ECRONICON OPEN ACCESS

EC DIABETES AND METABOLIC RESEARCH
Research Article

Burden of Obesity in Sedentary Jobs

Brijesh Mukherjee[1]* and Gargi Sarangi[2]

[1]*Associate Professor (Biochemistry), Hi-tech Medical College and Hospital, Rourkela, Odisha, India*

[2]*Consultant Physician, Sambandh Finserve Private Limited, Rourkela, Odisha, India*

***Corresponding Author:** Brijesh Mukherjee, Associate Professor, Department of Biochemistry, Hi-tech Medical College and Hospital, Rourkela, Odisha, India.

Received: March 20, 2019; **Published:** July 29, 2019

Abstract

Introduction: Obesity is a disease that adversely affects mortality, morbidity, and quality of life (QOL), as a result of its associated complications, like cardiometabolic, mechanical and lifestyle based. The health risks include diabetes, cardiovascular disease (CVD), hypertension, dyslipidemia, sleep apnea, musculoskeletal disease, infertility, and dementia. Moderate weight loss (5 - 10%) has been associated with improvements in these obesity-related comorbidities.

Objectives: With an aim to estimate the frequency of overweight and obesity in the adult population with sedentary lifestyle, a camp was organized at a private firm to screen the employees.

Materials and Methods: A total of 218 individuals were selected for analysis. Height, weight, pulse, blood pressure (BP), waist circumference, and body mass index (BMI) were measured. Plasma fasting sugar and fasting serum lipid profile were analyzed.

Results: The frequency of normal BMI in the study population was found to be 27.5%. The total frequency of overweight subjects was 48.6% and that of obese subjects was 23.9%. The raised BMI could be significantly associated with high blood pressure, waist circumference, diet and exercise as well as glycemic status. All lipid parameters except HDL depicted significant odds ratio (OR) and thus predicted the risk factor for obesity.

Conclusion: Obesity has assumed an epidemic proportion and necessary intervention are important to prevent morbidity and mortality.

Keywords: *Obesity; Dyslipidemia; Hypertension*

Introduction

World Health Organization (WHO) defines obesity as body mass index (BMI) greater than or equal to 30 kg/m^2. BMI is calculated by dividing the body weight in kilograms (kg) by the square of the height in meters (m).

- Worldwide obesity has nearly tripled since 1975.
- Most of the world's population lives in countries where overweight and obesity kills more people than underweight.
- 41 million children under the age of 5 were overweight or obese in 2016. Over 340 million children and adolescents aged 5 - 19 were overweight or obese in 2016.
- In 2016, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 650 million were obese.
- 39% of adults aged > 18 years were overweight and 13% were obese.

Worldwide, the highest percentage of obese seen in Cook Islands of Australia, followed by Middle Eastern countries (like Qatar, Kuwait) and developed countries like United States of America, Australia, Canada, and New Zealand. In India, 11.0% of men and 15.0% of women are obese. The state of Punjab has a maximum percentage of obese, female being 30%, and male being 22% of general population.

Obesity is generally caused by physical inactivity rather than consuming more calories, for example, spending lots of time sitting down at desks, on sofas, watching TV, using lift rather than stairs, or in the car; children playing indoor games more than outdoor, use of mobile

and a computer at peak. Obesity is an increasingly common problem because of our lifestyle which involves eating excessive amounts of high-calorie food and particularly those which are fatty and sugary. Processed foods and some high energy foods are cheaper than fruits/vegetables. Fast food meals have tripled its frequency, leading to quadrupling risk of obesity. The excess energy is stored by the body as fat.

BMI of 30 to 35kg/m^2 reduces life expectancy by 2 to 4 years, while severe obesity reduces life expectancy by 10 years. For individuals aged between 30 and 42 years, the risk of death increases by 1% for each 0.5 KG weight rise. For individuals between the ages of 50 and 62, this figure becomes 2% for each 0.5 KG weight rise.

Objectives of the Study

With an aim to screen for obesity, in the adult population of Rourkela city and estimate the frequency of overweight and obesity cases in the community involved in sedentary jobs, a camp was arranged in a private firm.

Materials and Methods

A camp was organized at Sambandh Finserve Private Limited, Rourkela after obtaining prior permission of the management of the firm. Most of the employees of the firm were involved in desk jobs with minimal physical activity. Concise instructions and preparatory information (overnight fasting of 8 hours) inscribed in pamphlets, in Odia and English, were distributed among all the employees. This camp was approved by our Institutional Ethics Committee.

A total of 218 individuals got enrolled for the camp. All individuals were asked to sign the informed consent form after registration. Height, weight, and waist circumference were measured, and BMI was calculated for all of them. Pulse and BP were measured by manual sphygmomanometer in sitting position.

