Prevalence of Obesity Among Type 2 Diabetes Patients Attending Diabetic Clinic in Nepalgunj Medical College Teaching Hospital

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ABSTRACT

Background: Obesity and type 2 diabetes constitute major public health issues in modern societies worldwide. These two forms frequently coexist, and statistics show that 60–90% of all patients with type 2 diabetes are or have been obese. Obesity is generally considered to be a strong risk factor for the development of type 2 diabetes mellitus in future. **Objectives**: This study aims to assess the prevalence of obesity among type 2 diabetes patients attending diabetic clinic in Nepalgunj Medical College Teaching Hospital. **Methods**: An analytical cross-sectional study was conducted at NGMCTH, kohalpur, Nepal during the period from October 2013 to March 2014. The present study comprised of a total of 385 type 2 diabetic subjects whose BMI was measured during the visit to the diabetic clinic. Respondents' height, weight, age, sex and duration of diabetes were taken as the study variable. **Results**: Out of total, 51.4% were female and 48.6% were male who attended the clinic. The mean age of the study population was 56.20±11.95 (95% CI; 54.47-57.92) of which 38% were overweight, 4.2% were obese and 55.8% had normal BMI. The proportion of overweight in total population is 37.1% where female type 2 diabetes proportion (41.4%) was comparatively higher than male(32.6%). 4.2 % of the total type 2 diabetes were obese and above(p=0.014). **Conclusions**: High prevalence of overweight and obesity in type 2 diabetics is associated with other serious complications. Ways to control prevent obesity and overweight should be stressed and made known to people of all ages in the population.

Key words: BMI, Obesity, overweight, type 2 diabetes

INTRODUCTION

Diabetes – A global epidemics and a serious public health problem. 382 million people have diabetes in 2013; by 2035 this will rise to 592 million. The number of people with type 2 diabetes is increasing in every country. 80% of people with diabetes live in low- and middle-income countries. The greatest number of people with diabetes is between 40 and 59 years of age[1]. In Nepal the number of diabetic patients was 436,000 in 2000 and it was projected be 1,328,000 in Nepal by 2030[2]. Healthy dietary habits and lifestyle modifications- the cornerstones of type 2 diabetes prevention and management[3]. The Diabetic Prevention Program suggested that dietary and physical activity changes to produce a 5-7% weight loss successfully maintains glycemic control in people diagnosed with type 2 diabetes[4].

The risk of diabetes mellitus increases independently with increasing age, obesity, and lack of physical activity,[5-10] and overall mortality rises with body mass index (BMI) level greater than 25 kg per m^2 [5]. Obesity is a complex disorder involving appetite regulation and energy metabolism, as the excess of body fat results from an imbalance of intake and expenditure[5]. Obesity is considered a major risk factor for type 2 diabetes[6]. It has been found that the incidence of diabetes increases by a factor of 2-3 fold in obese individuals when obesity is defined as 120% of ideal weight[11].

Obesity is a modifiable risk factor for Type 2 diabetes. It not only interferes with effective treatment of hyperglycemia, but also hypertension, and dyslipidemia, cardiovascular disease, cerbrovascular disease, hyperlipidemia, increased incidence of arthritis of the hands and knees, gallbladder disease, sleep apnea. It is also related to chronic back pain and respiratory dysfunction[5,6]. In addition to the increased risk of morbidity and mortality, obesity leads to various psychological stresses that vary from emotional distress to social stigmatization[1,6,8].

WHO classification of obesity is shown in Table I, the cut-off points of 25kg/m^2 and 30kg/m^2 used to define overweight and obesity respectively[13,14]. This study aims to assess the proportion of obesity among type 2 diabetes patients attending diabetic clinic in Nepalgunj Medical College Teaching Hospital.

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Classification	BMI (Kg/m2)	Risk of developing health problems
Underweight	< 18.5	Increased
Normal Weight	18.5 - 24.9	Least
Overweight	25.0 - 29.9	Increased
Obese class I	30.0 - 34.9	High
Obese class II	35.0 - 39.9	Very High
Obese class III	>= 40.0	Extremely High

Table I: International Classification of BMI

Variables	Male (n=187)	Female (n=198)	p-value
Age			
Mean±SD	56.20±11.95	52.62±10.739	
95% CI of mean	54.47-57.92	51.11-54.12	0.02
Median	57	53.5	
Weight (Kg)			
Mean±SD	62.40±8.547	58.32±9.055	
95% CI of mean	61.17-63.63	57.05-59.59	<0.0001
Median	62	60	
Height (cms.)			
Mean±SD	160.20±7.3	155.2±6.3	
95% CI of mean	159.15-161.25	154.32-156.10	<0.0001
Median	160	155	
BMI (kg/m2)			
Mean±SD	24.31±2.98	24.22±3. 64	
95% CI of mean	23.88-24.74	23.70-24.73	NS
Median	24.14	24.49	
Duration of diabetes (yrs)			
Mean±SD	5.13±4.73	4.39±3.83	
95% CI of mean	4.45-5.82	3.85-4.92	NS
Median	4	3	

Table II: Basic characteristics of the study populations (n=385)

METHODS

An analytical study with cross-sectional design was adopted and 385 type 2 diabetic patients, diagnosed for at least 3 months, from October 2013 to March 2014 were selected from tertiary level care hospital using the systematic random sampling method. The minimum required sample size was calculated as 358 using formula n = z2pq. 385 were taken as the sample size of the study. Data were collected by a pre-tested, interviewer administered questionnaire.

