ORIGINAL ARTICLE

FREQUENCY OF DYSLIPIDEMIAS IN NONDIABETIC, NORMOTENSIVE OBESE SUBJECTS

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ABSTRACT

Background and Objective: Obesity is now considered as an emerging epidemic worldwide. It is associated with dyslipidemias and is considered independent cardiovascular risk. The objective of the study was to determine the frequency of dyslipidemias in normotensive and non-diabetic obese subjects.

Methods: A descriptive study of case series was conducted at Fatima Memorial Hospital Medical Outpatient Department from 01-01-2015 to 30-06-2015. Fifty obese non-diabetic participants with normal blood pressures were included in this study. Body weight in kilograms and height in centimeters was measured to calculate Body Mass Index (BMI) and Waist Hip circumference was also measured. All study participants were investigated for fasting lipid profile.

Results: The mean age of the participants was 43.02 ± 7.90 years. The mean BMI was 35.23 ± 4.42. The mean Waist circumference was 95.68 ± 18.67 cms. The mean Hip circumference was 103.02 ± 20.04 cms. The mean Waist/Hip ratio of the participants was 0.93 ± 0.05. 36/50 (72%) participants had > 200 mg/dl total cholesterol, 33/50 (66%) participants with > 150 mg/dl triglycerides, 27/50 (54%) participants with > 130 mg/dl low density lipoproteins – cholesterol and 21/50 (42%) participants with < 40 mg/dl high density lipoproteins – cholesterol. There were 42/50 (84%) subjects having dyslipidemia only 08/50 (16%) participants were without any deranged lipid profile. The statistical test between two percentages was significant with p value < .03.

Conclusion: It is concluded from the study that non-diabetic, normotensive albeit obese subjects have higher frequency of dyslipidemia as it was found in 84% of the study participants and therefore are at a higher risk for CVD.

INTRODUCTION

Obesity is defined in terms of Body Mass Index (BMI). However BMI does not take into account the distribution of body fat. Abdominal fat deposition has emerged as a strong risk factor for Cardio-vascular Disease (CVD) and is measured in terms of Waist/Hip circumference.[1,2] Dyslipidemia is a term to lipoprotein abnormalities including elevated serum Triglycerides (TG), increased Total Cholesterol (TC), increased LDL-cholesterol (LDL), increased VLDL colesterol, and a reduced level of HDL-cholesterol (HDL).[3]

Dyslipidemia is one of the major risk factors for CVD.[4] Much work has been done in the field of standard risk factors like Diabetes Mellitus and Hypertension. Obesity is a proven independent risk factor for CVD, measured clinically as Body Mass Index (BMI).[5-7] Asian population has a greater percentage of body fat at lower BMI compared to Western population.[8] There is recent evidence that the current BMI and waist circumference cutoffs used in the World Health Organization's (WHO) definitions of overweight and obesity, that were developed using Western population, may need to be lowered for Asian population.[8] It is, therefore, important to assess the relationship between obesity and dyslipidaemia as both are independent risk factors for the CVD.[9]

Several studies have demonstrated that many middle aged obese persons are at increased absolute risk for developing CVD in the near future (e.g. 10 year risk).[10-12] Due to high relative risk for CVD, long term (lifetime) risk for CVD is increased even when 10 year risk is not considered to be high, e.g., in young adults who develop obesity.[13,14] Obese individuals especially with central obesity (intra-abdominal fat) have significantly higher mean TG, LDL, TC and a higher prevalence of dyslipidemia.[15] The mean levels of TG, TC and LDL increased with successive increase in BMI and waist circumference quintiles in both genders.[16]

Cardiovascular events are the number one cause of morbidity and mortality worldwide. Diabetes mellitus (D.M) and hypertension (HTN) are two major contributors towards cardiovascular morbidity and mortality. However, other risk factors should also be taken into account to reduce the number of casualties resul-

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ting from CVD.[3] Obesity and dyslipidemia are often overlooked and under treated. Since these are independent risk factors for cardiovascular events, therefore health care professionals should consider obesity and dyslipidemia in order to improve assessment of cardiovascular risk and mortality.[3] Framingham score must be used to stratify cardiovascular risk i.e. low, moderate and high score categories.[3]

Traditionally, diabetic and hypertensive patients are screened for dyslipidemias. Most of the time non-diabetic and normotensive patients do not get screened often as their disease is considered less life threatening. We would like to determine the frequency of dyslipidemias in non-diabetic and normotensive obese subjects to in this study. By early detection and management of this independent risk factor, it is hoped that we may be able to contribute towards minimizing the cardiovascular mortality and morbidity.

