

Prevalence of diabetic mellitus among obese and overweight people of 35 years and above in peri-urban area around Belgaum

Ashwini Narasannavar^{1*}, Prakash Kumar Yadav² and H.B. Rajshekhar³

¹Department of Public Health, Jawaharlal Nehru Medical College, KLE University Campus, Nehru Nagar, Belagavi-5900010, Karnataka, India, ²Research Coordinator, Hospital and Rehabilitation Center for Disabled Children, Ugratara VDC-6, Janagal, Kavre, Nepal and ³Director, USM-KLE International Medical Programme, Nehru Nagar, Belgaum-590010, Karnataka, India

Abstract: *Background:* Globally, the prevalence of diabetes is rising day by day. Diabetes is deeply rooted in Obesity and the other factor like aging of population. As per the WHO projection, diabetes is going to be the 7th leading cause of death in the year 2030. *Objective:* Estimate the Prevalence of diabetic mellitus among the obese and overweight people of 35 years and above. *Materials and Methods:* A Cross sectional study was conducted to estimate magnitude of diabetes among 335 obese and overweight of age 35 years and above. Random blood glucose was estimated with cut off of >180mg/dl. Data was analyzed using SPSS version. *Results:* Out of 335 obese and overweight participants 19.4 percent were diabetic. 59.4 percent were females. Most of them (36.71%) were farmers, followed by 16 percent laborer. There was a significant association in between sex and the diabetic mellitus as the p-value was found to be less than 0.05. *Conclusion:* Prevalence of diabetes among obese has been increased. Hence, obesity is measured as the foremost risk factor for diabetes.

Keywords: Obese and overweight, diabetes, prevalence, periurban area.

Introduction

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic hyperglycemic condition may cause long-term damage, dysfunction, and failure of the various organs especially eyes, kidney, nerves, heart and blood vessels [1]. Overweight and obesity is the condition arises due to the abnormal or excessive fat accumulation that can cause risk to health. Generally the person with BMI of 30 or more is considered as obese, where as the person with BMI of 25 or more is considered as overweight [2].

Globally, the prevalence of diabetes is rising day by day. Diabetes is deeply rooted in Obesity and the other factor like aging of population. Although the prevalence of diabetes is more in developed countries, the rise in diabetes rate is more in developing countries [3]. Diabetes mellitus is considered as one of the major contributor for the death and disability worldwide [4-5]. Globally the prevalence of diabetes was estimated to be 9 percent among adults in 2014 [6]. In the year 2012, an estimated 1.5 million

deaths took place because of the diabetes [7]. Developing countries are more sufferer of the disease. It showed that more than 80 percent of the diabetic death occurs in low and middle-income countries [7] as per the WHO projection, diabetes is going to be the 7th leading cause of death in the year 2030 [8]. There are more than 1 billion overweight adults, out of which at least 300 million of them are obese. The World Health Statistics Report, 2012 showed that globally 1 in 6 adult is obese and each year about 2.8 million individuals die because of the overweight or obesity [3, 8]. Obesity and overweight is the major risk factor for the chronic diseases like diabetes, hypertension, cardiovascular diseases, stroke and certain forms of cancer [9].

India contributes the highest prevalence of diabetes mellitus and the number is increasing at an alarming rate. According to the International Diabetes Federation (IDF), India contributes the highest prevalence of diabetes than any other country in the world. Currently the number of diagnosed diabetic cases in India is about 62 million which increase of

over 10 million from the year 2011. The disease has reached the endemic proportions in the country. It is estimated that in the year 2030, over 100 million people in India are likely to suffer from diabetes [10]. According to the World Health Organization; obesity is the most common among the most neglected, public health problems in both the developed and developing countries [11]. India is a country where more than 270 million people live below the poverty line. Hence obesity seems to be distant issue. But India is under the cordon of junk food, alcohol and sedentary lifestyle which leads to silent self-destruction and making one in every five Indian either obese or overweight [12].

