



## Relationship between prostate volume and lower urinary tract symptoms (LUTS) as measured by international prostate symptom score (IPSS)

\*<sup>1</sup> Imtiyaz Ahmed, <sup>2</sup> Iqbal Aziz

<sup>1</sup> Assistant Professor, Department of Jarahat (Surgery) DUMC & Research Center, Deoband Saharanpur, Utter Pradesh, India

<sup>2</sup> Professor, Department of Jarahat (Surgery) AKTC, AMU Aligarh, Utter Pradesh, India

### Abstract

Lower Urinary tract symptom (LUTS) is a common presentation among elderly male patients in urology clinical practice. Evaluation and treatment of LUTS is a major consideration and IPSS score is routine investigations for assessment of such patients. International Prostate Symptom Score (IPSS) have contributed much to the objective and quantitative evaluations of LUTS in terms of the elucidation of its pathogenesis and changes accompanied with treatments. The objective of this study is to evaluate the relationship between IPSS and prostate volume in patients with LUTS. There is a significant relationship between IPSS and prostate volume measured through transabdominal ultrasonography. The Total IPSS increases with the prostate volume, as a significant positive relationship between IPSS total score and prostate volume was recorded ( $r= 0.45$ ,  $t=3.8$ ,  $p<0.001$ ).

**Keywords:** lower urinary tract symptoms (LUTS), international prostate symptom score (IPSS), transabdominal ultrasonography and prostate volume

### 1. Introduction

Lower urinary tract symptoms (LUTS) are one of the commonest presentation in urology clinics. Although BPH is one common cause of these symptoms, some men with LUTS have no prostate enlargement<sup>[1]</sup>.

BPH has been known as a cause of urinary obstruction and the most common disease effecting the aging men. 50% of the men aged 51-60 years and 90% of men over aged 80 years have histological evidence of BPH<sup>[2]</sup>. Clinical diagnosis of BPH is made by the assessment of the IPSS, prostate size or volume and reduced urinary flow rate.

The International Prostate Symptom Score (IPSS) questionnaire is used worldwide to measure lower urinary tract symptoms (LUTS). Ultrasound of the prostate is the investigation that enables us to visualize the prostate gland directly and is one of the commonest diagnostic modalities performed in patients presenting with LUTS. It can be done using the trans-abdominal approach as well as trans-rectal approach. There is a controversy on the relationship between IPSS score and the prostate volume in the literature. The objective of the study was to evaluate the relationship between IPSS and sonologically measured prostate volume in the patients with LUTS.

### 2. Material and Methods

This study was carried out at Department of Jarahat, Ajmal Khan Tibbiya College A.M.U Aligarh. 58 patients with lower urinary tract symptoms (LUTS) from OPD and IPD of Jarahat, AKTC were included in the study from year 2015-16. All the patients were well informed about the study. Informed written consent was taken from patients who were willing to participate in this study.

All patients were assessed with clinical history, examination and interviewed using standardized questionnaires for IPSS. The IPSS is widely used in evaluating LUTS quantitatively and also in monitoring therapeutic effects in terms of improvement. The IPSS is based on the answers to seven questions (1. Straining 2. Weak stream 3. Intermittency 4. Incomplete emptying 5. Frequency 6. Urgency 7. Nocturia (times per night). Each question is assigned points from 0 (Not at all) to 5 (Almost always). Total score ranges from 0-35. A total score was categorized as mild (scores 7 or less), moderate (scores 8-19), and severe (scores 20-35). The prostate volume of each patient was then estimated by transabdominal ultrasound.

Data obtained was recorded and Pearson's correlation coefficient was used to assess correlation between prostate volume and IPSS score.

### 3. Observations and Results

The mean age of 58 BPH patients included in the study was found to be  $62.0 \pm 9.0$  years (range 45-90 years).

**Table 1:** Distribution of BPH Patients According to Age Group

Age Group (Years)	No. of Patients	Percentage (%)
40-50	4	6.9
50-60	18	31.0
60-70	21	36.2
70-80	12	20.7
80-90	3	5.2
Total	58	100.0
Mean Age $\pm$ SD	62.0 $\pm$ 9.0	

