

# Assessing the correlation between the Benign Prostatic Hyperplasia Bother Impact Index and International Prostate Symptom Score after Transurethral Resection of the Prostate

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## Abstract

Improvements in Lower Urinary Tract Symptoms (LUTS) and Quality of Life (QoL) are usually the key reasons men seek surgical options for their management. Transurethral Resection of the Prostate (TURP) is an effective surgical option for these patients, and it is increasingly being employed in the management of Benign Prostatic Hyperplasia (BPH) patients. The aim of this study was to evaluate the effect of TURP on the Bother Impact Index

(BII) score and International Prostate Symptom Score (IPSS) and assess the correlation between these two parameters three months after TURP. This was a prospective study of 194 men who had TURP between February 2018 and October 2019. On clinical evaluation, all the patients included in the study had moderate to severe LUTS attributable to BPH. Preoperatively, detailed histories were taken of each patient, and the IPSS questionnaire was administered. The mean age of the participants was 66.28 years (Standard Deviation, SD=8.19). The modal age group was the sixth decade. The mean BII score of the patients was 5.73 (SD=0.45), and the mean IPSS of the patients was 25.85 (SD=5.07). The mean BII score 3 months post-TURP was 1.44 (SD±0.91), while the mean IPSS 3 months post-TURP was 2.75 (SD±1.33). There was a strong positive and statistically significant correlation between BII score and IPSS at 3 months post-TURP ( $r=+0.770$ ,  $p<0.001$ ).

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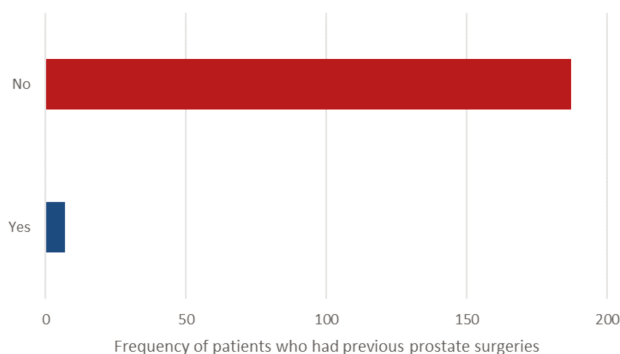
## Introduction

Transurethral Resection of the Prostate (TURP) and other surgical options for bladder outlet obstruction secondary to Benign Prostatic Hyperplasia (BPH) are usually the preferred modality of treatment when Lower Urinary Tract Symptoms (LUTS) are bothersome and impact on the patient's Quality of Life (QoL). It has been observed that men are generally hesitant to seek medical treatment for their LUTS and typically do so only when symptoms become sufficiently bothersome to impact their QoL.<sup>1</sup> Hence, due to the central role of bother in the decision to seek treatment and in the development of treatment algorithms, urologists have developed tools to assess the degree of bother.<sup>2</sup> One such tool is the International Prostate Symptom Score (IPSS). The IPSS is a self-administered questionnaire designed to assess the severity of symptoms and the degree of bother associated with BPH. It was developed in 1992 by a multidisciplinary measurement committee of the American Urological Association.<sup>3</sup> It was called the American Urological Association Symptom Index (AUASI) and consisted of seven questions, but it originally lacked questions on QoL. The first World Health Organization consultation on BPH adopted the AUASI with the addition of one quality of life question and called it the IPSS.<sup>4</sup> The IPSS rates seven symptoms experienced by the patient in the past month. The symptoms, which include both storage/irritative symptoms (frequency, urgency, and nocturia) and voiding/obstructive symptoms (weak stream, intermittency, straining, and incomplete emptying), are scored from 0 to 5. The sum of the individual scores gives the total IPSS score. A total score of 0 to 7 represents mild symptoms, 8 to 19 represents moderate symptoms, and a score of 20 to 35 represents severe symptoms. Furthermore, the IPSS questionnaire assesses the Bother Impact Index (BII), also called the QoL of the patient due to urinary symptoms. The BII is rated 0 to 6, where lower scores indicate less disruption of the patient's QoL and *vice versa*.

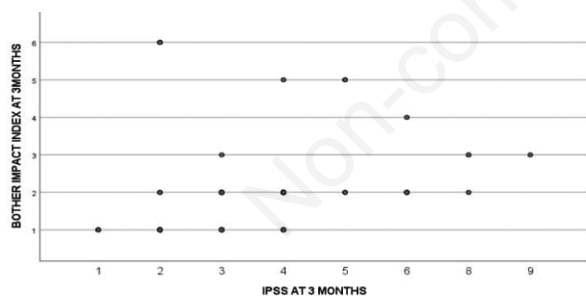


Although various validated QoL instruments have been used to assess bother in men with LUTS/BPH, the IPSS QoL is the easiest and most widely used to administer.<sup>5</sup> In the clinical setting, IPSS can be deployed to assess the severity of LUTS and the degree of bother both before and after TURP in men with BPH.

