



*Full Length Research Paper*

# Effect of body mass index and age on international prostate symptom score: on men attending urology clinic in a tertiary institution in Nigeria

Adegun Patrick Temi<sup>1\*</sup>, Ajayi Oladimeji Akande<sup>2</sup>, Salawu Adedayo Idris<sup>1</sup>, Areo Peter Olufemi<sup>1</sup>, Esho Julius Olusanmi<sup>1</sup> and Dada Samuel Ayokunle<sup>2</sup>.

<sup>1</sup>Department of Surgery, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.  
<sup>2</sup>Department of Medicine, Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.

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To establish possible effects of Body Mass Index [BMI] and age on International Prostate Symptoms Score [IPSS] in Nigerian men with lower urinary tracts symptoms [LUTS]. This is a prospective, cross-sectional, descriptive study. A total of 250 men aged 40 years and above, from Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria. BMI was calculated for each patient. IPSS and Bother Score were assessed by trained physicians. The mean age for the patients was  $62.28 \pm 12.1$  years, mean BMI was  $26.8 \pm 3.4 \text{ Kg/m}^2$ . The mean storage symptoms and mean voiding symptoms were  $8.3 \pm 4.1$  and  $8.5 \pm 6.4$  respectively. Overweight patients were 49.2% and 18% were obese. Moderate to severe symptoms were the most prevalent [80%] symptoms. Majority of the patients presented with poor QoL [84.4%]. There was an association between BMI and IPSS,  $p < 0.05$ . Age was positively associated with IPSS with older men having fewer mild symptoms than younger men,  $p < 0.05$ . This study demonstrated that BMI was significantly associated with IPSS as well as the age group. Majority of patients in this study were overweight. Physicians should consider BMI measurement in their routine clinical assessment of LUTS and counsel their patients on life style modifications.

**Keywords:** Age; BMI; IPSS; Nigeria.

## INTRODUCTION

The International prostate symptom score [IPSS], which was originally developed by the American Urological Association for a treatment outcome measure for benign prostatic hyperplasia, has now become a popular indicator of the severity of lower urinary symptom score [LUTS], Barry et al (1992). LUTS is a common condition and can be assessed by IPSS, Barry et al (1992),

Stranne et al (2009). Some medical conditions, especially obesity, have been suggested to contribute to LUTS apart from common aetiological factors such as aging, benign prostatic hyperplasia [BPH], overactive bladder [OAB], and detrusor overactivity, Melhmet (2014). It has been reported that BMI is a known risk factor for urinary incontinence in patients with overactive bladder [OAB] because obesity has been found to increase intra-abdominal and intra-vesicular pressure, apart from the pudendal nerve damage induced by the chronic stress resulting in pelvic floor dysfunction, Morrill et al (2007), Ritcher et al (2005) BMI of  $30 \text{ kg/m}^2$  and above has been

\*Corresponding Author E-mail: [patrickkelomo@yahoo.com](mailto:patrickkelomo@yahoo.com);  
Tel : +2348034531236

accepted as a risk factor in both sexes and obese male patients were seen to experience a relief in urge incontinence after losing weight, Melhmet (2014). In a study by Mehmet to determine the risk factor and the severity of symptoms relation in women with OAB, there was a positive correlation between BMI and severity of urgency, Melhmet (2014).

Currently, LUTS is not only viewed as a mere hydraulic problem, to be solved by a surgical intervention, but as a metabolic problem, to be solved with a multidisciplinary approach, which include the endocrinologist. Several recent studies have provided convincing evidence of a possible role of metabolic syndrome [MetS], and/or its individual components, in the development of BPH and prostate growth, Parsons (2007). Furthermore, LUTS is exceedingly common in aging men and is currently being assessed by IPSS which has been found to be a reliable instrument of assessment, Barry et al (1992), Medina et al (1999), Hassen et al (1995), Mebust et al (1991).

In a study conducted by Jiang et al, diagnosis of Bladder Outlet Obstruction [BOO] was affected by age and prostate volume. It was reported that as age increased, the tightness of bladder neck and prostate size increased, which caused more Bladder Neck Dysfunction [BND] in patients with small prostate and more Benign Prostate Obstruction [BPO] in those with large prostate, Jiang et al (2013). The prevalence of storage IPSS sub score was reported to increase from 3% in men aged 40 to 44 years to 42% in those aged 75 years and above, Jiang et al (2013).

