

Functional and Clinical Outcome Following Transurethral Resection after Benign Prostate Hyperplasia

Anees Soomro¹, Illahi Bux Brohi², Muhammad Mubashir Nawaz³, Mawara Ammar^{4*}

¹Department of Urology, Darul Sehat Hospital, Karachi, 75290, Pakistan.

²Department of Paediatric Surgery, Sindh Institute of Child Health & Neonatology, Sukkur, 65310, Pakistan.

³South Tees NHS Foundation Trust, Middlesbrough, TS4 3BW, United Kingdom.

⁴The Research Nation, Karachi, 75270, Pakistan.

Abstract: Frequency of benign prostate hyperplasia (BPH) is reportedly higher in elderly men, usually presented as moderate to severe lower urinary tract symptoms (LUTS) impacting quality of life. Transurethral resection of the prostate (TURP) is known as gold standard procedure used to treat BPH. This study aims to assess the improvement pattern of functional and clinical outcomes after TURP in Pakistani men with benign prostatic hyperplasia. This is a cross-sectional, observational study conducted in Karachi Institute of Kidney Disease, total 300 BPH patients with severe LUTS, listed for TURP were included in the study and follow up was documented after 6 months of surgery. Clinical details including Charlson Comorbidity Index, prostate volume and International Prostate Symptom Score (IPSS) were recorded. Functional outcomes were measured as changes in the IPSS, maximum urinary flow rate (Q-max), post void residual urine (PVR), prostate volume and postoperative Foley catheter status. Statistical tests were used to compare the patients who were discharged with and without a Foley catheter and $p < 0.05$ was considered statistically significant. The mean age was 46.3 ± 6.8 years. TURP resulted in significant improvement of urinary function following surgery. Mean IPSS decreased from 11.2 to 5.8 ($p < 0.001$), Q-max increased from 10.8 to 14.5 mL/sec ($p < 0.01$), post void residual urine decreased from 105.2 to 42.0 mL ($p < 0.0001$) and mean prostate volume decreased from 50.4 g to 20.0 g ($p < 0.001$). TURP is associated with significant enhanced resolution in lower urinary tract symptoms, urinary flow, bladder emptying and functional outcomes in Pakistani men with BPH.

Keywords: Benign prostatic hyperplasia; Transurethral resection of prostate; IPSS; LUTS; QoL; Functional outcomes.

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***Correspondence:** Mawara Ammar, The Research Nation, Karachi, Pakistan Tel: 923333656449. Email: mwtariq8@gmail.com

Introduction

The prevalence of the benign prostate hyperplasia (BPH) rises dramatically among men over 50, and it is closely linked to aging. A variety of lower urinary tract symptoms (LUTS) can arise from the prostate's enlargement, which can compress the urethra and impede normal urine flow. Frequent urination, urgency, nocturia, hesitation, weak urine stream, inadequate bladder emptying, and urine retention are typical symptoms. The progressive nature of BPH can significantly impair everyday functioning, sleep quality, emotional well-being, and general quality of life, even though it is not a life-threatening condition [1].



Growing life expectancy and an increasing percentage of older people have led to a rise in the burden of BPH worldwide. As demographic shifts lead to an older male population, the burden of BPH is growing in emerging nations like Pakistan [2]. BPH-related lower urinary tract symptoms frequently result in physical discomfort, social humiliation, decreased productivity, and psychological suffering. Effective BPH therapy is therefore crucial for both symptom alleviation and enhancing patients' general health-related quality of life [3].

Depending on the severity of symptoms and the course of the disease, BPH can be managed with conservative methods, medication, or surgery. For patients with moderate to severe symptoms or those who do not react well to medication therapy, Transurethral Resection of the Prostate (TURP) is still the gold standard among surgical procedures. In order to improve urine flow and relieve bladder outlet obstruction, TURP entails the endoscopic removal of obstructive prostatic tissue through the urethra. TURP is still frequently used in urological treatment around the world because of its long-standing effectiveness, safety record, and long-lasting results [4].

