A study of Body Mass Index (BMI) and its association with Diabetes Mellitus patient in a tertiary care hospital of central India.

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ABSTRACT

Introduction: India is the most populated developing country with industrialization, and rapid urbanization has resulted in a significant number of people being overweight or obese and/or having elevated blood pressure and blood glucose level. These conditions increase the risk of non-communicable diseases.

Aim & Objective - A study of Body Mass Index (BMI) and its association with Diabetes Mellitus patients in a tertiary care hospital of central India

Methodology – **Study Population-**Diabetic patients attending Medicine OPD/ IPD of Govt. Bundelkhand Medical College & Hospital, Sagar MP.

Sample size - 58 Diabetes mellitus patients.

Sampling Method - Simple random sampling method, Body Mass Index (BMI) was calculated according to Quetlet's equation: weight in kg/height in m ^{2}.

For Type 2 Diabetes ADA (American Diabetic Association) criteria were used. Correlations were calculated by using Microsoft excel data analyzer version 10.

Results: (1) In our study, we found that among 58 diabetic patients, 26 were males (45%) and 32 were females (55%).

(2) Out of the total 58 diabetic patients, the 41- 60 years of age group was more overweight (48%) and obese (12%) than the 21-40 years of age group where overweight (12%) and obese were (2%).

(3) In our study we found that among 58 diabetic patients, 60% are overweight,13% are obese and 26% are of normal BMI.

Conclusion: A strong association between overweight and obesity to diabetes was identified. BMI could be used in clinical practice for suggesting lifestyle modifications.

Keywords: Body Mass Index (BMI), Diabetes Mellitus, Overweight, Obesity.

MAIN ARTICLE

Introduction

India is one of the most populated developing countries with industrialization, and rapid urbanization has resulted in a significant number of people being overweight or obese and having elevated blood pressure and blood glucose [1,2].These conditions increase the risk of non-

communicable diseases [3].

Diabetes and its complications impose substantial economic costs on patients, their families, health systems, and national economies because of direct costs of treatment and loss of work and wages[4].

In India, 1 out of every 7, 29, 19, and 14 individuals at the national level had overweight, obesity, hypertension, and diabetes, respectively—between 2015 and 2016 in the National Family Health Survey.
The national prevalence of overweight, obesity, hypertension, and diabetes were 14.6%, 3.4%, 21.3%, and 15.6%, respectively in National Family Health Survey (5) .There are >135 million people who are obese in India (6)

It is well established that poor health outcomes and all-cause mortality, approximately 2.8 million cases (1 in 6 individuals) annually, are attributed to overweight, obesity, hypertension, and diabetes, possibly because these conditions/diseases increase the likelihood of coronary heart disease, stroke, certain cancers, obstructive apnoea , and osteoarthritis. (7)

Over 1.9 billion persons worldwide were overweight (39%) and 650 million were obese (13%), according to data from 2016. Of them, 15% of women and 11% of men suffer from obesity. Between 1975 and 2016, the prevalence of obesity almost tripled globally. (8) Obesity is a complicated disorder that affects people of almost all ages and socioeconomic backgrounds in developing nations with under-nutrition. It has significant social and psychological aspects (9).

Diabetes Mellitus (DM) is a global epidemic in this millennium. Colagiuri et al (10) reported that the highest increase in Diabetes Mellitus prevalence is among low and middle-income countries, predominantly within the 40-59 years age group, although a tendency is seen for onset at a younger age. According to WHO(11) , 80% of Diabetes deaths occur in low and middle income countries. Danaei et al (12)reported that globally, as of 2013, an estimated 347 million people had Diabetes Mellitus. Diabetes Mellitus occurs throughout the world, but is more common

(especially Type 2) in the more developed countries

AIM AND OBJECTIVE

AIM

A STUDY OF BODY MASS INDEX (BMI) AND ITS ASSOCIATION WITH DIABETES MELLITUS PATIENTS IN A TERTIARY CARE HOSPITAL OF CENTRAL INDIA .

