International Journal of Endorsing
HEALTH SCIENCE RESEARCH

IJEHSR

Short Communication

Prevalence of benign prostatic hyperplasia among obese patients at a tertiary care hospital in Karachi.

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Doi: 10.29052/IJEHSR.v12.i4.2024.195-201

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Received 02/07/2024
Accepted 11/10/2024
First Published 27/11/2024

OPEN ACCESS

Abstract

Background: Benign prostatic hyperplasia (BPH) is a prevalent condition in older men, marked by the noncancerous enlargement of the prostate gland. Obesity and various lifestyle factors have been linked to an increased risk of developing BPH, though the exact relationship remains unclear. This study aimed to investigate the frequency of BPH in obese patients and explore the potential association between obesity and BPH, alongside other factors such as smoking, hypertension, and age.

Methodology: A cross-sectional study was conducted on 182 male patients aged 45–85 years, diagnosed with BPH at the Urology Outpatient Department of a tertiary care hospital between January and February 2024. Body mass index (BMI) was calculated from patients' height and weight, and all patients underwent transabdominal ultrasound to confirm BPH. Additional demographic and clinical data, including smoking status, hypertension, and diabetes, were recorded.

Results: The mean age of participants was 64.45±2.95 years, with all patients classified as obese (Class 1: 33%, Class 2: 33%, Class 3: 34.1%). The majority (72.5%) of participants had BPH, while none were diabetic, 47.8% were hypertensive, and 34.7% were smokers. Statistical analysis revealed no significant association between BPH and obesity (P-value=0.06), smoking (P-value=0.42), hypertension (P-value=0.13), or age (P-value=0.64).

Conclusion: This study found no significant association between BPH and obesity, despite the high prevalence of BPH in the obese population. Further longitudinal research is warranted to examine whether targeted obesity management could meaningfully impact BPH progression and treatment outcomes.

Keywords

Benign Prostatic Hyperplasia, Obesity, Prostatic Hyperplasia

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Introduction

Benign prostatic hyperplasia (BPH) is a common condition in aging men, characterized by the nonmalignant and unregulated enlargement of the prostate gland. In severe cases, BPH can lead to serious complications such as sepsis, irreversible bladder damage, renal failure, or even death[1]. Globally, the prevalence of BPH among men aged 60 years or older exceeds 50%, highlighting its significance as a public health issue[2]. Despite its widespread occurrence, the underlying causes of BPH are not entirely understood. While androgens, essential for normal prostate development, play a crucial role in prostate growth[3], emerging evidence suggests that metabolic disturbances may also contribute to the pathogenesis of BPH.

Insulin-like growth factors (IGFs) are known to be powerful inducers of prostate cell growth in vitro[4]. Higher serum levels of insulin and IGF-I have been linked to an increased risk of clinical BPH, suggesting that these metabolic factors may play a role in the disease's progression. Additionally, inflammation is thought to be a key driver in prostate carcinogenesis[5]. It is hypothesized that BPH may represent a nonmalignant pathway of uncontrolled prostate growth, driven by oxidative stress, inflammatory mediators, and metabolic disruptions such as elevated IGFs[6].

Research has consistently shown that increased adiposity is positively correlated with prostate volume. Body weight, body mass index (BMI), and waist circumference have all been identified as significant factors associated with prostate enlargement across various populations[7-9]. In the Baltimore Longitudinal Study of Aging, for instance, each 1 kg/m² increase in BMI corresponded to a 0.41 mL increase in prostate volume. Obese individuals (BMI > 35 kg/m²) were found to have a 3.5-fold higher risk of developing prostate enlargement compared to those with a normal BMI (< 25 kg/m²)[10]. Furthermore, epidemiological data show that obesity is linked to higher risks of BPH-related surgeries, urinary symptom progression, and the need for BPH medical treatment[11-12]. A local study by Tabassum et al. found the prevalence of BPH among obese patients to be 36.3%[13].

Obesity is a major determinant influencing prostate size and volume, yet there remains a scarcity of local studies exploring this relationship, particularly in the context of Pakistan's rising obesity rates. Given the unique demographics, lifestyles, socioeconomic conditions, and genetic factors of the Pakistani population, understanding how these variables intersect with BPH risk is critical. The findings from this study will not only help inform strategies to educate patients about the risks of developing BPH but also potentially aid in the prevention of prostate cancer. Additionally, the study aims to encourage lifestyle modifications, such as increased physical activity, to improve patients' quality of life.

This study is designed to assess the frequency and association of BPH in obese patients at a tertiary care hospital in Karachi. By establishing this local perspective, we aim to contribute valuable data that can enhance public health interventions and clinical care for patients at risk of BPH and related complications.

Methodology

Study Design

This study was designed as a cross-sectional investigation aimed at exploring the prevalence and associated risk factors of BPH in obese male patients. The study was conducted at the Department of Urology, Liaquat National Hospital in Karachi. The total study duration was six months, initiated upon the approval of the study synopsis.