More importantly, people are observed to be living longer and, in some parts of the world, healthier lives in recent times. It was estimated that by 2030, the total population of people of 65 years and older will increase to 1 billion—1 in every 8 of the earth's inhabitants. Significantly, the most rapid increases in the 65 and older population are predicted to occur in developing countries, which are suggested to see a jump of 140 percent by 2030, Kinsella et al (1995). Hence, we must proactively face the health issues of the elderly, especially in the developing world. LUTS represent significant bother among aging men; they were previously considered as a "normal" consequence of the aging process and, as such, their negative effects on men's well-being only dealt with through medical or surgical intervention. This view has been challenged in the last decade and now LUTS is seen more to be preventable than inexorable ailments of the elderly. Interestingly, some evidences have been presented by some authors that indicate that several modifiable metabolic factors such as obesity, diabetes etc, play a role in the progression of the severity of LUTS, Prasad (2006). Obesity, which is the highest component of BMI classification, is a non-communicable disease which is gaining increasing importance globally and is a rapidly emerging disease in the developed world. It is a chronic condition characterized by an accumulation of body fat, Anate et al(1998), it is one of the most important

preventable diseases in developed countries. The prevalence of the disease is increasing in both industrialized nations and in those undergoing alterations in diet and activity patterns as a consequence of adoption of the western culture, Azinge (1997) and Nigeria is not an exception.

However, there are scanty literatures on the effect of BMI and age on IPSS especially in Africa. This study was designed to determine the effect of BMI and age on IPSS on men attending urology clinic in Nigeria and recommend certain life style changes where necessary.

To the best of our knowledge, this is the first study on the effect of BMI and age on IPSS in this environment.

## METHODS

### Study Site/Design

This non-randomized, cross-sectional, prospective study was conducted at the Urology clinic of Ekiti State University Teaching Hospital [EKSUTH], Ado-Ekiti, Ekiti State-Nigeria.

### Study Participants

Two hundred and fifty [250] new patients that presented to the EKSUTH with various lower urinary tract symptoms between July, 2013 and December, 2014 were recruited.

### Inclusion criteria

1. Males aged 40 years and above who reported to the urology clinic, for the first time with the complaint of LUTS.
2. Patients with no prior treatment for LUTS.

### Exclusion criteria

1. Patients on previous treatment for BPH, Prostate cancer.
2. Evidence of pelvic irradiation.
3. Previous surgery for BPH.
4. UTI [Urinary Tract Infection] within the past four weeks.
5. Patient with neurogenic bladder dysfunction.

### Data Collection

#### **Anthropometric variable**

Height to the nearest centimeter without shoes was measured with a stadiometer (seca, United Kingdom) and weight to the nearest 0.1 kg, in light clothing, was measured with a bathroom scale (Zhongshan Camry Electronic, China). BMI was calculated as a ratio of weight (kg) to height squared ( $m^2$ ). This was used to

**Table 1.** General characteristics of the study population.

Variables	N(SD)					
Mean age(SD)	64.01(12.9)					
Mean BMI(SD)	26.3(3.6)					
Mean voiding(SD)	8.5(6.4)					
Mean storage(SD)	8.3(4.1)					
<b>Population based on age group(YRS) N(%)</b>						
<65	144(57.6%)					
>65	106(42.4%)					
<b>IPSS severity range N(%)</b>						
Mild symptoms	50(20%)					
Moderate to severe symptoms	200(80%)					
storage symptoms	(54.4%)					
voiding symptoms	(44.6%)					
<b>BMI range</b>						
Underweight	1(0.4%)					
Normal	81(32.4%)					
Overweight	123(49.2%)					
Obese	45(18%)					
<b>Bother score[QoL]</b>						
Good	38(15.2%)					
Poor	212(84.8%)					
<b>Effect of age on IPSS and QoL</b>						
				<b>Test Value = 0</b>		
	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>	<b>Mean Difference</b>	<b>95% Confidence Interval of the Difference</b>	
					<b>Lower</b>	<b>Upper</b>
Agegroup	65.145	249	.000	4.336	4.20	4.47
IPSSseverity_Score	46.464	249	.000	2.184	2.09	2.28
Bother score	6.681	249	.000	.152	.11	.20

categorize participants as underweight (<18Kg/m<sup>2</sup>), normal (18-24 Kg/m<sup>2</sup>), overweight (25-29.9 Kg/m<sup>2</sup>) and obese (≥30 Kg/m<sup>2</sup>) according to WHO [World Health Organization] criteria, WHO (2000).

### Assessment of LUTS

The IPSS forms filled by the patients who presented to us in the Urology clinic were evaluated to assess the pattern of urological symptoms in this environment. In this study, LUTS was assessed by IPSS questionnaire and consists of voiding and storage symptoms [sub scores], because it is a reliable and widely used instrument since 1991, Barry et al(1992), Hassen et al(1995), and it offers best comparability of the findings. The quality of life [QoL or Bother Score] question of IPSS was used to assess the bothersomeness of the symptoms for all patients.

