

Original Article

Assessment of independent predictors of obesity

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ABSTRACT:

Background: Obesity is defined as a disease in which excess body fat has accumulated in such a way that health may be negatively affected. The present study was conducted to assess independent predictors of obesity. **Materials & Methods:** 120 subjects of both genders were included. Height, Weight and Body mass index was calculated by the formula; weight (kg)/height (m²). Waist circumference (WC), Hip circumference (HC), Waist hip ratio and blood pressure was measured. **Results:** The mean age was age (years) was 41.2, 38.5 and 40.2, weight (Kgs) was 65.4, 70.5 and 84.2, height (cm) was 157.5, 160.2 and 159.4, BMI (Kg/m²) was 22.3, 27.4 and 33.5. Male gender was 30, 33 and 18, WC (cm) was 89.2, 96.5 and 105.2, HC (cm) was 95.0, 100.2 and 108.2, SBP (mm Hg) was 128.2, 130.2 and 135.4, DBP (mm Hg) was 90.3, 89.7 and 90.5 in non-obese, over- weight and obese subjects respectively. The among the non- obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference, waist hip ratio. There was no significant correlation with age, height. Among the overweight subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference. Among the obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference and a mild negative correlation with the height observed. **Conclusion:** The anthropometric marker BMI, WC, HC and WHR were independently associated with obesity.

Key words: obesity, Hip circumference, Waist hip ratio

Received: 18 June, 2021

Accepted: 24 July, 2021

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This article may be cited as: Rehman MH, Jaiswal M. Assessment of independent predictors of obesity. J Adv Med Dent Scie Res 2021;9(8):139-142.

INTRODUCTION

Obesity is defined as a disease in which excess body fat has accumulated in such a way that health may be negatively affected.¹ Obesity results from an energy imbalance where energy intake has exceeded over a considerable period. Now-a-days, obesity has become the biggest health problem, which affects a person physically, psychologically and also has become an epidemic in many parts of the world.²

Recent results of the health surveys show obesity is more common in children and adults of low socioeconomic status. Information about education, occupational status, and net household income is used to measure the socioeconomic status; the same methodology was followed in our study to reveal socioeconomic differences affecting the occurrence and prevalence of overweight and obesity.³ Thus, obesity has become one of the most common health

problems of the 21st century, as it will contribute significantly to the high prevalence of cardiovascular disease in developing countries. Obesity is a serious health issue and predisposes individuals to an increased risk of morbidity and mortality from conditions such as diabetes and hypertension.⁴ Several reports suggested that Indians tend to have increased waist circumference, also have excess body fat, truncal and abdominal adiposity for any given Body Mass Index. Similarly, for any given waist circumference, they have excess body fat accumulation, as well as for any given body fat, they have increased insulin resistance.⁵ The present study was conducted to assess independent predictors of obesity.

MATERIALS & METHODS

The present study was conducted among 120 subjects of both genders. The written consent was obtained from all subjects.

A detailed personal history was obtained. A complete physical examination was performed. Height was measured using stadiometer with the help of a fixed scale. Body mass index was calculated by the formula; weight (kg)/height (m²). Waist circumference (WC) was measured mid-way between iliac crest and lowermost margin of the ribs. Hip circumference (HC) was measured at the maximum

protruding part of buttocks at the level of the greater trochanter while keeping the feet together. Waist hip ratio was calculated with the help of the formula WC (cm.)/HC (cm.). Blood Pressure was measured by a manual mercury sphygmomanometer. All the recruited subjects were grouped in to three categories non-obese, over weight and obese as per the WHO guidelines. The WHO guidelines; BMI 30 kg/m² obese. Results were statistically assessed using Mann Whitney U test. P value less than 0.05 was considered significant.