The community based studies regarding the prevalence of diabetes among obese people are very few. Hence, the present study is designed to know the Prevalence of diabetic mellitus among the obese and overweight people of 35 years and above during the year 2008 and 2009.

Material and Methods

A community based cross- sectional study was conducted over a period of 10 months from April 2008 to February 2009. Study area: The 3 PHCs namely Kinaye, Handignur and Vantamuri (Under the field practice area of J.N. Medical College, Belagavi). Sample size: The sample size was calculated by using the formula $n = \frac{4pq}{d^2}$. The value of $d=0.1$ (error in estimation of p). Hence, the sample size for the study was estimated to 1540. Sampling technique: Simple random sampling method Inclusion& Exclusion criteria: The population who was 35 years and above was enrolled in the study where as those who did not give the informed consent were excluded from the study.

Ethical clearance: Ethical clearance was taken from Institutional Ethics Committee (IEC) of J.N.M.C, KLES, Belagavi and informed consent was taken from participants prior to conduction of study. Tools for data collection: A pretested and predesigned questionnaire was used to collect the data. Study procedure: All the study participants were screened for Obesity and overweight having the cut off value of 25 (Body Mass Index- BMI). The BMI was calculated as weight in kg per square of height in meter. Out of 1540 participants, 335 were diagnosed as obese and overweight and hence they were enrolled in the

study. After the screening of Obese and overweight population, they were sent for random blood glucose test to diagnose whether they were diabetic. The data collectors were trained in measuring the height and weight of individuals.

The demographic profile like age, sex, occupation, education and income was collected. The data on family history, type of diet they consume and physical activities were also collected. Statistical analysis: Before entering the data in the computer, it was compiled, re checked and coded. Data was analyzed using appropriate statistical tools in SPSS 20. Data was presented on tabular and graphical form as per necessary.

Results

The study revealed that out of 1540 participants; 335 were detected as obesity and overweight. Hence those 335 participants were enrolled in the study and were further screened for the diabetic mellitus. Out of those who were obese, maximum i.e. 59.4 percent were female. Most of them (36.71%) were farmers, followed by 16 percent laborer, 13 percent were professionals, 12 percent were involved in their own business and 20 percent of the study participants were involved in other professions.

Table-1: Distribution of participants as per religion & family history of diabetes		
Religion	Frequency	Percentages
Hindu	223	66.56
Muslim	66	19.7
Christian	26	7.76
Others	20	5.87
Total	335	100
Family History		
Yes	84	25.07
No	251	74.92
Total	335	100

The study showed that 64.17 percent of the obese participants were literate however only 35.82 percent were illiterate. 48.65 percent of

the study participants had the annual income ranging from INR10001- 50000, followed by 31.04 percent i.e. Less than INR10000, 17.61 percent had INR50001-100000 and very minimal i.e. only 2.68 percent of the study participants had the annual income of more than INR100000. The study revealed that 99.4 percent of the study participants were aware of diabetic mellitus. Only 33.73 percent were doing some physical activities like walking, jogging and running. See table no. 1 for religion and family history of diabetes.

Table-2: Association in between sex and diabetes

Sex	Diabetes		Total
	Absent	Present	
Male	102	34	136
	75.0%	25.0%	100.0%
Female	168	31	199
	84.4%	15.6%	100.0%
Total	270	65	335
	80.6%	19.4%	100.0%

DF= 1, Chi-square value=4.586, P-value=<0.05

Out of 335 obese and overweight participants 19.4 percent were diabetic. The study also showed that 57.91 percent of the obese participants were non-vegetarian. There was a significant association in between sex and the diabetic mellitus as the p-value was found to be less than 0.05 (Table no. 2) .The associations in between diabetes and educational status, family history and physical activities can be seen in table no. 3, 4 and 5 respectively.

