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# EXPLORING THE CORRELATION BETWEEN PREHYPERTENSION & BMI IN BANK EMPLOYEES

Physiotherapy

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## ABSTRACT

Prehypertension is a significant predictor of future hypertension and heart diseases. The objective of this research is to establish a relationship between body mass index (BMI) and prehypertension among bank employees, as they are more likely to develop prehypertension due to their sedentary lifestyle. A cross-sectional study was conducted on 78 subjects, consisting of 65 males and 13 females. Anthropometric parameters were measured and used to calculate the subjects' body mass index. Blood pressure measurement was done by employing standard methods. The results showed a positive significant correlation between body mass index and blood pressure in both systolic and diastolic cases among male subjects (r = 0.3533 and r = 0.3129). No significant association was observed in females due to fewer subjects. It is evident from the results that body mass index is a significant predictor of prehypertension in both sexes; however, a stronger association is observed in males compared to females.

## KEYWORDS

Bank Employees, Hypertension, Bmi, Blood Pressure.

## INTRODUCTION

Hypertension is a serious public health problem worldwide, and it is a leading risk factor for cardiovascular morbidity and mortality. Prehypertension, where systolic blood pressure ranges from 120-139 mmHg and/or diastolic blood pressure ranges from 80-89 mmHg, is an intermediate level of hypertension that poses a significant risk of developing hypertension and its complications. [1] Therefore, early detection of such individuals is important to prevent complications. The Body Mass Index (BMI) method is a commonly used anthropometric measurement to measure obesity, a well-recognized modifiable risk factor for increased blood pressure [2,3]) The rise in sedentary lifestyle, particularly in bank employees, has led to an increase in overweight and obesity, thereby posing a risk of increased blood pressure.[4,5]Prolonged hours of sitting, work-related stress, and physical inactivity have increased the risk of heart diseases[4,6] Studies have shown a positive correlation between BMI and blood pressure;[7,8,3]however, differences exist in terms of gender and lifestyle factors.[7,8])Therefore, the present study aims to assess the correlation between BMI and prehypertension in bank employees, along with differences based on gender factors.

## AIM:

To determine the correlation between Body Mass Index (BMI) and prehypertension among bank employees.

## OBJECTIVES

To find the correlation between prehypertension and BMI in bank employees.

Study Type & Setting: The study is a cross-sectional study among bank employees.

## SAMPLE SIZE:

The sample size is 78.

## MATERIAL AND METHODOLOGY:

BMI is determined by calculating the weight and height among the study subjects. The blood pressure is determined by measuring the blood pressure among the study subjects.

## INCLUSION CRITERIA:

1.Participant willing to participate in study.
2. Both gender male and female.
3. Bank employees with age group between 25 to 50 years.
4. Individuals with systolic 120 and 139 mmHg. [1]
5. Individuals with diastolic BP 80 and 89 mmHg. [1]
6. Bankers who worked for ≥6 months.

## EXCLUSION CRITERIA:

1.Participants with prior diagnosis of hypertension.
2. Individuals currently taking antihypertensive medications.
3. Participants with heart disease, stroke or severe infections.
4. Pregnant or breast-feeding women
5. Chronic smokers.

## PROCEDURE

The ethical clearance was done by Institutional Ethics Committee of Dr. Ulhas Patil College of Physiotherapy, Jalgaon. Permission and consent were taken from the bank employees. Inclusion and exclusion criteria were applied for selection of the participants. Demographic information and baseline measures were taken. Statistical tests were applied for the purpose of analysis.

### Statistical Analysis

The analysis was performed using INSTAT software. Descriptive analysis was done using the method of Mean and Standard Deviation. A total of 78 employees from banks were considered for the analysis to find the correlation between BMI and prehypertension.