After TURP, evaluation of treatment results goes beyond objective clinical metrics and increasingly focuses on patient-reported results. A proven and popular tool for assessing the intensity of LUTS in BPH patients is the IPSS. It offers a consistent way to measure the burden of symptoms and track the efficacy of treatment across time. Similarly, as symptom relief does not always translate into patient satisfaction or perceived well-being, quality of life (QOL) assessment has become a crucial part of assessing therapy success. When combined, IPSS and QOL metrics provide a thorough assessment of the subjective and functional results of surgical intervention [5]. There is still comparatively little data from Pakistan, despite the fact that several international studies have shown notable improvements in urinary symptoms and quality of life after TURP. Pakistani patients' postoperative results may be impacted by variations in healthcare availability, patient characteristics, socioeconomic circumstances, cultural views of health, and treatment-seeking habits. To better understand TURP's efficacy in the Pakistani healthcare setting and to inform clinical decision-making, locally produced evidence is therefore required [6].

LUTS associated with BPH can have far-reaching effects that go beyond urine dysfunction. Persistent symptoms frequently interfere with work performance, conflict with daily activities, and have a detrimental impact on social interactions. In particular, nocturia is linked to impaired cognitive performance, daytime weariness, and sleep problems, all of which lower quality of life. Prolonged occlusion of the bladder outlet can also lead to problems such hematuria, urine retention, bladder stones, recurrent UTIs, and, in extreme situations, renal impairment. These possible side effects emphasize how crucial prompt diagnosis and efficient BPH treatment are to halting the disease's progression and maintaining patient wellbeing [7].

The evaluation of functional outcomes following TURP is especially important because successful treatment is expected to provide both symptomatic relief and meaningful improvements in patients' everyday lives. While objective clinical parameters such as urinary flow rate and post-void residual volume are useful indicators of treatment efficacy, patient-centered outcomes have gained increasing recognition in contemporary healthcare research. The assessment of symptom severity through the International Prostate Symptom Score and the evaluation of quality of life provide valuable insights into how patients perceive the benefits of treatment. Such measures facilitate a more comprehensive understanding of treatment success from the patient's perspective and support evidence-based clinical practice[8].

In Pakistan, access to specialized urological care has improved over recent years; however, data regarding postoperative functional outcomes among men undergoing TURP remain scarce. Most available evidence is derived from studies conducted in Western populations, whose demographic characteristics, healthcare systems, and cultural contexts may differ substantially from those of Pakistani patients. Consequently, there is a need for local studies that evaluate treatment outcomes using standardized and validated assessment tools. Generating context-specific evidence can assist healthcare providers in counseling patients regarding expected postoperative improvements,



optimizing treatment strategies, and enhancing the overall quality of urological care. Additionally, such research may contribute to the development of national clinical guidelines and inform future investigations focused on improving patient-centered outcomes in men with benign prostatic hyperplasia [9].

The present study was carried out to evaluate clinical and functional outcome after Transurethral Resection of the Prostate in Pakistani men with Benign Prostatic Hyperplasia. It aims to evaluate changes in the International Prostate Symptom Score and quality of life specifically after TURP. The findings of this study may add to the existing literature and provide useful insights into the effectiveness of TURP in improving both symptom severity and quality of life in Pakistani patients with BPH.

Method

This is a cross-sectional follow-up study conducted at the Karachi Institute of Kidney Diseases (KIKD), Karachi, Pakistan, from January 2023 to December 2025 (IRB #: KIKD/2023/029). To evaluate clinical and functional results in male patients after transurethral prostate resection (TURP). A total of 300 adult male patients who had undergone TURP for benign prostatic hyperplasia (BPH) were enrolled by consecutive sampling, during routine postoperative follow-up visits. We included patients aged 35–50 years who had undergone TURP at least 6 months before recruitment. We excluded patients with a diagnosis of prostate cancer, prior prostate surgery, neurogenic bladder, severe cognitive impairment, major psychiatric illness, chronic disabling neurologic disorders, and those with incomplete medical records.