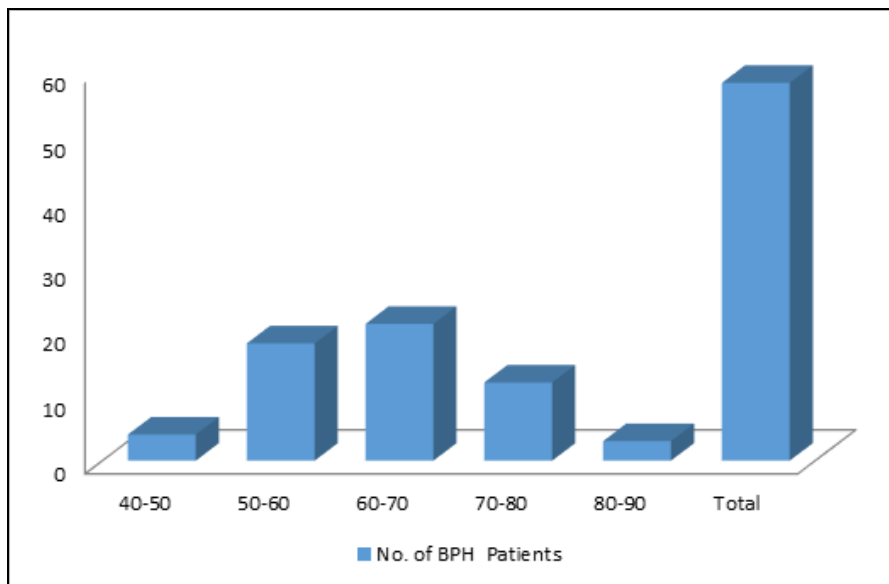


Fig 1: No. of BPH Patients According to Age Group

In this study out of 58 BPH patients 17 (29.3%) had mild, 29 (50%) had moderate and 12 patients (20.7%) had severe symptoms (IPSS score) and Mean prostatic volume in BPH

patients was found to be  $42.9 \pm 18.4 \text{ cm}^3$  with a range of 20-92 cc.

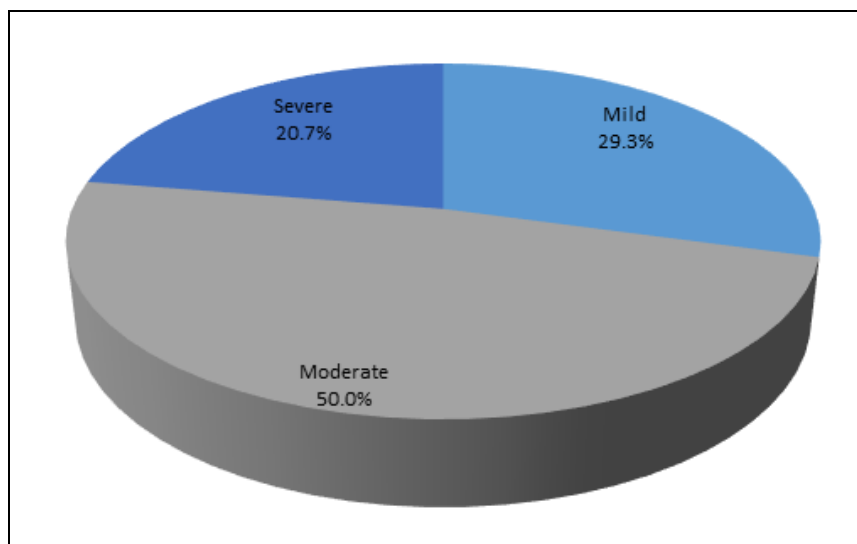
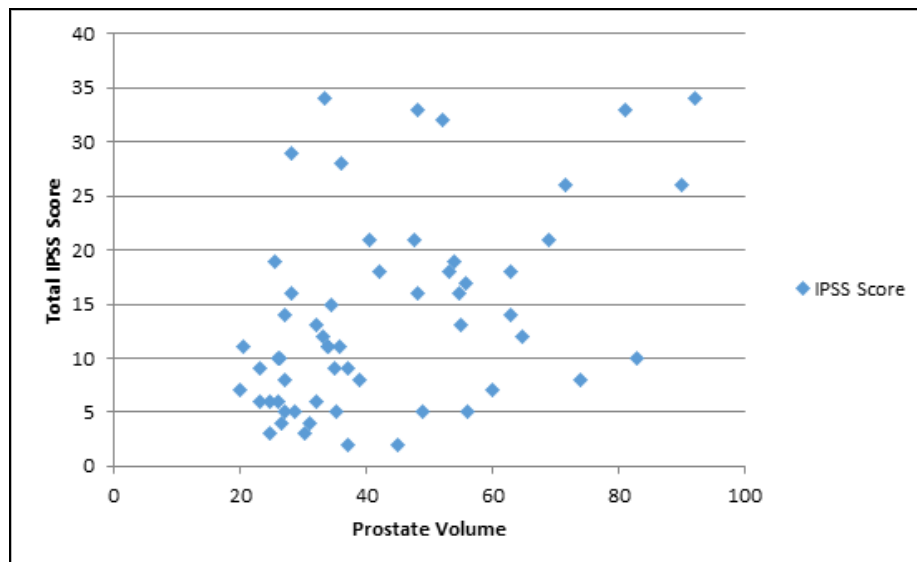