RESULTS

Table I Demographic data

Parameters	Non-obese (40)	Over- weight (50)	Obese (30)	P value
Age (years)	41.2	38.5	40.2	0.71
Weight (Kgs)	65.4	70.5	84.2	0.001
Height (cm)	157.5	160.2	159.4	0.09
BMI (Kg/m ²)	22.3	27.4	33.5	0.02
Male gender	30	33	18	0.15
WC (cm)	89.2	96.5	105.2	0.02
HC (cm)	95.0	100.2	108.2	0.01
SBP (mm Hg)	128.2	130.2	135.4	0.82
DBP (mm Hg)	90.3	89.7	90.5	0.91

Table I shows that mean age was age (years) was 41.2, 38.5 and 40.2, weight (Kgs) was 65.4, 70.5 and 84.2, height (cm) was 157.5, 160.2 and 159.4, BMI (Kg/m²) was 22.3, 27.4 and 33.5. Male gender was 30, 33 and 18, WC (cm) was 89.2, 96.5 and 105.2, HC (cm) was 95.0, 100.2 and 108.2, SBP (mm Hg) was 128.2, 130.2 and 135.4, DBP (mm Hg) was 90.3, 89.7 and 90.5 in non-obese, over- weight and obese subjects respectively. The difference was significant (P< 0.05).

Graph I Demographic data

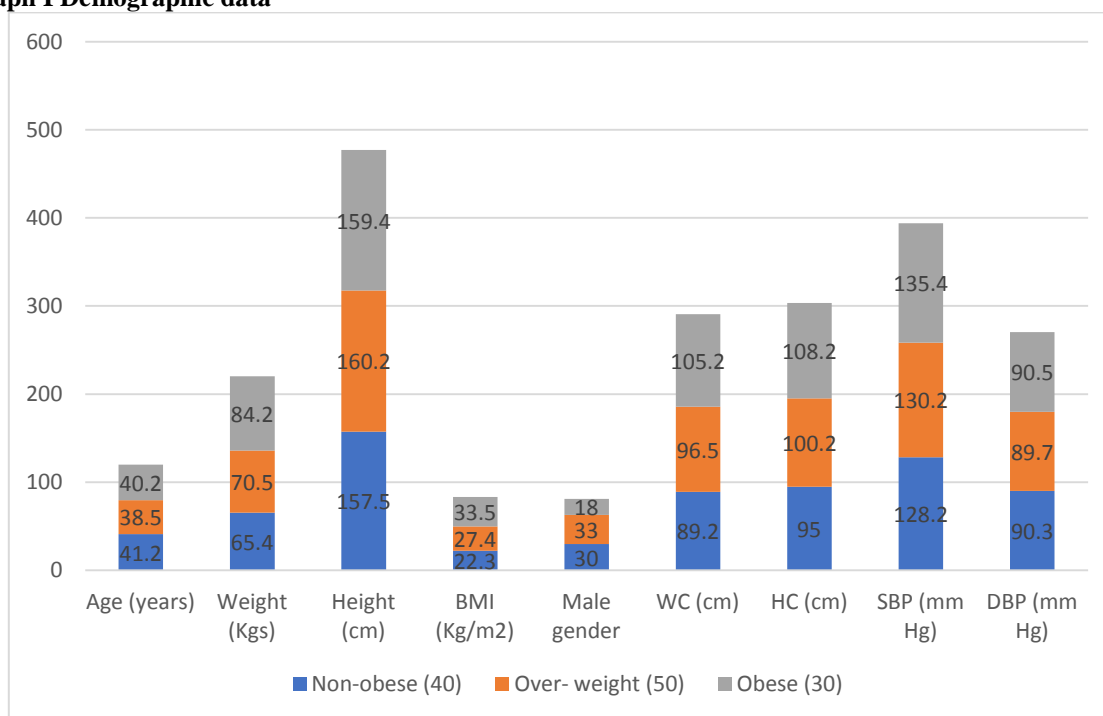


Table II Correlation of body mass index with anthropometric parameters among subjects

Parameters	Value	Non-obese (40)	Over- weight (50)	Obese (30)
Age (years)	r	-0.081	-0.072	-0.065
	p	0.12	0.15	0.18
Weight (Kgs)	r	0.671	0.441	0.412
	p	0.01	0.01	0.01
Height (cm)	r	0.12	0.023	-0.182
	p	0.231	0.74	0.05
WC (cm)	r	0.435	0.215	0.451
	p	0.001	0.001	0.001
HC (cm)	r	0.223	0.215	0.541
	p	0.05	0.02	0.01
Waist hip ratio	r	0.341	0.01	0.054
	p	0.002	0.841	0.146

Table II shows that among the non- obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference, waist hip ratio. There was no significant correlation with age, height. Among the overweight subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference. Among the obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference and a mild negative correlation with the height observed.