Demographic profile of the study participants

| Anthropometric measures | GENDER | N | Mean | Std. Deviation |
|---|---|---|---|---|
| AGE | Male | 65 | 34.72 | 7.11 |
| | Female | 13 | 31.92 | 5.19 |
| BMI (Kg/m2) | Male | 65 | 25.42 | 4.08 |
| | Female | 13 | 21.91 | 3.38 |
| Systolic BP (mmHg) | Male | 65 | 131.88 | 18.42 |
| | Female | 13 | 118.15 | 14.67 |
| Diastolic BP (mmHg) | Male | 65 | 89.85 | 17.85 |
| | Female | 13 | 76.62 | 10.38 |

### Results

The study included 78 participants (65 males, 13 females). Mean age was higher in males (34.72 ± 7.11 years) than females (31.92 ± 5.19 years). Males showed higher BMI and blood pressure, indicating greater risk of prehypertension and cardiovascular diseases.

**Table-2: Correlation of BMI with SBP and DBP in males**

| Parameters | SBP | | DBP | |
|---|---|---|---|---|
| | *r* | *p* | *r* | *p* |
| Overall (n=78) | 0.3533** Very Significant | 0.0039 | 0.3129** Significant | 0.0112 |
| BMI<18.5 Kg/m$^2$ (n=4) Underweight | -0.1463 | 0.8537 | 0.7098 | 0.2902 |
| BMI (18.5-23 Kg/m$^2$) (n=14) Normal weight | -0.03442 | 0.9070 | -0.1065 | 0.7172 |
| BMI>23 Kg/m$^2$ (n=13) Overweight | -0.1499 | 0.6250 | -0.1090 | 0.7229 |
| BMI 25 & above (n = 34) Obese | 0.2808 | 0.1077 | 0.2155 | 0.2210 |

A significant positive correlation was found between BMI and SBP (r=0.3533, p=0.0039) and DBP (r=0.3129, p=0.0112) in males. No

statistically significant association was found among female participants. Subgroup analysis showed no significant correlation across different BMI categories in males.

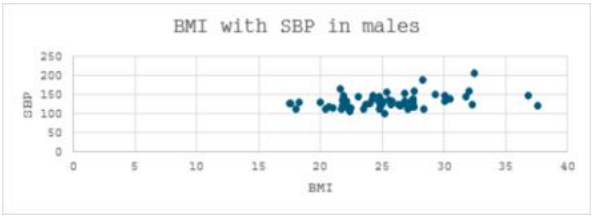


**Figure-1a: Scatter diagram showing correlation of BMI with SBP in male**


**Figure-1b: Scatter diagram showing correlation of BMI with DBP in male**

**Table-3: Correlation of BMI with SBP and DBP in females**

| Parameters | SBP | | DBP | |
|---|---|---|---|---|
| | *r* | *p* | *r* | *p* |
| Overall (n=78) | 0.3090* Not significant | 0.3042 | 0.01328* Not significant | 0,9657 |
| BMI<18.5 Kg/m$^2$ (n=3) Underweight | -0.7979 | 0.4119 | -0.6644 | 0.5374 |
| BMI (18.5-23 Kg/m$^2$) (n=7) Normal weight | 0.4008 | 0.3729 | 0.1009 | 0,8295 |
| BMI 25 & above (n = 3) Obese | -0.4470 | 0.7050 | -0.9135 | 0.2667 |

In females, no significant correlation was found with BMI and SBP from table3 & figure 2a (r = 0.3090, p = 0.3042) and DBP from table 3 & figure 2b (r = 0.01328, p = 0.9657). In addition to this, no significant correlation was found with BMI.