OBJECTIVES

1. To find out the Body Mass Index (BMI) of diabetes Mellitus patients coming to a tertiary care hospital of central India.

2. To find out the distribution of BMI in Diabetes Mellitus patients according to gender in tertiary care hospital of central India.

3. To assess the distribution of Diabetes Mellitus patients according to body mass index in tertiary care hospitals of central India. .

4. To assess the distribution of BMI in Diabetes Mellitus according to their age in tertiary care hospital of central India.

INCLUSION CRITERIA AND EXCLUSION CRITERIA

INCLUSION CRITERIA	EXCLUSION CRITERIA
Those who are willing to provide written informed consent to participate in the study.	Those who are not willing to provide the written informed consent to participate in the study.
Only sagar division patient , 21to 60 year age attending Bundelkhand medical college and hospital Sagar MP.	Patients below 21 years of age and above 60 years and other then sagar division patients.
Both gender aged 21 years to 60 years. Comorbidity include diabetes.	Pregnant female.

	PCOD diseases.
	Hypothyroid patient.

Methodology

Study Population

Diabetes mellitus patient 21 to 60 year attending opd/ipd in medicine department of Bundelkhand medical college and hospital sagar MP .

Study design

Observational ,cross sectional study

Sample size (N=58)

58 diabetes mellitus patient

Sampling Method

Simple Random sampling method

Data Collection

Above data was collected in a structured Pro forma/ Questionnaire Primary investigator obtaining a written informed consent from patient. The patients was undergo a comprehensive clinical and biochemical evaluation for study through well-structured face to face interviews/questionnaire. Primary investigator take patient personal demographic and anthropometric details such as age, sex, weight, height and random blood glucose level was taken by Glucometer .

 A fasting plasma glucose level of 126 mg/dl or higher

or

A 2-hour plasma glucose level of 200 mg/dl or higher during a 75-g oral glucose tolerance test (OGTT)

or

A random plasma glucose level of 200 mg/dl or higher in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis

or

A hemoglobin A1c (HbA1c) level of 6.5% or higher

TYPE 2 DIABETES ADA DIAGNOSIS CRITERIA

A fasting plasma glucose level of 126 mg/dl or higher

or

A 2-hour plasma glucose level of 200 mg/dl or higher during a 75-g oral glucose tolerance test (OGTT)

or

A random plasma glucose level of 200 mg/dl or higher in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis
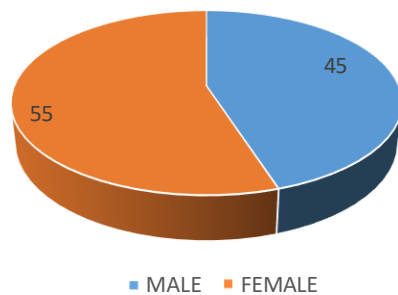
or

A hemoglobin A1c (HbA1c) level of 6.5% or higher

RESULT

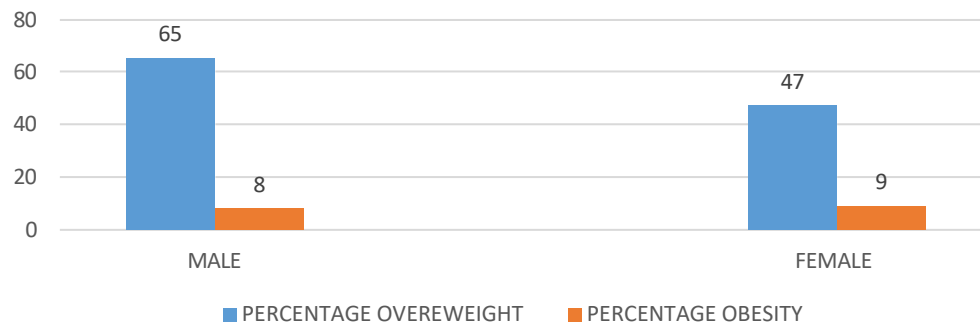TABLE 1=DISTRIBUTION OF DIABETES MELLITUS ACCORDING TO GENDER (N=58)

TOTAL DIABETES MELLITUS PATIENT	MALE	FEMALE
58	26	32
PERCENTAGE	45%	55%

■ MALE   ■ FEMALE

The distribution of Diabetes mellitus in female 55% and male 45%. So female are more Diabetic than male.