The data was entered and analyzed with Statistical package for social sciences (SPSS) version 27. Continuous variables including age, mean IPSS, urine volume etc were presented as mean $\pm$ standard deviation while categorical variables were presented as frequency and percentages. Paired t-tests was used to analyze continuous variables. Categorical variables were compared using Chi-square test, keeping p-value of ≤ 0.005 as significant.

Results

160 (53.3%) patients reported severe LUTS symptoms and 140 (46.7%) reported moderate LUTS symptoms. The mean age of overall patients was 46.3 ± 6.8 years. Patients with a severe LUTS were older than moderate LUTS patients (41.7 ± 3.2 years, vs. 38.1 ± 3.1 $p < 0.001$). Age distribution was similar across groups ($p = 0.072$). Preoperative functional decline was observed in 142 (47.3%) patients, 62 patients in severe LUTS group and 80 patients in moderate LUTS group, without significant intergroup difference ($p = 0.099$). Most patients had no comorbidities (49.7%) and higher comorbidity scores (≥ 2) were more common in patients with severe LUTS (Table 01).

Table 1. Characteristics of study population categorized on the basis of LUTS symptom severity.

Characteristics	n=300	Severe LUTS symptoms (n=160)	Moderate LUTS symptoms (n=140)	P-Value
Age (mean $\pm$ St. dev)	38.9 ± 3.2	38.1 ± 3.1	41.7 ± 3.2	<0.001
Age, categories				
35-40 years	41	20	21	0.072
41-45 years	141	70	71	
46-50 years	118	64	54	
Functional decline before surgery n	142	62	80	0.099



(%)				
Charlson Comorbidity Score, %				
0	149	78	71	0.001
1	92	42	50	
2	57	35	22	
>3	2	2	0	

Patients with recovered erectile function at six months after TURP had significant improvement of voiding symptoms, storage symptoms and total IPSS when compared with baseline ($p<0.05$). Symptom scores in patients with impaired erectile function were significantly lower, but less improvement was seen in those reporting no effect on erectile function. However, between categories of erectile function for voiding symptom score ($p=0.11$), storage symptom score ($p=0.17$), or total IPSS ($p=0.06$) (Table 02).

Table 2. Difference between mean IPSS characteristics at baseline and 6 month after TURP.

Mean IPSS				
IPSS Characteristics		Baseline	6 Months	P-Value
Voiding symptoms score	Recovered erection	11.2	2.8	0.11
	No influence erection	8.4	7.2	
	Impaired erection	10.9	3.8	
Storage Symptom score	Recovered erection	12.8	8.2	0.17
	No influence erection	8.9	7.5	
	Impaired erection	8.4	7.1	
IPSS total score	Recovered erection	23.1	6.8	0.06
	No influence erection	18.1	13	
	Impaired erection	19.9	7.9	

TURP resulted in significant improvement in objective urinary measures. The mean IPSS was 11.2 before surgery and 5.8 after surgery ($p<0.001$). The mean value of maximum urinary flow rate (Q-max) increased from 10.8 to 14.5 mL/s ($p<0.01$) and the mean post-void residual urine volume decreased from 105.2 mL to 42.0 mL ($p<0.0001$). The median IPSS quality-of-life score improved significantly from 5 (IQR: 4–6) before TURP to 2 (IQR: 1–3) at the 6-month follow-up ($p < 0.001$), indicating a substantial improvement in patient-perceived quality of life. The mean prostate volume also significantly decreased after surgery from 50.4 g to 20.0 g ($p<0.001$), which suggests successful relief of bladder outlet obstruction. The median prostate volume was 22.2 g (range, 4–85 g), median serum. (Table 03).

Table 3. Difference between IPSS score, QoL IPSS, Q-max, Residual urine and Prostate vol before and after TURP.