OBJECTIVE

The objective of this study was to determine the frequency of dyslipidemias in normotensive and non-diabetic obese subjects.

Operational Definitions

Obesity: Subjects with BMI > 30 in both males and females or Waist-to-Hip ratio > 0.90 for male subjects and > 0.85 for female subjects, were considered as obese.[17-19]

Dyslipidemia: Subjects were considered to have dyslipidemia if any of the four criteria was present:

Total cholesterol (TC)	> 200.
Triglycerides (TG)	> 150.
Low density lipoproteins (LDL)	> 130
High density lipoproteins (HDL)	< 40 mg/dl

Normotensive: Subjects with systolic blood pressure (SBP) less than 140 mmHg and diastolic blood pressure (DBP) less than 90mmHg without medicinal use were taken as normotensive.

Non-Diabetic: Subjects with fasting blood sugar level < 126 mg/dl were defined as non-diabetic.

PATIENTS AND METHODS

This study was conducted in the Department of Medicine Fatima Memorial Hospital Lahore. This was a descriptive case series study.50 normotensive, non-diabetic obese subjects were included in this study from 01-01-2015 to 30-06-2015. Sampling technique was non-probability purposive sampling.

Inclusion Criteria

1. Age between 30 to 70 years.
2. Both male and female subjects.
3. BMI > 30 and/or Waist to Hip ratio > 0.90 for male subjects and > 0.85 for female subjects.

Exclusion Criteria

1. Subjects with systolic blood pressure (SBP) greater than 140 mmHg and diastolic blood pressure (DBP) greater than 90 mmHg.
2. Subjects with fasting blood sugar level > 126mg/dl, or known diabetic and known Hypertensive.
3. Already diagnosed case of Renal, Hepatic and Cardiac disease on urinalysis, renal function tests, liver function tests, complete blood count and ECG respectively.

Data Collection Procedure

Fifty non-diabetic and normotensive obese subjects of both genders presented in outpatient and inpatient department of Medicine at Fatima Memorial Hospital Lahore and fulfilling the inclusion criteria were selected for this study. An informed consent was taken from all the participants. The demographic information such as name, age, gender were noted on a designed proforma for this study (Annexure – A). Patients were interviewed and investigated for absence of hypertension, diabetes, renal, hepatic or cardiac disease. Body weight in kilograms and height in centimeters was measured to calculate Body Mass Index and Waist/Hip circumference was measured as well.

These details were noted on proforma. All patients in the study were specifically investigated for fasting cholesterol, triglycerides, low density lipoproteins and high density lipoproteins. All this information was collected through a specially designed pro-forma.

Statistical Analysis Procedure

The data was entered into SPSS version 14 and analyzed. The qualitative variables like family history of obesity, walking difficulty, joint pains and exertional dyspnea were presented as frequencies and percentages. Numerical data like age, weight height, and BMI and waist hip circumference ratio were presented as simple descriptive statistics giving mean and standard deviation. The outcome of routine investigations and specific investigations were described as proportion of positive and negative depending upon presence or absence.

Test of significance between two percentages was applied to see any statistically significant difference or otherwise.

RESULTS

Variable like age, gender, weight, height, and BMI are given in table I.

Distribution of subjects according to lipid abnormalities is shown below in Table II.

The mean waist of the subjects was 95.68±18.67 cms. There were 3/50 (6%) male subjects in the waist

ANNEXURE – A

PROFORMA

"FREQUENCY OF DYSLIPIDEMIAS IN NON DIABETIC, NORMOTENSIVE OBESE SUBJECTS"

1. Case No: _____
2. OPD Reg. No:_____
3. Date: _____/_____/_____
4. Name:_____
5. Age: _____ 6. Gender: _____
7. Address: _____
8. Contact No: _____
9. Weight (Kg) _____
10. Height (Cm)_____

    BMI _____

11. Waist/hip circumference _____
12. DM/ Hypertension _____
13. Dietary habits _____ More on vegetable diet / more on animal source diet
14. Regular Home food Yes ☐ No ☐
15. Regular hoteling Yes ☐ No ☐
16. a) Fasting Cholesterol _____

    b) Triglycerides_____

    c) Low Density Lipoproteins (LDL) _____

    d) High Density Lipoproteins (HDL) _____

Table I:

Variable	*Number*	*% (Frequency)*
Age (Years)		
30 – 40	20	40
41 – 50	23	46
51 – 60	6	12
61 – 70	1	2
Sex		
Male	20	40
Female	30	60
Total	50	100
Weight(Kgs)		
61 – 70	7	14
71 – 80	10	20
81 – 90	19	38
91 – 100	12	24
101 – 110	2	4
Height(cms)		
140 – 150	18	36
151 – 160	18	36
161 – 170	10	20
171 – 180	4	8
BMI		
30.0 – 33.0	21	42
33.1 – 36.0	11	22
36.1 – 39.0	6	12
39.1 – 42.0	6	12
42.1 – 45.0	6	12

Table II:

(mg/dl)	*No.*	*% (frequency)*
TC < 200	14	28
TC > 200	36	72
TGS < 150	17	34
TGS > 150	33	66
LDL < 130	23	46
LDL > 130	27	54
HDL < 40	21	42
HDL > 40	29	58
Dyslipidemia	44	88
Non-dyslipidemia	6	12
Total	50	100

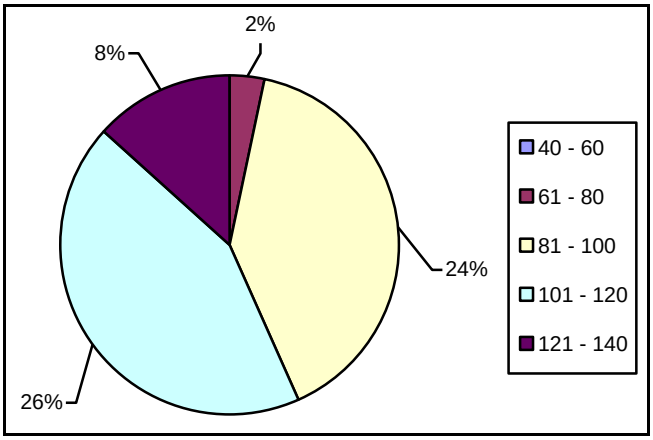

Fig. 1: *Waist (Female).*

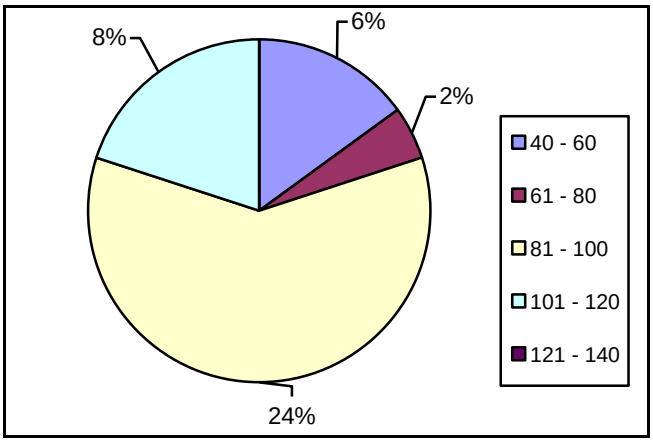

Fig. 2: *Waist (Male).*

range of 40 – 60 cms, 2/50 (4%) subjects (1 male and 1 female) in the waist range of 61 – 80 cms, 24/50 (48%) subjects (12 male and 12 female) in the waist range of 81 – 100 cms, 17/50 (34%) subjects (4 male and 13 female) in the waist range of 101 – 120 cms and 4/50 (8%) subjects (4 females) in the waist range of 121 – 140 cms.

The mean hip circumference of the subjects was 103.02 ± 20.04 cms. There were 3/50(6%) subjects (3 male) in the range of 40 – 60 cms, 16/50 (32%) sub-

jects (9 male and 7 female) in the range of 81 – 100 cms, 26/50 (52%) subjects (7 male and 19 female) in