TABLE 2 =DISTRIBUTION OF BMI IN DIABETES MELLITUS PATIENTS ACCORDING TO GENDER

GENDER	OVEREWEIGHT	OBESITY	NORMAL
MALE 26	17 (65%)	2 (8%)	7 (27%)
FEMALE 32	15 (47%)	3 (9%)	14 (44%)

The distribution of BMI in Diabetes mellitus was :Among all patients, overweight was 65 % male and 47% female.

TABLE 3 =DISTRIBUTION OF BMI IN DIABETES PATIENT ACCORDING TO THEIR AGE (N=58)

DIABEESE PATIENT 58	OVERWEIGHT	OBESE	NORMAL	TOTAL
21 TO 40 YEAR	7 (12%)	1 (1.8%)	2 (3.4%)	10 (17%)
41 TO 60 YEAR	28 (48%)	7(12%)	13 (22%)	48(82%)

 In age group 41 -60 years 48% were overweight and 12% obese and in age group 21- 40 years 12% were overweight and 2% obese.

TABLE 4=DISTRIBUTION OF DIABETES MELLITUS PATIENT ACORDING TO BODY MASS INDEX(N=58)

DIABETES MELLI TUS PATIENT	OVERWEIGHT	OBESE	NORMAL
58	35(60%)	8(13%)	15(26%)
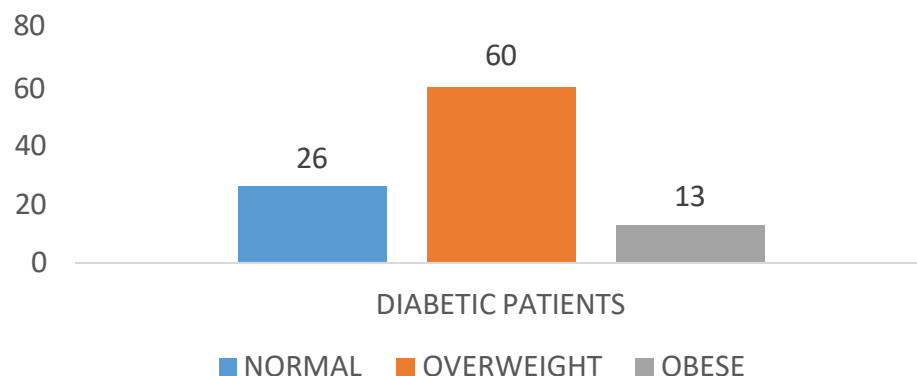
In this study we found among all diabetic patients 60% were overweight ,13% obese and 26% were of normal BMI.

Discussion

1. In our study result shows that female patient (55%) are more prone for diabetic mellitus than male (45%). Another study done by Natasha Sobers –Grannum et al that the risk of developing diabetes was higher among Caribbean women (13). A study done by Jingyan Li et al from China also found a higher prevalence of DM among older women compared with men(14) .

2. In our study result show that male diabetic patients (65%) are more associated to overweight than female patient.

3. In our study result shows that 41 to 60 year of patient (48%) was more overweight and obese then 21 to 40 year so increase age chance of overweight and obesity increase. The probability of diabetes was higher with increased age due to deficiency in insulin secretion following weaker pancreatic function of old people.

Conclusion:

 A strong association between overweight and obesity indices to diabetes was identified. BMI could be used in clinical practice for suggesting life style modifications.The study can be use for adults for maintaining blood sugar through improving lifestyle. Our findings should be a matter

of great concern warranting urgent preventive measures at a multidisciplinary level, involving the central and state governments, non-governmental organizations, and healthcare professionals, to implement policies and programs to improve the well-being and quality of life of individuals at the regional and national levels.

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