Fig 2: No. of BPH Patients According to Severity of Symptoms (IPSS)

Table 2: Frequency of IPSS Severity in Relation to Prostate Volume

Prostate Volume (cc)	Mild (Score 0-7)	Moderate (Score 8-19)	Severe (Score 20-35)	Total
20-30	8	8	1	17
30-40	5	9	2	16
40-50	2	2	3	7
50-60	1	5	1	7
60-70	1	3	1	5
70-80	0	1	1	2
80-90	0	1	3	4
Total	17	29	12	N=58



**Fig 3:** Total IPSS Score in Relation with Prostate Volume

There was a positive correlation between prostate volume and total IPSS score in our study, which was statistically significant. ( $r=0.45$ ,  $t=3.8$ ,  $p<0.001$ ). Pearson correlation was applied to determine the relationship between prostate volume and total IPSS score.

#### 4. Discussion

The mean age of 58 BPH patients included in the study was found to be  $62.0 \pm 9.0$  years (range 45-90 years). Data suggest that the incidence of symptomatic BPH is 23% in men aged 50 years and 78% in men aged 60-70 years. (3) Akin *et al.*, (4) on 48 BPH patients, reported mean age of  $60.17 \pm 1.18$  years. Pethiyagoda *et al.*, (5) in their study on 185 patients showed mean age of  $65.2 \pm 11.46$  years. Thus, our findings appear to be in conformity with the findings of other researchers. In our study, most of the patients (36.2%) were in the age group of 60-70 years. Manjunath *et al.*, (6) conducted a study on 60 BPH patients to determine the relationship among the parameters of uroflowmetry and severity of symptoms. The mean age of patients was 67.8 years. Most of the patients (46%) in their study were in the age group of 61-70 years. Agarwal *et al.*, (7) did a study, the mean age of patients was found to be  $67.5 \pm 8.5$  years and most of the patients (44.0%) were in age group of 61-70 years. Jiang *et al.*, (8) on 298 patients with LUTS reported mean age of  $72.7 \pm 9.0$  years (range, 44–92). Eghbali *et al.*, (9) did study on 44 patients of BPH, the mean age was  $61.7 \pm 9.2$  years.

In our study out of 58 BPH patients 17 (29.3%) had mild, 29 (50%) had moderate and 12 patients (20.7%) had severe symptoms (IPSS score). A similar study conducted by Itoh *et al.*, (10) in which the frequencies of mild, moderate and severe symptoms according to total IPSS were 23.8%, 50.0% and 26.2%, respectively. In the study conducted by Pethiyagoda *et al.*, (5) on 185 patients, 4.4% had mild, 50.5% had moderate and 45.1% had severe LUTS according to IPSS total score, respectively. However, Mostafa *et al.*, (11) showed 58.3% of BPH patients had mild, 27.3% had moderate and 4.4% had severe symptoms on the basis of IPSS and the prevalence of moderate to severe was 31.7%.

Mean prostatic volume in BPH patients was found to be  $42.9 \pm 18.4$  cm<sup>3</sup> with a range of 20-92 cc, which was comparable to other studies done by Agarwal *et al.*, (7) where the mean volume of prostate was found to be  $42.5 \pm 12.7$  cm<sup>3</sup> on 100 patients of BPH and by Vesely *et al.*, (12) who reported mean prostate volume of  $40.1 \pm 23.9$  cm<sup>3</sup> conducted on 354 men in a study. Akin *et al.*, (4) reported a mean prostate volume of  $35.77 \pm 3.86$  cc in 48 patients of BPH. In the study conducted by Dicuio *et al.*, (13) mean prostate volume was 41.4cc.

There was a positive correlation between prostate volume and total IPSS score in our study, which was statistically significant. ( $r=0.45$ ,  $t=3.8$ ,  $p<0.001$ ). Pearson correlation was applied to determine the relationship between prostate volume and total IPSS score. These findings were further supported by other study which was done on 185 patients by Pethiyagoda *et al.*, (5) in which there was a strong positive correlation between two parameters (Correlation Coefficient =0.223,  $p<0.003$ ). Similarly, Tsukamoto *et al.*, (14) showed that correlation between change in IPSS and change in PV was 0.47 ( $P=0.05$ ) based on 25 patients. They concluded that change in IPSS was associated with change in prostate volume.

#### 5. Conclusion

There is a significant positive relationship between IPSS total score and prostate volume. It is evident from this study that there will be significant rise in IPSS score as prostate volume increases. However, the treatment of BPH should be based on IPSS and urinary flow rather than prostate volume only.

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