Table-3: Association in between educational status and diabetes

Education	Diabetes		Total
	Absent	Present	
Literate	186	29	215
	86.5%	13.5%	100.0%
Illiterate	84	36	120
	70.0%	30.0%	100.0%
Total	270	65	335
	80.6%	19.4%	100.0%

DF=1, Chi-square value= 13.427, P-value= 0.000

Table-4: Association in between family history and Diabetes

Family History	Diabetes		Total
	Absent	Present	
Yes	74	10	84
	88.1%	11.9%	100.0%
No	196	55	251
	78.1%	21.9%	100.0%
Total	270	65	335
	80.6%	19.4%	100.0%

DF=1, Chi-square value= 4.031, p-value= 0.029

Table-5: Association in between physical activities and diabetes

Physical activities	Diabetic status		Total
	Absent	Present	
Yes	98	15	113
	86.7%	13.3%	100.0%
No	172	50	222
	77.5%	22.5%	100.0%
Total	270	65	335
	80.6%	19.4%	100.0%

DF=1, Chi-square value= 4.096, p-value= 0.028

Discussion

The study revealed that, out of those who were obese, maximum i.e. 59.4 percent were females. Most of them i.e. 36.71 percent were farmers. 64.17 percent of the obese participants were literate. The study revealed that 99.4 percent of the study participants were aware of diabetic mellitus. However, only 33.73 percent were doing some physical activities like walking, jogging and running. This is because they must have started physical activity after being detected as obese and diabetic. The prevalence of diabetes among the 335 obese and overweight was 19.4 percent.

A study conducted in Pune, India in the year 2011 with total sample of 53 showed that 64.15 percent of the study participants were

females. The prevalence of obesity and diabetes was 41 and 13.2 percent respectively. The study also showed the statistical significant association in between diabetes and obesity [13]. A study conducted in the north of Liverpool, United Kingdom in the year 2002 with the sample of 3637, showed that 916 were type 1 diabetic and the remaining 2721 of the study participants suffered from type 2 diabetes. Among the type 1 diabetic patients, 53.3 percent were overweight, 16.6 percent were obese and 0.4 percent had morbid obesity. However, among the type 2 diabetic patients, 86 percent were overweight and 52 percent were obese and 8.1 percent had morbid obesity. 54.2 percent and 53.5 percent of the study participants were male in type 1 and type 2 diabetes mellitus respectively [14]

Another study conducted in Manipur, India with the sample of 1099 male and 669 female populations showed that the overall prevalence of diabetes in the entire study population was found to be 16.63%. About 13.8% individuals had shown co-prevalence of Diabetes Mellitus. The association of Diabetes Mellitus with different risk factors such as consumption of alcohol and difference in physical activities were found to be statistically significant. The association of Diabetes Mellitus with different populations and age groups are also statistically significant [15].

Conclusion

The study revealed that the prevalence of diabetes among obese is high. Hence, obesity is measured

as the foremost risk factor for diabetes. More than 50 percent of the study participants were females and the association in between sex and diabetes was statistically significant. Association was also observed in between educational status, family history and physical activities with diabetes mellitus was statistically significant.

Implications

As diabetes is an iceberg disease and the prevalence is high among the obese in rural population, the primary health centers can be given with the responsibility to conduct the diabetes screening health camp on routine basis.

Recommendations

Early diagnosis of diabetes cases among the obese and overweight is important and this can be done by continuous screening programmes in the community. Though the government of India has launched NCD (Non Communicable Diseases) prevention programme, the focus should be given on community based mass screening. Obesity and overweight is most often due to the sedentary lifestyle, hence the modification in lifestyle is another important issue for the prevention of obesity and overweight. And this can be done by encouraging the people for avoiding the fast foods and increase the physical activities.

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*All correspondences to: Dr. Ashwini Narasannavar, Assistant Professor, Department of Public Health, Jawaharlal Nehru Medical College, KLE University Campus, Nehru Nagar, Belagavi-5900010, Karnataka, India. Email: drashwinimph2004@gmail.com