Ethics

Prior to study commencement, ethical approval was obtained from the Institutional Ethical Review Committee of Liaquat National Hospital. Informed written consent was secured from all participants after providing them with a clear explanation of the study's objectives, procedures, and potential risks. Participant anonymity and confidentiality were ensured through measures such as the anonymization of participant data, secure data storage with restricted access, and oversight by the

Institutional Review Board to uphold ethical and privacy standards throughout the study.

Setting

The study was conducted at Liaquat National Hospital, a tertiary care center in Karachi, Pakistan. The hospital's Urology Department provided the setting for the patient recruitment and assessments, including clinical evaluations and diagnostic tests.

Participants

The target population consisted of obese male patients aged between 45 and 85 years, who presented with difficulty urinating for more than one month. Patients were selected based on predefined inclusion and exclusion criteria.

Inclusion Criteria

- Obese male patients (BMI≥30) aged 45-85 years.
- Patients experiencing urination difficulty for more than one month, according to the operational definition of BPH.

Exclusion Criteria

- Patients with a history of chronic conditions such as asthma, chronic obstructive pulmonary disease (COPD), acute coronary syndrome, stroke, chronic liver disease, chronic renal failure, congestive cardiac failure, and endocrine disorders (hypothyroidism, hyperthyroidism, Cushing's disease, pheochromocytoma).
- Patients with urological conditions such as previous transurethral resection of the prostate (TURP), renal, ureteric, or bladder stones, malignancy, or other relevant medical histories.

Variables

The study included both quantitative and qualitative variables:

- **Quantitative Variables:** Age, BMI.
- **Qualitative Variables:** Residence status (urban/rural), diabetes mellitus type II, hypertension, smoking status, and the presence or absence of benign prostatic hyperplasia (BPH).

Data Sources/Measurement

Data was collected using a structured, pre-designed proforma. Participants' demographic details (age, residence), medical history (comorbidities such as diabetes and hypertension), and clinical status (smoking, urination difficulty) were recorded. All patients underwent a transabdominal ultrasound to confirm BPH, adhering to the study's operational definition of BPH.

Measurements were conducted by trained clinicians to ensure consistent data collection. Ultrasound imaging was performed by a certified radiologist, and BPH was diagnosed based on standardized imaging criteria.

Bias

To minimize potential biases, standardized data collection procedures were followed. All participants were assessed under similar conditions, and data collection tools were validated prior to the study. Confounding variables such as age, comorbid conditions (e.g., diabetes and hypertension), and residence status were addressed through stratification and statistical adjustments.

Study Size

The required sample size was determined to be 182 patients. The sample size calculation was based on the prevalence of BPH in obese patients, which was reported to be 36.3%, with a 7% margin of error and a 95% confidence interval. This calculation was conducted using WHO sample size determination software.

Statistical Methods

Data analysis was performed using SPSS version 20. Descriptive statistics, such as mean and standard deviation, were calculated for quantitative variables like age. Frequencies and percentages

were used for categorical variables such as residence status, diabetes mellitus type II, hypertension, smoking status, and BPH status (Yes/No). Stratified analyses were conducted to explore the associations between BPH and factors such as age, residence, diabetes, hypertension, and smoking. The chi-square test or Fisher's exact test was applied as appropriate to assess the relationships between categorical variables. A p-value of ≤0.05 was considered statistically significant.

Results

Participants

A total of 182 participants were enrolled in the study, with a mean age of 64.45 years (SD ± 2.95). The inclusion criteria ensured that all participants were obese, and they were distributed almost equally across three obesity classes: Class 1 (33%), Class 2 (33%), and Class 3 (34%). The majority of participants (72.5%) were diagnosed with benign prostatic hyperplasia (BPH), while the remaining 27.5% did not have BPH. None of the participants were diabetic, and 47.8% had a history of hypertension. Regarding smoking habits, 37.4% of participants were current smokers.

Descriptive Data

The study population exhibited a varied distribution in terms of obesity class, smoking status, and hypertension prevalence. Notably, the prevalence of BPH was higher in Obesity Class 2 (48 participants) and Class 3 (47 participants) compared to Class 1 (37 participants). Similarly, hypertension was present in 47.8% of the participants, while the remaining 52.2% were non-hypertensive. Among smokers, 37.4% reported active smoking habits, and 62.6% were non-smokers.

Outcome Data

Table 2 presents the association of BPH with various factors, including obesity class, smoking status, hypertension, and age. Although the majority of participants with BPH fell into higher obesity classes (Class 2 and Class 3), the relationship between obesity and BPH did not reach statistical significance (p = 0.06). Similarly, the associations between BPH and smoking (p = 0.42), hypertension (p = 0.13), and age (p = 0.648) were not statistically significant.