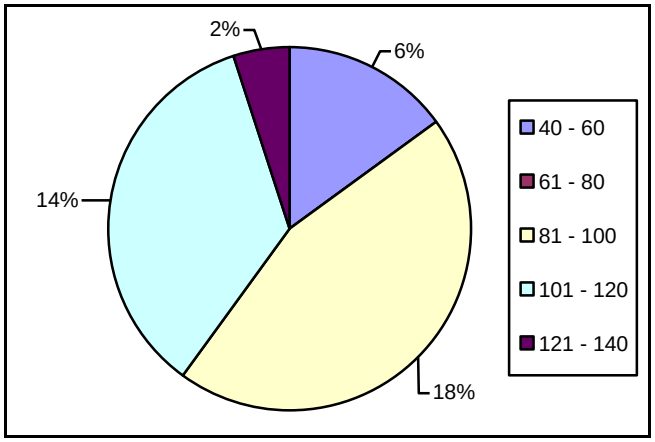

Fig. 3: *Male's Hip (cms).*

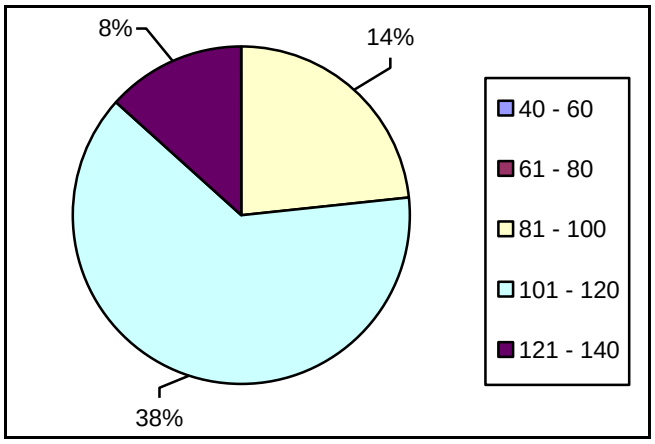

Fig. 4: Fem*ale's Hip (cms).*

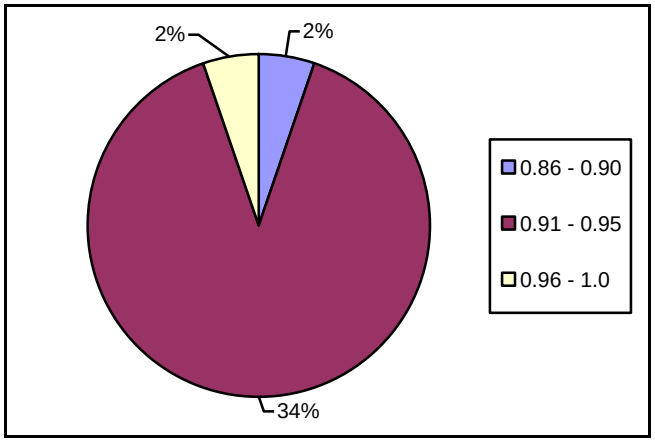

Fig. 5: *Male's Waist / Hip Ratio.*

the range of 101 – 120 cms and 5/50 (10%) subjects (1 male and 4 female) in the range of 121 – 140 cms.

The mean Waist/Hip ratio of the subjects was 0.93 ± 0.05. There were 6/50 (12%)subjects (1 male and 5 female) in the Waist/Hip ratio range of 0.86 – 0.90, 39 (78%) subjects (17 male and 22 female) in the range of 0.91 – 0.95, 2/50 (4%) subjects (1 male and 1 female) in the range of 0.96 – 1.0 and 3/50 (6%) subjects (1 male and 2 female) range of more than 1.0.

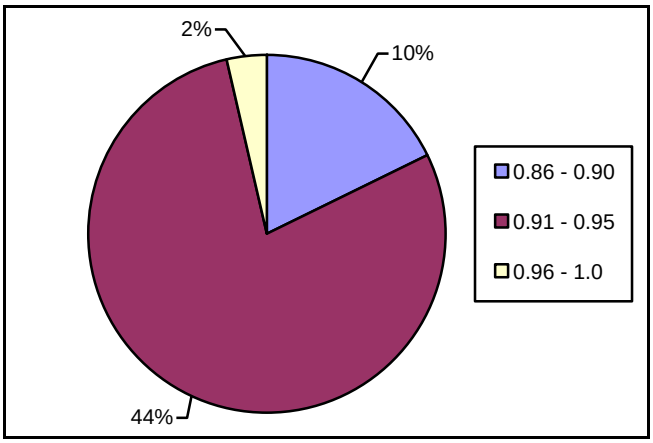

Fig. 6: Female's *Waist / Hip Ratio.*

The test of statistical significance for two percentages was applied at alpha level of 0.03. It was found to be significant with $p < 0.0.3$ Thus it is inferred that the incidence of dyslipidemia is significantly higher in obese non diabetic normotensive individuals.

