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## Research Article

# To Study Relationship Between Body Mass Index And Hypercholesterolemia

Saraswati M. Thapa<sup>1\*</sup>, Janvi Kachhia<sup>1</sup>, Ameer Upadhyay<sup>1</sup>, Jignasa Mansuriya<sup>2</sup>

<sup>1</sup>Sardar Patel University

<sup>2</sup>Assistant professor of BN Patel institute of paramedical and science affiliated to Sardar Patel University, Vallabh Vidhyanagar -388120 Gujarat, India

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### ABSTRACT

Obesity and overweight are a disorder of unusually increased body fat generally resulting in increased intake relative to energy expenditure and is primary sustenance related disorder globally. This also leads to disorder that can increase the occurrence of hypercholesterolemia. Modern and sedentary lifestyle tends to diet increase in calories, fat and risk factors for this problem. A person can be categorised as based on body mass index calculation. Body mass index is calculated by dividing a person's height in meters (or feet) by their weight in kilograms [1]. The purpose of this study is to determine relationship between body mass index and serum total cholesterol level in students at BN Patel institute of paramedical and science, BN Patel college of physiotherapy and BN Patel college of nursing Anand. Total 103 subjects were included in the study, out of that 51 were male and 52 were female of different age group from 17 years to 26 years of age.

### INTRODUCTION

Overweight and obesity are characterized by abnormal or excessive fat buildup that may have negative health effects [1]. The fundamental cause of this remarkable shift is the growing epidemics of diabetes, cardiovascular disease, and obesity. Of all of these, obesity has grown into a massive pandemic that poses a major threat to public health and is responsible for 2.6 million deaths yearly

worldwide [2]. Obesity in early adulthood has an adverse effect on social and cognitive development as well as self-esteem. With the rise in the incidence of obesity, diseases like type 2 diabetes mellitus, hypertension, and hypercholesterolemia—which were previously only observed in adults—are becoming more prevalent among adolescents. Obesity in early adulthood itself is predictive of obesity in

\*Corresponding Author: Saraswati M. Thapa

Address: Sardar Patel University

Email ✉: [saraswatithapa7794@gmail.com](mailto:saraswatithapa7794@gmail.com)

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adulthood as well as higher than anticipated adult morbidity and death. Preventing obesity in early adulthood has become a public health priority due to the challenges associated with treating adult obesity and the numerous long-term negative impacts of obesity [3]. According to WHO body mass index is a simple index of weight to height used to classify underweight, overweight and obese person. Obesity is increase in body weight beyond the limit of skeletal and physical needs due to the accumulation of excessive body fat [4]. Obesity can be caused by eating large amount of junk food, sedentary lifestyle, drinking alcohol, smoking, pregnancy etc. There are 2 types of obesity exogenous and endogenous [5]. It is also due to increased cholesterol level. They are esters of fatty acid, insoluble in water but soluble in other chloroform and other fat solvents. Increased level of serum cholesterol level can cause several kinds of issues, including congestive cardiac failure, hypercholesterolemia dyslipidaemia etc [4]. Deceased in plasma cholesterol concentration in blood plasma is called hypocholesterolaemia. It is less common and is caused by pernicious anaemia, malabsorption syndrome, inherited condition, hyperthyroidism, chronic inflammation, use of drugs, and malignancy [6]. Whereas hypercholesterolemia is increased level of cholesterol level in blood. It is rare but can be fatal. It is caused by diabetes mellites, lack of exercise, anorexia, tobacco product, medication, hypothyroidism etc [7]. Hypercholesterolemia can be of both familial and acquired. hypercholesterolemia can be treated by bringing down cholesterol level to prevent heart disease. There are various ways to lower down high cholesterol level [8]. Increased low-density lipoprotein (LDL) cholesterol is a primary risk factor that contributes to the development of atherosclerotic plaques. The presence of these plaques increases the risk of several detrimental clinical consequences, such as coronary artery

disease. PAD aortic aneurysms, and stroke.[9] Research have been initiated to examine if there is relationship between BMI and total cholesterol in student at BN Patel college Anand.