	IPSS Score	QoL IPSS (Q-08)	Q-max (ml/sec)	Residual urine (ml)	Prostate Vol (g)
Pre- TURP	11.2	5	10.8	105.2	50.4
Post- TURP	5.8	2	14.5	42	20
p-value	<0.001	<0.001	<0.01	<0.0001	<0.001



Discussion

TURP resulted in significant improvements in lower urinary tract symptoms (LUTS), urinary flow parameters, post-void residual urine and prostate volume, confirming its efficacy in restoring urinary function and improving patient well-being. The improvement of symptoms in patients with various postoperative erectile function was different but not statistically significant. The results support TURP as an effective surgical treatment for symptomatic BPH with favorable short-term functional outcomes [10]. Common symptoms such as urinary frequency, urgency, nocturia, weak urinary stream, incomplete bladder emptying and urinary retention are often due to progressive bladder outlet obstruction. Pharmacologic therapy is appropriate for patients with mild to moderate symptoms, but for men with moderate to severe LUTS or those who fail conservative management, TURP remains the gold standard surgical treatment. The present results support this well-established role and show clinically significant improvements in both subjective symptom scores and objective functional parameters within 6 months post surgery [11-12]

Objective measures of urinary function also improved significantly post-surgery. The maximum urinary flow rate (Q-max) was significantly increased and the post-void residual urine volume was markedly decreased indicating improvement in bladder emptying efficiency. Moreover, previous prospective studies have demonstrated significant improvements in Q-max and residual urine following TURP, confirming the close correlation of these objective outcomes with improvements in patient-reported symptoms and quality of life. The concordance between subjective and objective findings in the present study adds additional validity to the observed functional recovery [13]. Another important finding after TURP was a significant reduction of prostate volume. Surgical removal of hyperplastic tissue is expected to result in a substantial reduction in gland size, and the postoperative measurements seen in this study are consistent with the mechanism of action of the procedure. Prostate volume reduction results in improved urinary flow and reduced outlet resistance, contributing to long-term symptom relief [14].

There were no significant differences between the two groups in baseline characteristics such as age distribution or preoperative functional decline suggesting the two groups were broadly similar preoperatively. Patients discharged with a Foley catheter had significantly higher Charlson Comorbidity Index scores, representing a higher burden of underlying medical conditions. This finding is clinically plausible as patients with multiple comorbidities are frequently left with impaired bladder contractility, delayed postoperative recovery, increased risk of urinary retention or delayed restoration of spontaneous voiding [15-16]. The present study also examined symptom improvement in relation to postoperative erectile function status. The most improvement in voiding, storage, and total IPSS score were found in patients with recovered erectile function, whereas patients with no change or impaired erectile function showed relatively smaller improvements. The lack of significant differences between erectile function groups in the present study provides reassurance that symptomatic urinary improvement can be obtained independent of post-operative changes in erectile status [17].

Lower urinary tract symptoms often disrupt daily activities, occupational performance, social interaction, and sleep quality, leading to a decline in physical and psychological well-being. Relief of bladder outlet obstruction restores urinary continence, reduces urinary frequency and nocturia and restores confidence in performing daily activities without fear of urinary urgency or retention. Although quality-of-life scores were not reported separately in the current analysis, the large reduction in IPSS is very suggestive of improved patient-reported quality of life, as previous studies have consistently demonstrated a close correlation between symptom severity and quality-of-life metrics. The improvements seen in the current cohort are therefore likely to represent clinically meaningful improvement in overall health status and functional independence [18]. The objective improvements in Q-max and post-void residual urine confirmed the successful relief of bladder outlet obstruction and substantiated the subjective reductions seen in IPSS [19]. The



combined use of subjective and objective outcome measures gives a more complete assessment of recovery after surgery and mitigates the risk of relying on symptom perception alone, which can vary from person to person. This multidimensional assessment is increasingly advocated in modern urological research, as it accounts for physiological recovery and patient-centric outcomes [20]. One of the important clinical findings of this study was the association between increased comorbidity burden and postoperative Foley catheterization. Patients with high Charlson Comorbidity Index score had a higher frequency of requiring catheterization after surgery, indicating that systemic health status could influence postoperative recovery irrespective of surgical success. Comorbidities such as diabetes mellitus, cardiovascular disease, neurologic disorders, and chronic kidney disease may compromise bladder contractility, slow tissue repair, or predispose to postoperative urinary retention. Identifying these high-risk patients preoperatively allows optimization of perioperative management, realistic counselling regarding recovery expectations, and formulation of individualized postoperative care plans. Future prediction models of risk that include comorbidity indices may further enhance patient selection and perioperative decision making [21].