Fasting plasma glucose and serum lipid profile (cholesterol, TG, HDL) were estimated immediately after in automated analyzer (Erba Manheim EM 200) and HbA1c in D10 hemato analyzer. The LDL was calculated by Friedewald's method.

Desirable ranges for the variables measured were as per Atherosclerotic Cardiovascular Disease Risk Categories given in table 1 [1].

Variables	Desirable range
Waist circumference	Men: < 94 cm; Women: < 80 cm
BMI	18.5 - 24.9 kg/m^2
Pulse	60-90 bpm
BP	< 130/80
FPG	< 100 mg/dl
HbA1c	< 5.7%
Serum cholesterol	< 200 mg/dl
Serum TG	< 150 mg/dl
Serum LDL	< 130 mg/dl
Serum HDL	> 50 mg/dl
Serum VLDL	< 30 mg/dl

Table 1: *Desirable range for the measured variables.*

Statistical analysis was performed using Graph Pad Prism. Causal relationship between the variables was determined by chi-square (χ^2) test. The OR with 95% confidence interval (CI) was estimated using logistic regression predicting the factors associated with obesity. For two-tailed p-values of < 0.05 were considered significant, with 95% CIs.

Results

The data analysis revealed that 67.9% (n = 148) of the participants were young adults of age group less than 40 years. The frequency of overweight was calculated to be 48.6% (106/218) in this community (Table 2). The incidence of obesity was observed to be 23.9% (52/218).

Dependent variables according to BMI in kg/$^{m}2$	Frequency	Percentage
Normal (18.5 - 24.9)	60 (n = 218)	27.5
Overweight (25.0 - 29.9)	106 (n = 218)	48.6
Obese (≥ 30.0)	52 (n = 218)	23.9

Table 2: *Distribution of study population according to body mass index (BMI).*

The mean age of participants was 37.4 ± 11.1 years, frequency of hypertension was 40.82%, 53.67% had greater waist circumference, and 28.4 were hyperglycemic, of which 11% (n = 24/158) were diabetic. Addiction history was positive in 41.28% cases and the diet of 68.8% study subjects were found to be mixed.63.3% subjects did not do any exercise. Dyslipidemia was represented in 57.5% of the study population.

The χ^2 test in table 3 revealed that blood pressure, waist circumference, diet and exercise have a significant ($p < 0.05$) difference in proportion within each group.

Variable	Normal	Overweight	Obese	Total	p-value
Age group in years					
20 - 40	40	76	32	148	
> 40	20	30	20	70	0.4256
Gender					
Males	38	60	30	128	
Females	22	46	22	90	0.7453
BP (mm Hg)					
Normotensive	47	55	27	129	
Hypertensive	13	51	25	89	0.0019
Waist circumference (cm)					
Normal	50	30	21	101	
High	10	76	31	117	< 0.0001
Diet					
Vegetarian	10	42	16	68	
Mixed	50	64	36	150	0.0091
Addiction history					
Positive	20	44	26	90	
Negative	40	62	26	128	0.2022
Exercise					
Yes	40	30	10	80	
No	20	76	42	138	< 0.0001
Glycemic status					
Normoglycemic	50	80	26	156	
Prediabetes	7	20	11	38	
Diabetes	3	6	25	24	0.00029

Table 3: *Percentage distribution of obesity status by physiological characteristics and glycemic status by chi-squared test.*

**p < 0.05 significant difference.*

The patient with diabetes and prediabetes have high risk for obesity (p = 0.00029).

As shown in table 4, associated hyperlipidemia increases the risk for obesity. Highest risk was associated with cholesterol and least with HDL.

Variables	Odds ratio	95% CI Lower	95% CI Higher	p-value
Total cholesterol (mg/dl) Desirable (< 200) Moderate and high risk (≥ 200)	3.75	2.75	5.11	< 0.01**
TG (mg/dl) Desirable (< 150) Moderate and high risk (≥ 150)	3.18	2.43	4.16	< 0.01**
HDL (mg/dl) Desirable (≥ 50) Moderate and high risk (< 50)	1.76	1.25	2.47	0.12
LDL (mg/dl) Desirable (< 129) Moderate and high risk (≥ 129)	3.28	2.46	4.37	< 0.01**

Table 4: *Lipid profile association with BMI.*

*(Logistic regression, *p < 0.05 significant difference).*

Pearson correlation analysis demonstrated significant positive correlation between obesity with BP (p = 0.0077), waist circumference (p < 0.001), plasma glucose (p = 0.0011), TC (p = 0.0181) and TG (p = 0.0381) as tabulated in table 5.