## MATERIAL AND METHODOLOGY

After obtaining participants approval following test were conducted. Total of 103 subjects were taken from age group of 17-26 years. The anthropometric measurements have been taken that include persons height, weight, and body mass index. Anthropometric measurement was calculated as weight (kg) / height (m<sup>2</sup>). Body mass index was classified into 6 groups that are underweight, normal, overweight, obese I, obese II and obese III. For biochemical studies blood samples were taken from the median cubital vein and placed in plain – clot activator vacutainer (4ml). Serum was separated by centrifugation at 1500rpm for 5 minutes. Serum cholesterol level was estimated using RX-50 semi-automated biochemistry analyser by CHOD-POD method.

## RESULT

**Table 1: Distribution of subjects based on gender.**

Respondents	N (no. of subjects)	Percentage (%)
Male	51	49.51%
Female	52	50.48%
Total	103	100

Table 1 shows distribution of subjects based on their gender. Out of 103 subjects the number of males were 51 (49.51%) and female were 52 (50.48%).

**Table 2: BMI based on gender criteria between male and female. (N=103)**

	Obese	Overweight	Normal	Total
Male	7	12	32	51
Female	4	6	42	52
Total	11	18	74	103

Table 2 shows frequency distribution of body mass index based on gender criteria. The result shows that total no. of participants of male were 51 out of that 32 were normal, 12 were overweight, obese



were 7. The female participants were 52 out of that 42 were normal, 6 were overweight, obese were 4.

**Table 3: Relationship between anthropometric parameter and cholesterol level.**

	Male	Female	Total
Height (Cm)	170.12 (±6.49)	154.69 (±6.04)	162.40 (±0.090)
Weight (Kg)	68.66 (±16.82)	52.88 (±10.88)	59.76 (±4.19)
BMI	23.71(±5.79)	22.20 (±4.51)	22.95 (±0.90)

Table 3 shows relationship between anthropometric parameter and cholesterol level. The result shows mean height of male is 170.1 (±6.49) mean weight is 68.66 (±16.82) total BMI is 23.7196 (±5.79) and total cholesterol is 164.48 (±48.15). Mean height of female subjects is 154.69 (±6.04), mean weight of is 52.88 (±10.88) and mean BMI is 22.20 (±4.51) and mean cholesterol is 149.28 (±39.39). The total mean of both male and female height is 162.40 (±0.090), mean weight is 59.76 (±4.19), mean BMI is 22.95 (±0.90) and cholesterol is 156.88 (±6.19).

**Table 4: Variation of mean cholesterol level (in mg/dl) with different group of BMI.**

BMI	Male		Female		Total	
	N	TC	N	TC	N	TC
Underweight (<18.5)	9	137.26±21.31	9	128.05±24.67	9	132.66±22.86
Normal (18.5-24.9)	23	167.17±52.59	33	144.25±39.52	56	153.83±46.41
Overweight (25.0-29.9)	12	157.51±32.33	6	184.41±40.76	18	167.00±37.59
Obese (>30.0)	7	146.74±54.51	4	178.76±43.31	11	158.38±53.88

Table 4 shows variation of mean cholesterol level (in mg/dl) with different group of BMI of 103 subjects who are included in underweight, normal, overweight and obese category. Here mean cholesterol level of underweight subjects are 132.66±22.86, normal subject cholesterol is 153.83±46.41, overweight subjects' cholesterol is 167.00±37.59 and obese subjects has 158.38±53.88 level.

## DISCUSSION

In this current content, the study of relationship between body mass index and hypercholesterolemia of 103 subjects were taken in which males were 51 and female were 52. Out of that the mean cholesterol level (in mg/dl) with different group of BMI are underweight subjects (<18.5) cholesterol level are 132.66±22.86, normal subject (18.5-24.9) cholesterol is 153.83±46.41, overweight subjects (25.0-29.9) cholesterol is 167.00±37.59 and obese subjects (>30.0 or greater) has 158.38±53.88 level. Hence Mean ±SD of cholesterol level is different.

## CONCLUSION

The result that is obtained after performing both anthropometric and biochemical test shows males has greater level of cholesterol as compared to female. But female subjects are more prone to obesity with majority level of normal cholesterol.

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