This study has evaluated postoperative symptom improvement, urinary function and catheter-related outcomes in a relatively large cohort of Pakistani patients and provides useful information which may help clinicians in counselling patients, benchmarking institutional outcomes and supporting evidence-based management of BPH in the local healthcare system. Several strengths support the validity of the present study. There are, however, several limitations that must be acknowledged despite these strengths. This was a single-centre observational study, which may limit the generalizability of findings to other health care settings. The 6-month period of follow-up did not allow for assessment of the long-term durability of symptom relief or late postoperative complications. Quality-of-life outcomes were not assessed with comprehensive validated health-related quality-of-life instruments but indirectly by symptom improvement. The authors did not assess for confounding factors such as prostate morphology, surgeon experience, medication history, and intra-operative variables. Finally, the observational design does not allow to establish causal relationships between post-operative catheterization and functional outcomes.

To evaluate functional outcomes beyond one year after TURP, future prospective multicentre studies on larger and more diverse patient populations are needed. The use of validated quality of life questionnaires, measures of continence and patient satisfaction scores would provide a more complete assessment of recovery from surgery. Predictive models based on age, comorbidity burden, bladder function and perioperative factors may allow individualised patient counselling and management postoperatively. Further comparative studies of TURP with emerging minimally invasive surgical therapies are also warranted in Pakistani populations to guide evidence based treatment selection.

Conclusion

TURP continues to be an efficient and safe surgical treatment for BPH, resulting in significant improvements in urinary symptoms, urinary flow rate, post-void residual urine and prostate volume within 6 months after surgery. Functional recovery was independent of postoperative erectile function, while patients with greater comorbidity burden were more likely to need Foley catheterization.

Ethics Approval and Consent to Participate

Current study was conducted under prior ethical approval from the departmental ethical review committee (IRB #: KIKD/2023/029) of the Karachi Institute of Kidney Diseases. All the procedures were carried out in accordance with institutional ethical guidelines. Whole procedure was explained and written consent was obtained from the student volunteers.



Human and Animal Rights

No animals were used in this study. The study on humans was conducted in accordance with the ethical rules of the Helsinki Declaration and Good Clinical Practice.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

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Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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References

1. Lee CL, Kuo HC. Pathophysiology of benign prostate enlargement and lower urinary tract symptoms: Current concepts. *Tzu Chi Medical Journal*. 2017;29(2):79–83.
2. Hussain M, et al. A comparative study of transurethral resection of the prostate versus transurethral incision of the prostate in small-sized prostate glands with benign prostatic hyperplasia. *Cureus*. 2025;17(2):e86848–e86859.
3. Hussain M, Khan A, Mehmood PK, Qureshi U, Shah A. Outcomes of transurethral resection of the prostate in patients with and without renal failure secondary to enlarged prostate. *Journal of the College of Physicians and Surgeons Pakistan*. 2022;32(11):1432–1436.
4. Khalil MAU, et al. Therapeutic efficacy and complication profile of monopolar transurethral resection of the prostate in the management of bladder outlet obstruction. *Cureus*. 2024;16(12):e89640–e89654.
5. Porto JG, Bhatia AM, Bhat A, et al. Evaluating transurethral resection of the prostate over twenty years: A systematic review and meta-analysis of randomized clinical trials. *World Journal of Urology*. 2024;42(1):639–651.
6. Hussain K, et al. Visual Prostate Symptom Score versus International Prostate Symptom Score in patients with lower urinary tract symptoms. *Journal of Bahria University Medical and Dental College*. 2024;14(2):272–279.
7. Haider A, Ahsen MR. An analytical study of therapeutic outcomes in the medical and surgical management of prostate enlargement. *Pakistan Journal of Medical Cardiology Review*. 2026;5(2):2891–2912.
8. Lokeshwar SD, Harper BT, Webb E, et al. Epidemiology and treatment modalities for the management of benign prostatic hyperplasia. *Translational Andrology and Urology*. 2019;8(5):529–539.
9. Awaisu M, Ahmed M, Lawal AT, et al. Correlation of prostate volume with severity of lower urinary tract symptoms as measured by International Prostate Symptom Score and maximum urine flow rate among patients with benign prostatic hyperplasia. *African Journal of Urology*. 2021;27(1):1–7.