In our practice, we have observed that in some patients, the storage or irritative symptoms continue several months after TURP, and such patients are usually quick to show their displeasure with the procedure despite having a good urine stream. This could affect the total IPSS post-TURP. Following this observation, this study aimed to document the magnitude of this problem by evaluating the effect of TURP on BII score and total IPSS and also to assess the correlation between these two parameters three months after TURP.



**Figure 1.** The proportion of patients who had prior prostate surgeries.



**Figure 2.** A scatterplot of Bother Impact Index (BII) and International Prostate Symptom Score (IPSS) 3 months post Transurethral Resection of the Prostate (TURP). It shows a positive correlation between these two variables.

## Materials and Methods

This was a prospective study of 194 men who had TURP between February 2018 and October 2019. All the patients included in the study had moderate to severe LUTS attributable to BPH on clinical evaluation. Patients with neurological conditions like diabetes mellitus, Parkinson's disease, or cerebrovascular accident were excluded from this study. Preoperatively, a detailed history of each patient was taken, and the IPSS questionnaire was administered by the research assistant (a senior resident in Urology). Routine workup investigations were done before surgery. These include prostate-specific antigen, full blood count, kidney function test, urinalysis, urine culture, and transabdominal and transrectal ultrasound scan. All the TURPs were done by the same surgeon. The resected prostate chips from each patient were submitted for histopathological examination. Patients who had malignancy detected on histopathological examination of their prostate chips were excluded from the study. Each patient was followed up in the clinic until there was optimal recovery (usually up to six weeks post-TURP). The IPSS was administered again to each patient three months after TURP.

## Results

A total of 194 patients that had TURP were included in this study. The mean age of the participants was 66.28 years

**Table 1.** Comparison of the Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and pre-treatment International Prostate Symptom Score (IPSS) scores between different categories of patients.

Variable	Young (<65 years)	Old (≥65 years)	t	p
Pre-treatment IPSS Score	26.93±5.42	25.43±4.84	1.855	0.065
BPH-BII	5.65±0.48	5.77±0.71	-1.637	0.103

**Table 2.** The comparison of the Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and pretreatment International Prostate Symptom Score (IPSS) scores between the prostate size categories.

Variable	Small prostate (<30 g)	Big prostate (≥30 g)	t	p
Pre-treatment IPSS Score	25.36±5.24	26.22±4.88	-1.167	0.245
BPH-BII	5.63±0.44	5.81±0.42	-2.880	0.004*

\*significant at 0.05.

**Table 3.** The mean International Prostate Symptom Score (IPSS) and mean Bother Impact Index (BII) at 3 months post Transurethral Resection of the Prostate (TURP).

Statistics	IPSS at 6 weeks	IPSS at 3 months	Bother Impact Index at 3 months
N			
Valid	194	194	192
Missing	0	0	2
Mean	4.71	2.75	1.44
Standard deviation	1.958	1.331	0.908



(SD±8.19). The modal age group was the sixth decade. Seven patients had previous prostate surgeries, as illustrated in Figure 1. Four patients (2.06%) had an open prostatectomy, while three participants (1.55%) had TURP.

The mean BII score of the patients was 5.73 (SD=0.45), and the mean IPSS of the patients was 25.85 (SD=5.07). The mean BII score 3 months post-TURP was 1.44 (SD±0.91), while the mean IPSS 3 months post-TURP was 2.75 (SD±1.33).

The patients were categorized into those less than 65 years and those aged 65 years and above for the purpose of subgroup analysis. Similarly, the prostate size was classified into small prostate (<30 g on Trans-Rectal Ultrasound, TRUS) and large prostate (30 g and above) for the same purpose. There was no significant difference in the mean BPH-BII and the mean IPSS among the age categories, as shown in Table 1. Similarly, no significant difference was seen in the Mean BPH-BII score and IPSS among the prostate size groups, as shown in Table 2 and Table 3.

### Correlation between the Benign Prostate Hyperplasia Bother Impact Index and the International Prostate Symptom Score

There was a weak but significant positive correlation between the BPH-BII and the IPSS scores, with a Spearman's correlation coefficient of 0.255 ( $p<0.001$ ). When categorized according to prostate size, the correlation remained weak but significant, as shown in Table 4.

By contrast, the correlation between the post TURP IPSS and BPH-BII at 3 months become strong and significant, Spearman's  $\rho=0.770$ ,  $p<0.001$ . It remained strong when categorized based on the prostatic size, as shown in Table 5.

Similarly, when a subgroup analysis was performed for the different age categories, the correlation was insignificant on the young age group compared to a weak but significant correlation at the old age group, as illustrated in Table 6.

However, after TURP, the correlation between IPSS and BPH-BII became strong and significant for both age groups at 3 months, as illustrated in Table 7.