World Health Organization's criteria for diabetes classification were used to define patients as Type 2 diabetes mellitus (9,10). Experienced medical interns using standard techniques, measured height and weight. Body mass index (BMI) was calculated according to person's weight in kilograms divided by the square of the person's height in meters[14]. Weight was recorded by the calibrated scale in the diabetic clinic; and height was taken in the same setting. Data were entered into a personal computer using SPSS statistical package, a p-value of 0.05 or less was considered to represent statistical significance. Descriptive statistics and statistical tests were used as appropriate.

RESULTS

A total number of 385 patients with 20 years of age or older attended to the diabetic clinic under management since 6

months were recruited in the study. Table II shows that the median duration of diabetes mellitus (DM) was 4 years and the mean duration was 5.13±4.73 (95% CI 4.45-5.82). The mean age of the study population was 56.20±11.95 (95% CI; 54.47-57.92). Most of the patients 68.8% (265) were recently diagnosed within 5 years. Out of total 38% were overweight , 4.2% were obese and 55.8% had normal BMI. The basic characteristics of the study population is shown in Table II. It illustrates that mean age of male was greater than the female (p=0.02). The mean height and weight of the males were significantly higher than female (p<0.001). However, there was no significant difference between the mean BMI of male and female.

Table III shows sex-specific and age-specific mean BMI values of the study population. Overall, there was no significant difference between male and female mean BMI. When age increased, mean BMI also increased in female type 2 diabetes patients.

Table IV depicts the BMI status of study population on the basis of sex which was statistically significant (p=0.014).The proportion of overweight in total population is 37.1% where female type 2 diabetes proportion (41.4%) was comparatively higher than male(32.6%). 4.2% of the total type 2 diabetes were obese and above.

Age	Male		Female	
	No	BMI(M±SD)	No	BMI(M±SD)
20 - 29	2	31.21±0.00	1	21.21±0.00
30 - 39	10	23.63±3.27	14	23.79±2.83
40 - 49	51	24.61±2.77	67	23.80±3.5
50 - 59	48	24.41±2.25	61	24.75±3.7
60+	76	23.96±3.30	55	24.29±3.9
Total	187	24.31±2.98	198	4.22±2.99

Table III: Mean BMI values on the basis of age and sex categorization (n=385)

BMI categorization	Male n(%)	Female n(%)	Total n(%)	p-value
Underweight	1(0.5)	9(4.5)	10(2.6)	
Normal	117(62.6)	99(50)	216(56.1)	
Overweight	61(32.6)	82(41.4)	143(37.1)	0.014
Obese and above	8(4.3)	8(4)	16(4.2)	
Total	187(100)	198(100)	385(100)	

Table IV: BMI status among male and female type 2 diabetes patients (n=385)

DISCUSSION

Obesity is a condition in which excess body fat may put a person's health at risk. In adults, the risk increases independently with increasing BMI and excess abdominal fat. Cardiovascular and other obesity related disease risks increase significantly when BMI exceeds 25kg/m^2. The risk increases with the extent of obesity and those with a BMI >40 kg/m2 are at highest risk[6].

Our study shows, out of total 385 type 2 patients who were followed in diabetic clinic, 2.6 % were underweight and 56.1 % BMI within the normal range while 37.1 % were overweight, the percentage of female patients being higher (41.4%) than male patients (32.6%) which was statistically significant (p= 0.014). Obesity was found in 4.2 % of the patients. . In consistent with this, a recent study done in tertiary care hospital in Nepal showed that 39.0% and 11.0% of the diabetics to be overweight and obese respectively[15]. A study by Ahmed et al. (2007) showed that 67% of the patients with diabetes mellitus had BMI ≥ 25 kg/m2. Similarly, one study done in Pakistan showed that 61% of the diabetics had BMI ≥ 25 kg/m2[16]. However, higher prevalence was reported in one of the study done in Nigeria, the majority (83%) of the type 2 diabetic patients were either overweight or obese[17]. These findings further support the fact that obesity or excess body fat accumulation is a strong risk factor for type 2 diabetes. The differences in percentage of overweight and obesity among type 2 diabetes in various studies might be due to different factors like geographical variations, life style, occupational status, genetic factor or ethnic differences of the population.

In accordance with the findings observed in other studies, Sharma and Jain 2009, this study also found higher prevalence of abdominal obesity as indexed in female subjects than their male counterparts[18]. Nearly all the female diabetics (94.3%) had abdominal obesity while only 51.1% of the male diabetics had abdominal obesity. Besides abdominal obesity, the present study also found that generalized obesity is more prevalent in female diabetics than male diabetics. This fact is also in agreement with several other studies conducted in Nepal[19] and Nigeria[17]. Hence, in this study, obesity was more prevalent among females than males. The factors that affect these differences may include childbearing, hormonal status and the high female illiteracy rates, which lead to lower female awareness to the importance of their physique[20,21]. This may further be due to cultural practices that tend to limit physical exertion by females with resultant sedentary habits, obesity and its attendant complications [20].

CONCLUSIONS

Based on the findings of the present study, it can be concluded that overweight/obesity persists in diabetic patients. Furthermore, both obesity and central obesity were more prevalent among females than males. Both the diseases are

closely interlinked, obesity being central to the development of insulin resistance and hence is a strong risk factor for type 2 diabetes. Therefore an important implication from this study is that effective treatment of obesity with sustained weight loss and obesity prevention including lifestyle modifications are important interventions in an effort to reduce the risk for diabetes and other related complications. Public education about obesity and its consequences is strongly recommended. Ways to control, prevent obesity and overweight should be stressed and made known to people of all ages in the population. Education about diabetes mellitus and its complications could be presented in basic simple public lectures that stress the importance of the awareness of this health condition.

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