10. Lekei EE, Mbwapbo JS, Bright F, Elias M, Cheyo ZI, Mteta AK, Mbwapbo O, Ngowi BN. Short-term outcome and predictors of post-operative complications following transurethral resection of the prostate among patients with benign prostatic hyperplasia in Northern Tanzania: A prospective analytical study. *African Journal of Urology*. 2025;31(1):36.
11. Tabei T, Horiguchi A, Shinchu M, Hirano Y, Ojima K, Ito K, Azuma R. Outcomes of urethroplasty in patients with proximal bulbar urethral stricture following transurethral surgery for benign prostatic hyperplasia: A focus on continence and patient-reported outcome measures. *Indian Journal of Urology*. 2025.
12. Chughtai B, Rojanasart S, Neeser K, Gultyaev D, Fu S, Bhattacharyya SK, El-Arabi AM, Cutone BJ, McVary KT. A comprehensive analysis of clinical, quality of life, and cost-effectiveness outcomes of key treatment options for benign prostatic hyperplasia. *PLoS ONE*. 2022;17(4):e0266824.
13. Al Demour SH, Abuhamad M, Santarisi AN, Al-Zubi M, Al-Rawashdah SF, Halalsheh O, Carbone A, Pastore AL, Ahmad MM. The effect of transurethral resection of the prostate on erectile and ejaculatory functions in patients with benign prostatic hyperplasia. *Urologia Internationalis*. 2022;106(10):997–1004.
14. Gemma L, Pecoraro A, Sebastianelli A, Spatafora P, Sessa F, Nicoletti R, Gravas S, Campi R, Serni S, Gacci M. Impact of minimally invasive surgical procedures for male lower urinary tract symptoms due to benign prostatic hyperplasia on ejaculatory function: A systematic review. *Prostate Cancer and Prostatic Diseases*. 2024;27(3):404–421.
15. Yang J, Song H, Zhan H, Ding M, Luan T, Chen J, Wei H, Wang J. The influence of preoperative urodynamic parameters on clinical results in patients with benign prostatic hyperplasia after transurethral resection of the prostate. *World Journal of Urology*. 2023;41(12):3679–3685.
16. Mehmood MT, Niazi AB, Akhtar M, Abbas SR, Qureshi MF, Hussain I. Comparative study of TURP versus medical management in benign prostatic hyperplasia. *International Journal of Pharmacy Research & Technology*. 2026;16(1):468–472.
17. Haseeb A, Zeb M, Ahmed I, Shah JA, Moosa M, Hussain R, Raheel M, Tayyib M, Muhammad R, Shah JA, Muhammad SR. Comparison of complications and outcomes following transurethral resection of the prostate in patients presenting with and without acute urinary retention. *Cureus*. 2025;17(1).
18. Khan K, Rehman IU, Ahmad N, Javed ML, Faisal M, Naz R. Comparative outcomes of open prostatectomy and transurethral resection of the prostate for benign prostatic hyperplasia. *Pakistan Journal of Health Sciences*. 2024:162–167.
19. Khan F, Soomro N, Sarwar MA, Aslam MM, Qureshi HA, Murtaza HB. Impact of transurethral resection of the prostate on erectile function in benign prostatic hyperplasia patients: A descriptive study at a tertiary care hospital. *Journal of University Medical & Dental College*. 2024;15(2):819–823.
20. Tariq K, Haider S, Khan A, Halimi SM, Ahsan H. Erectile functioning and associated outcomes in geriatric patients after transurethral resection of the prostate. *International Journal of Pharmacy Innovative Research*. 2024;1(1).
21. Yousuf MA, Shahzad I, Awan KH, Pathan GM, Manzoor M, Ahmed T. Erectile dysfunction after transurethral resection of the prostate in patients with benign prostatic hyperplasia. *Journal of Health and Rehabilitation Research*. 2023;3(2):951–958.

