

Original Article

Relationship Between Body Mass Index and Measures of Benign Prostate Enlargement in an Apparently Normal Nigerian Population.

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ABSTRACT

Majority of the studies on the relationship of body mass index, prostate specific antigen, prostate volume and international prostate symptoms score (IPSS) in the medical literature were conducted in symptomatic subjects. Our objective was to investigate the relationship between these variables in apparently normal Nigerian population. This was a prospective cross-sectional study of adult male subjects, forty years and above with no prior history of lower urinary tract symptoms or history suggestive of prostatic disease or surgery who presented voluntarily for screening during a public enlightenment lecture on prostate disease. Digital rectal examination (DRE) findings, Body mass index, prostate specific antigen prostate volume and international prostate symptoms score were determined. Subjects with suspicious findings on DRE or PSA of more than 10ng/ml were excluded from the analysis. P value less than 0.05 was considered statistically significant on statistical analysis. The age distribution of the participants was 41 -66years with a mean of 50+/4.9sd. Majority of them were in the 4th decade of life. The body mass index of the majority of the studied group showed a range of 18.5-24.9 (n=43s, 66.1%). The mean total prostate specific antigen [PSA] of the participants was 1.98+/1.21sd with a range of 0.00-8ng/ml. All the participants had an IPSS of 0-7. Correlation analysis among variables revealed only statically significant correlation between BMI & prostate volume and IPSS & quality of life. There was significant relationship only between body mass index and prostate volume & IPSS and quality of life index. Weight reduction in an obese individual may slow than prostate enlargement and the possibility of reduction in the severity of lower urinary tract symptoms (IPSS)

Keywords: Benign prostatic enlargement, Prostate specific antigen, Prostate volume

INTRODUCTION

Benign prostatic hyperplasia is a common disease of the aging men.¹ Although not all men with prostate enlargement develop symptoms of the disease, symptomatic patients often present with lower urinary tract symptoms (LUTS) with attendant poor quality of life.² This includes voiding, storage and post-micturition symptoms. The important clinical parameters of benign prostatic hyperplasia that are of significance in the diagnosis, management

and progression of the disease include international prostate symptom scores (IPSS), digital rectal examination findings (DRE), peak flow rate, post void residual volume and bladder wall thickness among others. These parameters have been established as measures of the severity of benign prostatic hyperplasia (BPH) and upon which therapeutic intervention may be made. They are also considered in the estimation of BPE disease progression.⁴ Increasing age has been consistently

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linked with the development of BPH and has been regarded as one of the strongest risk factors for BPH.⁵ Studies have shown a positive correlation between increasing age and prostate volume which has been reported to be associated with increasing prostate specific antigen especially in symptomatic BPH. It has been established that the prostate volume does not correlate with lower urinary tract symptoms.⁶ The direction and extent of the relationship between body mass index, prostate specific antigen, prostate volume and international prostate symptoms scores (IPSS) are keys to understanding the natural history of the disease. The knowledge of this relationship in apparently asymptomatic subjects will not only improve the understanding of the pathology of BPE but may also be useful in estimating the risk of disease progression in positive individuals and thus reduce morbidity. Majority of the studies on the relationship of body mass index, prostate specific antigen, prostate volume and international prostate symptoms scores (IPSS) in the medical literature were conducted among the white population as well as majorly in symptomatic patients.⁷ Some of these studies were limited to two to three of these clinical parameters. It is known that these clinical parameters have racial variation. Higher values of prostate specific antigen have been noted in African population with or without presence of prostatic disease. Average prostate volume in African population is also higher than in the western population. Our objective for this study was therefore to investigate the relationship between body mass index and measures of BPE in an apparently normal Nigerian population

MATERIALS AND METHODS

This was a prospective cross-sectional study that was conducted among dwellers of a community in Oyo state over a period of one month. The community is close to Ladoko Akintola University of Technology Teaching Hospital Ogbomosho. The sample size was limited to the number of individuals that voluntarily presented at the place of the public enlightenment and met the inclusion criteria. Consecutively consenting individuals that presented to the dedicated place for the general health check-up, apparently healthy with no prior history of prostatic

disease or lower urinary tract symptoms were recruited into the study while subjects with previous history of prostatic disease, suspicious findings on DRE and PSA of more than 10ng/ml were excluded from the study. The participants were asked to complete international prostate symptoms scores forms (IPSS & IPSS QoL index) and then made to undergo general physical examination including DRE. Weight and height of the individuals were recorded and body mass index was calculated. Blood samples were taken for PSA assay and also TRUSS prostate volume estimation was done. Data obtained was entered into SPSS version 23. Descriptive statistics was done and correlation analysis was carried out between variables using Pearson correlation coefficient. P values less than 0.05 were considered statistically significant.

Ethical clearance was obtained from the concerned institution review board (IRB) with an approval number LTH/OGB/EC/2024/508.

RESULTS

A total of 100 men were available for the general health check but only 65 of them were included in the study after informed consent. The rest were excluded due to the presence of lower urinary tract symptoms. The age distribution of the participant was 41-66 years with a mean of 50+4.9sd. Majority of them were in the 4th decade of life. (Figure 1).

The body mass index of the majority of the studied group showed a range of 18.5-24.9 (n=43, 66.1%). Others were 17-18.4 (n=3, 4.6%), 25-25.9 (n=16, 24.6%), 30-34.9 (n=3, 4.6%). (Figure 2).