DISCUSSION

Dyslipidemia is one of the major risk factors for CVD. Many researches have been done in the field of standard risk factors like diabetes and hypertension. It is therefore important to assess the relationship between obesity and dyslipidemia as both are independent risk factors for the cardiovascular disease.[9] The mean age of the subjects in our study was 43.02 ± 7.90 years as compared with the study of Sonmez et al,[20] where the mean age of the subjects was 47.2 ± 10.3 years. So the age group selected in both studies belongs to population at higher risk for cardiovascular events.

Obesity is a proven independent risk factor for CVD, measured clinically as Body Mass Index (BMI).[5-7] In our study the mean BMI of the subjects was 35.23 ± 4.42 kg/m^2, as compared with the study of Barter et al,[21] where mean BMI of the subjects was 28.7 kg/m^2, which is much less from our study because we included the subjects of BMI of 30 and more and Barter et al,[21] included the subjects of BMI of 25 or more. In another study Sonmez et al,[20] in Turkey, the mean BMI of the subjects was 30.07 ± 4.04 kg/m^2. Another study conducted by Myara et al,[22] found that mean BMI of the subjects was 35 kg/m^2, while in our study the mean BMI of the subjects was also 35.23 ± 4.42 kg/m^2 which is comparable with our study. Asian

population has a greater percentage of body fat at lower BMI compared to Western populations.[8] There is recent evidence that the current BMI and waist circumference cutoffs used in the World Health Organization's definitions of overweight and obesity, that were developed using Western populations, may need to be lowered for Asian populations.[8]

The mean waist circumference of the subjects in our study was 95.68 ± 18.67 centimeters. As compared with the study conducted by Rastogi et al,[23] at Delhi Medical Hospital and Research Centre, Moradabad India, where the mean waist of the subjects was 95.7 ± 6.7 centimeters, which is comparable with our study. As compared with the study conducted by Rastogi et al,[23] the mean Waist/ Hip ratio of the subjects was 0.95 ± 0.06 centimeters, which is comparable with our study. In our study the mean Waist/Hip ratio of the subjects was 0.93 ± 0.05.

As dyslipidemia is major contributing factor in cardiovascular risk much researches have been done worldwide in different geographical regions. A study was conducted by Rastogi et al,[23] the mean total cholesterol of the subjects was 204 ± 15.8 gm. /dl, which is a bit lower than our data, which is 214.38 ± 37.86 mg/dl. Similarly in another study conducted by Ahmed et al,[24] the mean total cholesterol of the subjects was 211.91 ± 40.19 mg/dl, which in our study was 214.38 ± 37.86 mg/dl which is comparable with the above study. The mean triglycerides of the subjects in our study was 160.80 ± 22.78 mg/dl, as compared with the study conducted by Rastogi et al,[23] where mean serum triglycerides of the subjects was 162 ± 14.19 gm/dl, which is comparable with our study. In our study the mean LDL of the subjects was 134.06 ± 26.04 mg/dl, as compared to study conducted by Ahmed et al,[24] at Bahawal Victoria Hospital Bahawalpur the mean LDL of the subjects was 131.82 ± 32.13 gm/dl. In our study the mean HDL of the subjects was 38.36 ± 8.10 mg/dl as compared to a study conducted by Ahmed et al,[24] the mean HDL of the subjects was 38.88 ± 3.8 gm/dl, which is comparable with our study.

In our study the dyslipidemia was found in 88% subjects as compared with the study conducted by Rastogi et al,[23] where frequency of dyslipidemia was 78% in study subjects. It is therefore concluded that our population is at a slightly higher risk for cardiovascular disease considering the percentage of dyslipidemia in our obese population. However our sample size was small to extrapolate the findings on the entire population. More research is required with larger sample size to determine the actual risk.

Furthermore, as non diabetic, normotensive but obese persons have high risk of dyslipidemia these individuals should be provided with health education on life style modifications to prevent dyslipidemias and their serum lipid levels should be checked on regular follow-up.

It is ***concluded*** that our population at risk has a greater tendency of obesity, dyslipidaemias and hence cardiovascular disease. Education on life style, eating habits and regular medical checkup are essential.

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Author's Contribution

MKR conceived, designed the study and did manuscript writing. AZKC, MBB did editing of the manuscript. AZKC, MBB did review and final approval of manuscript.

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