DISCUSSION

The global status of obesity has shown an epidemic trend in many developed countries. The same phenomenon is now being observed in developing countries.⁶ Changes in the world food system have involved developing countries in a nutritional transition characterized by westernized diet and an increasingly sedentary lifestyle.⁷ Because of the accelerated nutritional transition and globalization, it is now noted that in developing countries obesity and overweight are found in both poor and rich population.⁸ Socioeconomic factors influence the occurrence of overweight and obesity in a given population. Recent studies have shown that, in countries with a western-type lifestyle, economically weaker sections and socially disadvantaged groups are more often affected by obesity than are relatively well-to-do individuals.⁹ The present study was conducted to assess independent predictors of obesity. In present study, mean age was age (years) was 41.2, 38.5 and 40.2, weight (Kgs) was 65.4, 70.5 and 84.2, height (cm) was 157.5, 160.2 and 159.4, BMI (Kg/m²) was 22.3, 27.4 and 33.5. Male gender was 30, 33 and 18, WC (cm) was 89.2, 96.5 and 105.2, HC (cm) was 95.0, 100.2 and 108.2, SBP (mm Hg) was 128.2, 130.2 and 135.4, DBP (mm Hg) was 90.3, 89.7 and 90.5 in non-obese, over- weight and obese subjects respectively. Mandeshia et al¹⁰ found that weight, body mass index, waist circumference, hip circumference and waist hip ratio were significantly different among the groups (p=0.0001). Among the obese subjects the body mass index was positively correlated with the weight, WC, and HC. There was no additional, clinically relevant information obtained after measuring different anthropometric profile together with BMI.

We found that among the non- obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference, waist

hip ratio. There was no significant correlation with age, height. Among the overweight subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference. Among the obese subjects the body mass index was positively correlated with the weight, waist circumference, hip circumference and a mild negative correlation with the height observed. Al-Qahtani et al¹¹ found that data on body mass index (BMI) measurement was recorded for 1649 out of 1681 participants (98.1%). The overall mean weight was 74.1 ± 15.81 kg; and that for men was 77.69 ± 16.14 kg vs. 69.37 ± 14.02 kg for women with significant statistical difference of p < 0.001. The overall prevalence of overweight and obesity was, respectively, 38.3% and 27.6%. Smoking was not significantly associated with obesity, whereas hypertension was significantly associated with obesity. The risk of overweight or obesity significantly increased from the highest to the lowest monthly income; it passed from 1.67 CI 95% = [1.24-2.25] within the category 5000-7000 SAR to 2.23 CI 95% = [1.71-2.90] within the category less than 5000 SAR.

Dorn et al¹² investigated the long-term relation between body mass index (BMI) and mortality from all causes and from specific causes in the general population. A 29-year follow-up study was conducted in a random sample of white men (n = 611) and women (n = 697) aged 20-96 years. At baseline, height and weight were determined by self-report. BMI was calculated as weight (kg)/height (m²). With the Cox proportional hazards model and adjustment for age, education, and cigarette smoking, a significant linear association was found between BMI and all-cause mortality in men less than age 65 years at baseline (relative risk (RR) = 1.06, 95 percent confidence interval 1.02-1.09), but not in women (RR = 1.02, 95 percent confidence interval 0.99-1.05). In men age 65 years and older, the relation was quadratic

in form ($p = 0.02$), with the lowest risks appearing in the BMI range of 23-27. BMI was most strongly related to cardiovascular disease (CVD) and coronary heart disease mortality in women and younger men. No such associations were observed in older men. BMI was not related to an increased risk of death from non-CVD or cancer in either sex.¹²

CONCLUSION

Authors found that the anthropometric marker BMI, WC, HC and WHR were independently associated with obesity.

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