The mean total prostate specific antigen [tPSA] of the participants was 1.98+1.21sd with a range of 0.00-8ng/ml. Participants' tPSA was further classified into two: less than or equal to four and more than four. A total of 64[98.5%] participants had a tPSA of less than or equal to four. Analysis of the participants' prostate volume revealed a range of 15-100mls with a mean of 30.4+15sd. Almost sixty percent of them [n=37] had a prostate volume of less than or equal to 25mls while the rest had a prostate size of 26-100mls. The mean international prostate symptoms score [IPSS] was 5.6+4.1sd. All the participants had an IPSS of 0-7. All of them had a

score that ranged between 0-3 except one with a score of 5. Majority of them were satisfied with their quality of life. (62/65, 95%) Correlation analysis among variables revealed no statically significant correlation between 1. Body mass index and age (p=0.3), body mass index and IPSS (p=0.88). Body mass index and PSA (p=0.4), body mass index and quality of life (0.6), age and PSA (P=0.2), Age and prostate volume (0.1), PSA and prostate volume p=(0.4) There was however significant correlation between body mass index and prostate volume (p< 0.05) and IPSS and quality of life index (p < 0.001). (Figure 3).

DISCUSSION

Benign prostatic hyperplasia is the most common benign neoplasm in Men.8 Individuals with BPH may not be symptomatic.9 This study has investigated the relationship between body mass index and some measures of BPH in asymptomatic individual. The age distribution observed among the studied group fell within the common age of development of clinical BPH.10 Even though participants with clinical BPH were excluded from the study, the similarity in the age distribution of the study group with the established age of occurrence of BPH may be a coincidence since no age was excluded from the general screening. It may also be a reflection of previous public enlightenment on BPH where the age at risk would have been mentioned hence the need for the individual at this age to present himself for the checkup.

It was observed that the mean tPSA among the studied group was within the same range observed by Iya Det al in a study titled prostate specific antigen in Africans: a study in Nigeria men.11 This was in contrast to what was noted in African –American and Caucasian men where it was noted to be higher.12

The normal average volume of prostate as measured by ultrasound scan has been generally reported to be 20-25mls. This study has further elucidated on this as majority of the study group had a prostate volume of less than 25ml.13 The rest had an enlarged prostate. The diagnosis of apparently asymptomatic BPH in some of the study group was in agreement with earlier findings on the possibility of non-clinical BPH in an individual and the fact that prostate size does not correlate with severity of symptoms. The IPSS score of this study group was in conformity with the previous similar study. 14

Correlation analysis among variables showed statistical significance only between body mass index & prostate volume and IPSS & quality of life. This finding is similar to what has been reported in the medical literature concerning the relationship between increasing weight and prostate volume. In a study done by Batai Kon the relationship between body mass index and prostate volume it was noted

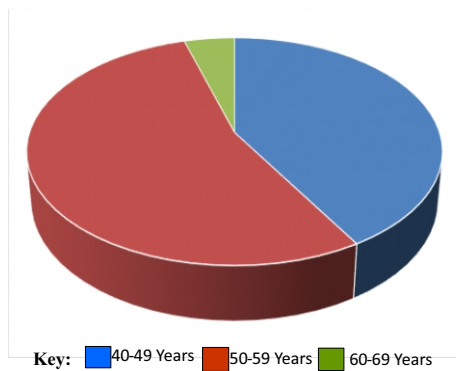


Figure 1. Age distribution of the study group (N=65)

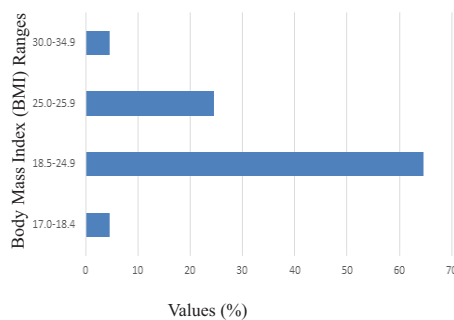


Figure 2. Distribution of Body Mass Index (BMI) of the study group (N=65)

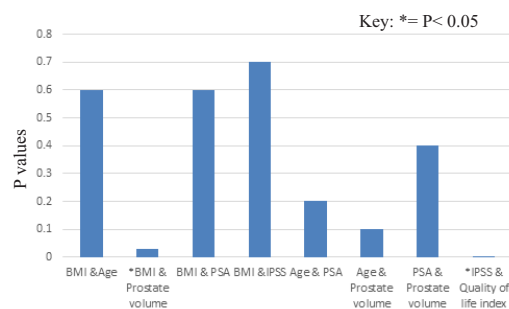


Figure 3. Analysis of anthropometric values in relation to prostate variables among the study group.

that patients with larger prostate had significant BMI. ¹⁵This may be linked to higher level of inflammatory cytokines such as IL-6, TNF and IL-1beter among others in more obese individuals and inflammations has been significantly correlated with enlarged prostate.¹⁶

The relationship between other measures of BPH investigated in this study did not reach statistically significant levels. Although these were investigated in apparently normal population, these findings were similar to what was observed in a similar study on symptomatic individuals. Some studies have however reported significant relationship among these variables such as PSA & prostate volume and IPSS & age.¹⁷

CONCLUSION

There was significant relationship between body mass index and prostate volume and also between IPSS and quality of life. The relationship between body mass index and other measures of BPH investigated did not reach significant level.

RECOMMENDATION

Weight reduction in an obese individual may slow down prostate enlargement and the possibility of reduction in the severity of possibly lower urinary tract symptoms as well as other symptoms associated with prostate enlargement (IPSS).

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