## Discussion

Improvements in LUTS and QoL are usually the key reason men seek surgical options for their management. TURP is an effective surgical option for these patients, and it is increasingly being employed in the management of BPH patients<sup>6</sup>. Several studies deployed the IPSS to evaluate the outcome of TURP,<sup>7-9</sup> and some authors have reported significant improvement in LUTS/BII after TURP.<sup>10,11</sup> In our study, the mean pre-treatment BII score was 5.73 (SD=0.45) while the mean pre-treatment IPSS score was 25.85 (SD=5.07). The pre-treatment mean BII score and IPSS noted in our study are similar to the respective values of 5.2 and 23.4 recorded by Chalise and Agrawal.<sup>12</sup> These values are slightly different from what was noted by Milonas *et al.*<sup>13</sup> We observed a significant improvement in BII score and mean IPSS 3 months post-TURP as evidenced by respective mean values of 1.44 and 2.75 as shown in Table 3, which also demonstrated that the mean IPSS observed at 6 weeks post-TURP was a bit higher than that noted at 3 months. This could be due to the gradual resolution of storage LUTS that tend to persist after TURP. In our series, some of the patients that had persisting storage LUTS expressed their displeasure when they presented for follow-up visits. Some of the patients had resolution of these symptoms after 3 to 6 months. Some others

had to wait for up to 12 months before the storage LUTS resolved. The reason for the persisting storage of LUTS in some of the participants in this study is not very clear. Ultrastructural changes in the bladder due to long-standing infravesical obstruction by the prostate could be contributory. It is also possible that some factors other than mechanical obstruction were involved in the etiology of LUTS in these participants. Therefore, LUTS (especially storage LUTS) may not be attributable to the prostate, even in the presence of an enlarged prostate. This underscores the importance of urodynamic study in the evaluation of patients who present with symptomatic BPH.

Similar to our findings, several other authors noted significant improvement in BII score and IPSS after TURP.<sup>12,14,15</sup> Some other studies that assessed BII scores recorded significant improvement in the scores at various intervals post TURP.<sup>16-18</sup> The degree of improvement in BII score and IPSS varies among these studies. This may be related to several factors, including the severity of symptoms before surgery and the extent of resection of the prostate adenoma. Patients with severe symptoms before surgery tend to record greater improvement in symptoms post-TURP.<sup>12</sup> On the

**Table 4.** The correlation of the pre-treatment Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and International Prostate Symptom Score (IPSS) scores between the prostate size categories.

Variable	r	p
Small prostate (<30 g)	0.264	0.018*
Large prostate (≥30 g)	0.212	0.029*

\*significant at 0.05.

**Table 5.** The correlation of the pre-treatment Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and International Prostate Symptom Score (IPSS) scores between the prostate size categories.

Variable	r	p
Small prostate (<30 g)	0.778	<0.001*
Large prostate (≥30 g)	0.765	<0.001*

\*significant at 0.05.

**Table 6.** The correlation of the pre-treatment Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and International Prostate Symptom Score (IPSS) scores between the age categories.

Variable	r	p
Young patients (<65 years)	0.257	0.061
Old patients (≥65 years)	0.296	0.001*

\*significant at 0.05.

**Table 7.** The correlation of the 3-month post-treatment Benign Prostate Hyperplasia Bother Impact Index (BPH-BII) and International Prostate Symptom Score (IPSS) scores between the age categories.

Variable	Spearman's rho	p
Young patients (<65 years)	0.778	<0.001*
Old patients (≥65 years)	0.778	<0.001*

\*significant at 0.05.



other hand, the degree of efficacy of TURP during short-term follow-up may depend on the completeness of the resection. An improvement in symptoms, QoL and voiding function could be expected when at least 30-35% of the total prostate volume or 60% of the transitional zone has been removed.<sup>13</sup>

Following the categorization of the patients into young (<65 years) and old patients (65 years and above) and then the prostate size into small prostate (<30 g on TRUS) and large prostate (30 g and above), there was no significant difference in the mean BPH-BII between the age or prostate size categories as shown in Table 1. Similarly, no significant difference was seen in the IPSS score between the age or prostate size groups (Table 2). This suggests that the severity of LUTS is independent of patients' age and prostate size. This further buttress the fact that the severity of LUTS is not dependent on the size of the prostate.<sup>19-21</sup> This study found a strong positive and statistically significant correlation between BII and IPSS at 3 months post TURP ( $r=0.770$ ,  $p<0.001$ ) as shown in Figure 2. This correlation remained strong when the participants were categorized based on prostate size and patients' age (Tables 5 and 7).

## Conclusions

Following TURP, there was a significant improvement in both the BII score and IPSS. This improvement was noted in the immediate post-operative period after catheter removal and continued up to 3 months after TURP. A strong and statistically significant correlation was found between the BII score and IPSS 3 months after TURP.

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