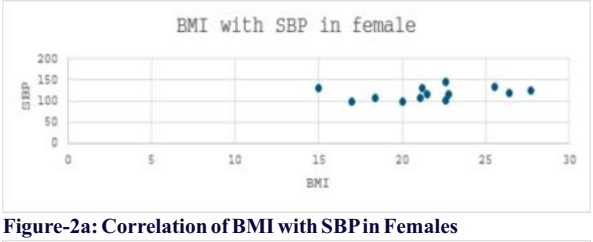


**Figure-2a: Correlation of BMI with SBP in Females**

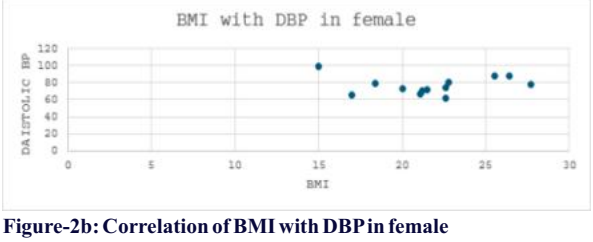


**Figure-2b: Correlation of BMI with DBP in female**

## DISCUSSION:

The present study aimed to evaluate the relationship between prehypertension and Body Mass Index (BMI) among bank workers, an occupational group predisposed to cardiovascular risk factors due to sedentary work patterns. The findings revealed a statistically significant positive correlation between BMI and both systolic blood pressure (SBP) (r = 0.3533) and diastolic blood pressure (DBP) (r = 0.3129) among male participants, whereas no significant association was observed among females.

The positive correlation observed in males is consistent with existing literature identifying BMI as an important predictor of elevated blood pressure [9,10]. Increased adiposity contributes to hypertension through mechanisms such as activation of the sympathetic nervous system, increased vascular resistance, insulin resistance, and altered renal sodium handling. These changes lead to increased cardiac output and peripheral resistance, thereby elevating blood pressure levels.

The findings are in agreement with Bhala et al. (2021) [9] who reported a higher prevalence of prehypertension among overweight and obese individuals, particularly males. Similarly, Ghosh et al. (2016) [10] demonstrated a strong association between BMI, physical inactivity, and prehypertension among working professionals. Kulkarni et al. (2019) [11] also observed a high prevalence of overweight and obesity among bank employees, highlighting their susceptibility to metabolic and cardiovascular disorders. The present study extends these findings by showing that elevated BMI is significantly associated with increased blood pressure among male bank workers, emphasizing the need for workplace interventions promoting physical activity and weight management.

Furthermore, the observed association aligns with Yang et al. (2007) [12] who highlighted the role of weight gain in increasing the risk of prehypertension. This reinforces the concept that increased body weight directly contributes to elevated blood pressure and underscores the importance of maintaining an optimal BMI.

However, the correlation was not statistically significant among female participants. This may be attributed to the relatively small sample size of females (n = 13), which may have limited the statistical power and increased the likelihood of Type II error. Physiological factors may also explain this finding. Premenopausal females benefit from the protective effects of oestrogen, which promotes vasodilation and improves endothelial function, thereby reducing vascular resistance.

Differences in fat distribution patterns may further contribute to gender differences. Females typically exhibit a gynoid pattern of fat distribution, characterized by subcutaneous fat accumulation, whereas males tend to accumulate visceral fat, which is more strongly associated with cardiovascular risk. Since BMI does not account for fat distribution, it may not accurately reflect cardiovascular risk in females.

Some studies, including Gupta et al. (2010) [13] Bansal et al. (2012) [14] and Tesfaye et al. (2007) [15] have reported a significant association between BMI and blood pressure in females. However, variations in sample size, demographics, and lifestyle factors may explain the discrepancy. Supporting this, Das et al. (2015) [16] and Choudhary et al. (2017) [17] noted that the association in females is often weaker and may not reach statistical significance. Kaur et al. (2014) [18] further emphasized that hormonal status, age, and lifestyle factors can influence this relationship.

The present study has certain limitations. The sample size was relatively small, particularly among females. Additionally, lifestyle factors such as diet, stress, and physical activity were not assessed in detail and may have acted as confounders. The reliance on BMI alone, without considering measures of central obesity such as waist circumference, is another limitation.

Despite these limitations, the findings support existing evidence of a positive association between BMI and blood pressure, particularly among males.

## CONCLUSION

The study found a significant positive correlation between BMI and blood pressure among male bank workers, while no significant association was observed in females. These findings highlight the importance of maintaining a healthy body weight and active lifestyle to reduce the risk of prehypertension and cardiovascular diseases.

### Declaration by Authors

Ethical Approval: Ethical clearance for this study was obtained from the Institutional Ethics Committee. Informed consent was collected from all participants prior to their involvement and prior to publication of the findings.

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