ultimately requiring surgical or medical intervention for bladder outflow obstruction, outcome data from other high-risk populations, such as renal transplant recipients, have demonstrated marked improvement in IPSS, PVR, and flow rate following appropriately timed treatment, reinforcing the value of timely definitive management once conservative measures fail. [9] Beyond the parameters assessed in the present study, metabolic markers such as serum uric acid have also shown a non-linear, dose-dependent association with BPH risk in prospective cohorts, [10] suggesting that a broader metabolic risk-factor panel may add value in future Nepalese studies of BPH.

Limitations

This study was limited by its single-centre, cross-sectional design, which precludes causal inference and temporal assessment of disease progression. Consecutive non-probability sampling from a single tertiary hospital may limit generalisability to the wider community, where milder, undiagnosed cases are less likely to seek hospital care. Follow-up data on treatment response, recurrence, or long-term complication rates after medical or surgical management were not captured. Prostate

volume was assessed by transabdominal rather than transrectal ultrasonography, which may be less precise, particularly at the extremes of gland size. Finally, as with any cross-sectional design, associations identified (e.g., between IPSS severity and clinical/investigational variables) should be interpreted as descriptive rather than causal.

CONCLUSION

Among men presenting with BPH at this tertiary hospital in Nepal, moderate-to-severe IPSS categories predominated, and IPSS severity together with the choice of definitive management were both closely associated with objective clinical and investigational parameters, including age, prostate volume, PVR, Qmax, and PSA. Acute urinary retention was the complication most strongly linked to symptom severity, and nearly half of patients ultimately required TURP. These findings highlight the substantial burden of moderate-to-severe LUTS among ageing men in this setting and support early, structured evaluation - incorporating IPSS, uroflowmetry, prostate imaging, and PSA - to guide timely and appropriate management. Larger, multi-centre, and prospective studies are recommended to validate these findings and to clarify the contribution of comorbidities and lifestyle factors to BPH severity in the Nepalese population.

Declaration by Authors

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