Questions for symptoms assessment are as follows:

1. Incomplete emptying
2. Frequency
3. Intermittency
4. Urgency
5. Weak Stream
6. Straining
7. Nocturia
8. Refers to the patient's perceived quality of life and assessed bother score.

For the purpose of analysis of the LUTS determinants, IPSS was categorized into mild symptom (score was 0-7), moderate to severe symptom (score was 8 – 35).

However, for the assessment of the impact of LUTS on QoL, Bother Score[BS], which is a measure of QoL, was categorized into two groups, Chatelain et al (2001); delighted, pleased, mostly satisfied, or mixed versus mostly dissatisfied, unhappy or terrible i.e BS 0-3 was regarded as good QoL, while BS 4-6 was regarded as a poor QoL.

### Statistical Analysis

The data obtained were analyzed using the SPSS Windows Version 20.0 (SPSS Inc,IBM,UK). Student's t-test was used for continuous variables. P-values < 0.05 were considered as statistically significant.

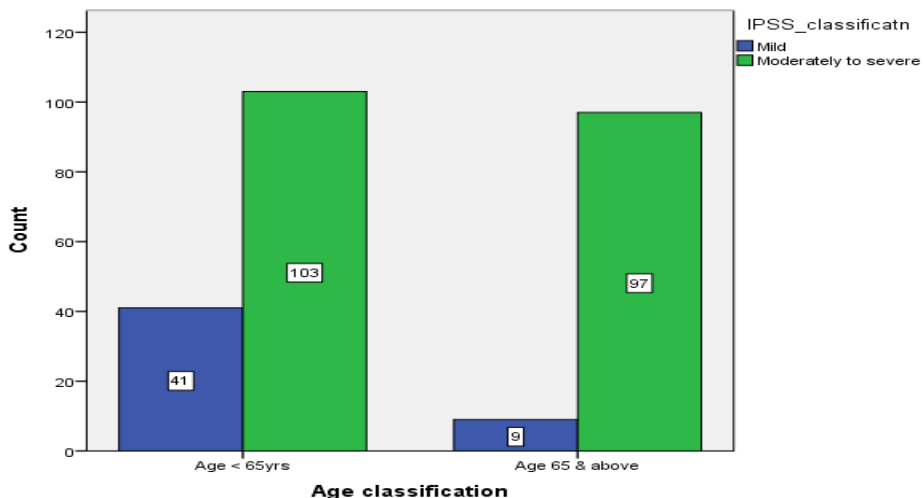
### Ethical Approval

Ethical clearance was obtained from the ethical committee of Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria. Informed consent was obtained from each patient prior to commencement of the study.

### RESULTS

Table 1 showed that majority of our patients presented with poor QoL[84.8%].

Most of the patients were in the age classification <65years which constituted about 57.6%.It also showed that majority of the participants were overweight. A



**Figure 1.** showed the effect of age on IPSS. Y-axis showed the number of patients in the IPSS severity groups while X-axis showed the age classification into <or>65years.

**Table 2.** The effect of BMI category on IPSS.

BMI classification	Frequency	Percent	Valid Percent	Cumulative Percent
<18, under weight	1	.4	.4	.4
18-24, Normal weight	81	32.4	32.4	32.8
25-29.9, over weight	123	49.2	49.2	82.0
30 & above, obese	45	18.0	18.0	100.0
Total	250	100.0	100.0	

Distribution of IPSS according to BMI	IPSSseverity Score			Total
	Mildly Symptomatic	Moderately Symptomatic	Severely Symptomatic	
<18, under weight	0	1	0	1
18-24, Normal weight	18	30	33	81
25-29.9, over weight	19	56	48	123
30 & above, obese	13	17	15	45
Total	50	104	96	250

Distribution of BMI according to QoL	Bother score(QoL)		Total
	Poor qol	Good qol	
<18, under weight	1	0	1
18-24, Normal weight	67	14	81
25-29.9, over weight	108	15	123
30 & above, obese	36	9	45
Total	212	38	250

EFFECT OF BMI ON IPSS & BS(QoL)	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
BMI classification	63.754	249	.000	2.848	2.76	2.94
IPSS	46.464	249	.000	2.184	2.09	2.28
BS	6.681	249	.000	.152	.11	.20

significant proportion of the participants presented with moderate to severe symptoms. Age was significantly associated with IPSS and BS,  $p < 0.05$ . Storage symptom was more prevalent.

Figure 1 showed that mild symptoms were commoner in the younger age group.