BMI	Pearson correlation	Significance (two tailed)	n
Age	0.12	0.077	218
Pulse	0.10	0.141	218
BP	0.18	0.0077*	218
BMI	1		218
Waist circumference	0.27	< 0.001**	218
Plasma glucose	0.22	0.0011*	218
Cholesterol	0.16	0.0181*	218
TG	0.14	0.0381*	218
LDL	0.11	0.1053	218
HDL	-0.08	0.2395	218

Table 5: *Pearson correlation between BMI and physiological and biochemical parameters.*

**p < 0.05 significant difference.*

Discussions

The prevalence of overweight (48.6%) and obesity (23.9%) recorded in the present study are more than to 36.0% and 6.5% for overweight and obesity, respectively, reported among senior civil servants in Kuala Lumpur [2] and 33.4% for overweight/obesity reported among white collar employees in Nepal [3].

Previously, higher lipid profile and obesity have been reported among hypertensive Nigerians [4] which was similar in our study. The positive correlations observed between the lipids and BMI were in corroboration with previous studies [5,6] and reaffirmed the role of lipids in the pathophysiology of overweight and obesity.

Patients with type 2 diabetes have increased risk of cardiovascular disease associated with atherogenic dyslipidaemia [7]. This signifies that individuals having diabetes-associated obesity are more prone to develop cardiovascular disease than obese non-diabetic individuals. It has been well documented that high levels of cholesterol and LDL play a significant role in the development of arteriosclerosis and hence coronary artery disease [8,9]. We found out that diabetics and prediabetics are at more risk for obesity which increases the risk of CVD in the subjects.

Our study showed that diet played an important role in obesity which is again in accordance to different studies all over the world. The role of addiction (smoking, alcohol) in obesity was confirmed in our study.

Prevention is the key to controlling the obesity epidemic. The various prevention strategies recommended by the WHO include; a universal or public health approach directed at all members of a community; a selective approach directed at high-risk individuals and groups; and a targeted approach directed at individuals with weight-related problems and those at high risk of diseases associated with overweight and obesity. Of these the population-wide obesity prevention programs have a greater potential of stemming the obesity epidemic and being more cost-effective than the clinic-based treatments [10].

Conclusion

India is going through an economic development along with nutrition transition and experiencing an increase in the prevalence of obesity and obesity-related illnesses. There is the need now, more than ever, to set up a multi-sectoral taskforce to assess the national prevalence, trends, determinants and impact of obesity and its related NCDs (non-communicable diseases) on the society as a whole and on health care provision in the country.

Bibliography

1. Jellinger PS., *et al*. "American Association of Clinical Endocrinologists' Guidelines for Management of Dyslipidemia and Prevention of Atherosclerosis: executive summary". *Endocrine* 18.2 (2012): 269-293.

2. Liew YM., *et al*. "Health status of senior civil servants in Kuala Lumpur". *Medical Journal of Malaysia* 52.4 (1997): 348-366.

3. Simkhada P., *et al*. "Knowledge, attitude, and prevalence of overweight and obesity among civil servants in Nepal". *Asia Pacific Journal of Public Health* 23.4 (2011): 507-517.

4. Idemudia JA and Ugwuja EI. "Plasma lipid profiles in hypertensive Nigerians". *Internet Journal of Cardiovascular Research* 6.2 (2009): 6.

5. Akpa MR., *et al*. "Lipid profile of healthy adult Nigerians in Port Harcourt, Nigeria". *Nigerian Journal of Medicine* 15.2 (2006): 137-140.

6. Hajian-Tilaki KO and Heidari B. "Prevalence of obesity, central obesity and the associated factors in urban population aged 20 - 70 years, in the north of Iran: A population-based study and regression approach". *Obesity Reviews* 8.1 (2007): 3-10.

7. Toth PP. "Effective management of the type 2 diabetes patient with cardiovascular and renal disease: Secondary prevention strategies after a myocardial infarction". *Current Diabetes Reviews* 8.3 (2012): 219-228.

8. Pyörälä K., *et al*. "Diabetes and atherosclerosis: An epidemiologic view". *Diabetes/Metabolism Reviews* 3.2 (1987): 463-524.

9. Kannel WB. "Lipids, diabetes, and coronary heart disease: Insights from the Framingham Study". *American Heart Journal* 110.5 (1985): 1100-1107.

10. World Health Organisation. "Obesity: preventing and managing the global epidemic: report of a WHO consultation". Geneva. WHO Technical Report Series 894 (2000).

Volume 3 Issue 4 August 2019