Main Results

The key finding of the study was that there was no statistically significant association between BPH and obesity (p = 0.06), although the trend suggests a clinically meaningful association, particularly in participants with higher obesity classes. Additionally, there was no significant relationship between BPH and smoking status (p = 0.426), hypertension (p = 0.13), or age (p = 0.64). These results suggest that while obesity, smoking, hypertension, and age may contribute to clinical presentations of BPH, they do not independently predict the presence of BPH in this sample based on the statistical thresholds applied.

Table 1: Demographic and clinical characteristics of study participants and their association with Benign Prostatic Hyperplasia (BPH).

Variables		Total (n=182)	BPH n(%)		p-value
			Yes (n=132)	No (n=50)	
Age Group	60-65 years	119 (65.4)	85 (64.4)	34 (68.0)	0.64
	>65 years	63 (34.6)	47 (35.6)	16 (32.0)	
Hypertension	Yes	87 (47.8)	68 (51.5)	19 (38.0)	0.13
	No	95 (52.2)	64 (48.5)	31 (62.0)	
Smoking Status	Yes	68 (37.4)	47 (35.6)	21 (42.0)	0.42
	No	114 (62.6)	85 (64.4)	29 (58.0)	
Obesity Class	Class 1	60 (33)	37 (28.0)	23 (46.0)	0.06

Class 2	60 (33)	48 (36.4)	12 (24.0)
Class 3	62 (34.1)	47 (35.6)	15 (30.0)

Discussion

Our study found no statistically significant relationship between BPH and obesity, although the clinical relevance of obesity cannot be dismissed, as all cases of BPH occurred in obese individuals. Additionally, no clear associations were identified between BPH and other factors such as smoking, hypertension, diabetes, or age. These findings align with the complex and multifactorial nature of BPH, where obesity may play a role, but other contributing factors are less clear.

Previous research offers mixed conclusions regarding the relationship between obesity and prostate volume. A study by Mampa et al. similarly found no significant correlation between waist circumference (WC) and prostatic volume (PV)[14]. While it is often assumed that increased body mass index (BMI) leads to greater prostate size, both Lee et al. and Kim et al. concluded that BMI does not directly correlate with prostate volume. They suggested that central obesity, indicated by a WC greater than 90 cm, may be a more reliable predictor of prostate growth and lower urinary tract symptoms (LUTS) than general obesity[15,16]. Their multicenter study, conducted across four urology centers in Korea, involved 602 BPH patients and demonstrated that men with a WC greater than 90 cm had significantly larger prostate volumes, but lower PSA levels, than those with a smaller WC. This reinforces the idea that central obesity, rather than overall body mass, may be more influential in prostate enlargement and related symptoms.

Our study also found no significant association between BPH and hypertension, which aligns with findings from Mampa et al.[14] and Li-Peng et al.[17], who reported similar results. This lack of association suggests that while hypertension is a common comorbidity in aging populations, it may not play a direct role in the pathophysiology of BPH. The relationship between smoking and BPH has also been debated, with some studies suggesting that smoking may exacerbate prostate inflammation and contribute to BPH development[18]. However, our study did not find a significant link between smoking and prostate volume. This is consistent with previous findings by Mampa et al.[14] and Platz et al.[21], who also observed no significant impact of smoking on prostate size. Interestingly, Platz et al. proposed that smoking might even have a protective effect by reducing prostate volume[21], though the mechanisms behind this observation remain unclear and warrant further investigation[22].

Similarly, we found no significant association between BPH and age in our study. While it is widely accepted that prostate volume tends to increase with age, our findings are consistent with studies like that of Loeb et al., who reported considerable variability in prostate size among older men, with some experiencing stable or even decreasing prostate volume[23]. This variability in the aging process may explain why age did not emerge as a significant factor in our cohort, as BPH progression may not follow a uniform pattern.

The link between obesity and BPH has led to recommendations advocating for lifestyle modifications, such as weight management and increased physical activity, as part of BPH prevention and treatment strategies [24-26]. However, our findings suggest that while obesity and central adiposity may be clinically relevant to BPH, routine medical management of obesity, particularly in terms of intensive interventions, may have limited efficacy in reducing BPH progression or LUTS severity. This aligns with previous studies that indicate even modest weight loss may not be sufficient to prevent the onset or progression of LUTS[27]. Therefore, while addressing obesity is important for overall health, its direct impact on BPH and LUTS may be more nuanced than previously believed.

Conclusion

While obesity is widely recognized as a risk factor for the development of BPH and LUTS, our study found no direct association between BPH and BMI. However, obesity may still play a role in exacerbating BPH symptoms by increasing intra-abdominal and intravesical pressure. To better understand this complex relationship, further longitudinal studies are needed to investigate how obesity influences LUTS and urinary flow rates over time. Additionally, research should focus on whether aggressive obesity management could lead to meaningful improvements in BPH treatment and symptom relief.

Conflicts of Interest

The author(s) have no conflicts of interest.

Acknowledgement

The authors like to acknowledge the study participants for their contribution.

Funding

None.

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