Table 2 showed that BMI was positively associated with IPSS and QoL [ $P < 0.05$ ]. Also, almost half of the patients

**Table 3.** Effect of BS on voiding and storage sub scores.

BS & IPSS sub scores	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Bother score Voiding symptoms	-8.332	6.480	.410	-9.139	-7.525	-20.330	249	.000
Bother score Storage symptoms	-8.164	4.295	.272	-8.699	-7.629	-30.058	249	.000
<b>Correlation between BS &amp; IPSS sub scores</b>	N		Correlation			Sig.		
Bother score & Voiding symptoms	250		-.342			.000		
Bother score &Storage symptoms	250		-.486			.000		

T were overweight [49.2%].

Table 2 also showed that majority of the patients irrespective of their BMI had poor QoL.

In addition, there was a positive relationship between BMI and IPSS and QoL. This association was statistically significant  $<0.05$ . The BMI classification with highest prevalence of poor QoL was the overweight group apart from the underweight that had only one patient.

Table 3 showed that both the storage and voiding symptoms were significantly related to the QoL of the patients,  $p < 0.05$ .

## DISCUSSION

We sought to establish the impact of BMI and age on IPSS in this environment. Our study showed that BMI and age were significantly associated with IPSS.

Also, it has been established in this study that the QoL of the men attending urology clinic for the first time was significantly affected by BMI. This is in agreement with the findings of Mehmet who reported that by losing weight, men tended to have a relief in urgency, Melhmet (2014). This is due to the fact that overweight/obesity has been reported to increase the intra-abdominal and intra-vesicular pressure, apart from the tendency to damage the pudendal nerve resulting in pelvic floor dysfunction, Morrill et al (2007), Ritcher et al (2005).

In addition, there are greater percentage [57.6%] of patients in the age group younger than 65years. This

trend is worrisome because the middle age group which is included in this group, is also the workforce of the economy and this pattern could impact negatively on the country's economy.

In addition, this study has demonstrated that the higher the IPSS the poorer the QoL ( $P < 0.05$ ). This is in agreement with the findings of Hansen BJ et al that men are generally hesitant to seek medical treatment for LUTS and typically do so when symptoms become sufficiently bothersome to impact their quality of life, Hnasen et al (1995). Despite this, overwhelming majority of patients in this study irrespective of IPSS classification, presented with poor QoL (see table 2). Perhaps this may be due to co-morbidities which could have contributed to the depreciation in the QoL. This fact has earlier been alluded to by some authors, Adegun et al (2011).

Majority of the patients in this study were overweight (49.2%). This is a worrisome situation considering the cardiovascular and other possible complications of being overweight, Malnick et al (2006). Besides, majority of the cohort presented with moderate to severe symptoms irrespective of their BMI. This shows that most of the patients would not seek medical help until their symptoms become worse. This is in line with the report of Silva et al and Rhodes et al that most patients with mild symptoms are not sufficiently bothered to accept the risks of even noninvasive therapy. For a lot of them, the decision to pursue treatment might be driven by moderate or severe genitourinary symptoms, whereas in others, fear of prostate cancer, surgery, or impotence is the factor that

drives the decision to seek medical attention: in which case the symptoms have become worsened, Silva et al (1997), Lee et al (1998). However, lack of medical education on LUTS or a previous visit to a native doctor or other alternative sources of treatment that abound in this environment may be a contributory factor. A research on this area is needed in future to confirm this hypothesis.

This study has demonstrated that the mean voiding symptoms was higher than that of storage symptoms. This is similar to the findings of Carlos et al that voiding symptoms are mostly common in LUTS especially in men. In addition, the storage symptoms were more prevalent [55.44%]. These findings are contrary to the study by Peter TJ et al that voiding symptoms are usually most prevalent whereas the most bothersome are storage symptoms, Peter et al (1997). The reason for this disparity requires further research. The higher prevalence of the storage symptoms may not be unconnected with the poor QoL of majority of patients. This finding agrees with Carlos et al and Peters et al who reported that patients with predominantly storage symptoms are more likely to report that their QoL is affected than are men with predominantly voiding symptoms because storage symptoms are considered more bothersome, as they interfere extensively with daily life activities and have a great impact on QoL, Peter et al (1997), Carlos et al (2010). However, the QoL is affected significantly in this study by both storage and voiding symptoms. The overweight/obesity tendency of majority of the patients in this study, may be contributory.

## CONCLUSION

Finally, the study has demonstrated that BMI was significantly associated with IPSS as well as the age group. Majority of patients in this study are overweight. Physicians should include BMI measurement in their routine clinical assessment of LUTS and counsel their patients on life style modifications appropriately.

## RECOMMENDATION

1. Patients presenting with LUTS who are overweight/obese need to be counseled on life style modifications e.g. regular monitored exercises and balance diets.
2. There is need for health education in the clinic to sensitize the patients on the danger of overweight and obesity.
3. Community health education on danger of overweight and obesity should be embarked upon by the health workers, to stem the tides of these conditions.

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