



Prevalence of Diabetes mellitus Among School Teachers in Urban Area of Nagpur City, Central India

KEYWORDS

diabetes mellitus, school teachers, urban city.

* Dr. Deepak Lone

Assistant Professor, Department of Community Medicine, Govt. Medical College, Aurangabad, Maharashtra, India.
* Corresponding author

Dr. Sushma Thakre

Associate Professor Department of Community Medicine, Indira Gandhi Govt. Medical College, Nagpur, Maharashtra, India.

Dr. Subhash Thakre

Associate Professor Department of Community Medicine, Govt. Medical College, Nagpur, Maharashtra, India

Dr. Avinash Borkar

Assistant Professor, Department of Community Medicine, Shri Vasantrao Naik, Govt. Medical College, Yeotmal, Maharashtra, India.

Dr. Namita Deshmukh

Assistant Professor, Department of Community Medicine, Govt. Medical College, Akola, Maharashtra, India.

ABSTRACT This paper discusses the current level of prevalence of diabetes mellitus among school teachers in urban area of Nagpur city, Maharashtra, Central India. A cross-sectional study was carried out from June 2011 - December 2012 involving 726 school teachers of age > 20 years, from 21 randomly selected schools of urban area of Nagpur city. A pretested proforma was used to collect socio-demographic information and oral glucose tolerance test (OGTT) was performed using 75 gm of glucose. Fasting and 2 hour post glucose load blood sugar level was measured by Accu-check Performa glucometer. Results showed that 14.60% teachers were having diabetes mellitus. About 6.47% were known diabetics and 8.13% were newly detected.

Introduction:

The prevalence of diabetes is rapidly rising all over the globe at an alarming rate.¹

According to the latest WHO estimates 171 million people worldwide are having diabetes and this figure is likely to be more than double by 2030.² According to the recent projections of World Health Organization (WHO), India already leads the world with the largest number of diabetic subjects (nearly 40 million) and it is predicted that this number would reach almost 80 million by the year 2030. This would represent approximately 20 per cent of the total diabetic population of the world.³ Recent population based studies reveal a rising prevalence of diabetes in the urban areas of India with figures ranging between 12-16 per cent.^{4, 5, 6}

Some studies have also been done in high risk groups having sedentary life styles, job stress, obesity and other risk factors. School teachers in urban area are experiencing sedentary urban life style behaviors such as vehicle use for transport, environmental pollution, high calorie diet, lack of physical exercise and sedentary behavior and job stress. The major sources of stress are colleagues, curriculum, parents, pupils, school authority, society, supervision/teaching, teaching environment and wages (income)⁷. Teachers regardless of what level they teach are exposed to high level of stress. The fact that teachers are exposed to high level of stress can be an international phenomenon (Mokdad, 2005).⁸ Development of diabetes is also related to the occupations involving sedentary behavior and high degree of stress.⁹

Methodology:

Determination of sample size :

According to National Urban Diabetes Survey (2000)⁵ the

prevalence of diabetes mellitus in urban India in adults was 12.1%. Accordingly sample size was calculated by using following formula.¹⁰

$$n = \frac{Z^2(1-\alpha/2)p(1-p)}{d^2}$$

Where, n = Sample size, $Z^2(1-\alpha/2) = 1.96$, α = Level of significance (95%), p = Prevalence (12.1%), d = Absolute precision (20 %). Thus sample size came to be 726.

Study design and setting

This study was a community-based cross-sectional study carried out in Urban area under Urban Health & Training Centre of Department of Preventive and Social Medicine, IGGMC, Nagpur in north-east Maharashtra from July 2010 to December 2012. Approval from Institutional Ethics Committee and Ethics committee of Maharashtra University of Health Sciences, Nashik was sought before the start of study. Schools were randomly selected according to the willingness of school teachers and permission given by the school authorities till the fulfillment of required sample size. Thus 21 schools were covered and 726 school teachers were examined.

Data collection

Permission was obtained from school authority. The teachers were contacted and briefed them about the purpose of the study, information required and investigations to be done in detail. A rapport was established and full co-operation was guaranteed by study participants. The teachers who showed willingness and gave informed written consent to participate in the study were asked about socio-demographic characteristics. Data

was collected by using Interview technique.

Those who had furnished basic information were asked to come overnight fasting on next day. On the next day morning Fasting capillary blood glucose was checked with glucometer (Accu-check Performa) with all aseptic precautions. Oral Glucose Tolerance Test (OGTT) was performed with 75 gm of glucose. Exactly after 2 hours of glucose ingestion, post glucose load blood sugar was checked with the same glucometer. Subjects were classified as diabetics and non-diabetics based on WHO criteria 1999.¹¹

WHO 1999 criteria for diagnosis of diabetes mellitus:

Diabetes mellitus:

Fasting capillary blood glucose ≥ 110 mg/dl (≥ 6.1 mmol/L) and 2 hour post glucose load blood glucose ≥ 200 mg/dl (≥ 11.1 mmol/L)

Data entry and analysis

Data was entered in Microsoft excel 2007. Continuous data presented by mean and standard deviation (SD). Categorical data analyzed by use of chi-square test. P value < 0.05 was considered as statistically significant. Percentages were calculated for estimating the prevalence of diabetes mellitus.

Results:

Demographic profile:

Table 1 shows age and gender wise distribution of 726 study subjects. Out of total 726 study subjects 454 (62.53%) were females and 272 (37.47%) were males. The age-wise distribution of 726 study subjects shows that proportionately higher 274 (37.74%) subjects belonged to the age group of 41-50 years, followed by 193 (26.58%) in 31-40 years age group and 161 (22.18%) were in 51-60 years age group.

There were 98 (13.50%) subjects in the age group of 20-30 years. The mean (\pm SD) age of study subjects was 42.58 (\pm 9.52) years.

Table 1: Age and Gender wise distribution of study subjects

Age (Years)	Study subjects					
	Male		Female		Total	
	N	%	N	%	N	%
20 - 30	37	13.60	61	13.44	98	13.50
31 - 40	63	23.16	130	28.63	193	26.58
41 - 50	101	37.14	173	38.10	274	37.74
51 - 60	71	26.10	90	19.83	161	22.18
Total	272	37.47	454	62.53	726	100

Table 2: Distribution of study subjects according to blood glucose level

Blood glucose level	Study subject		
	Male N (%)	Female N(%)	Total N (%)
Normal (F<110, 2hPG<140)	232 (85.30)	388 (85.46)	620 (85.40)

Blood glucose level	Study subject		
	Male N (%)	Female N(%)	Total N (%)
Diabetes mellitus (F>110, 2hPG>200)	40 (14.70)	66 (14.54)	106 (14.60)
Total	272 (100)	454 (100)	726 (100)

Table 2 reveals distribution of study subjects according to blood glucose level. From above table it is observed that 106 (14.60%) subjects were having diabetes while 620 (85.40%) were normal subjects. The diabetics males were 40 (14.70%) and females were 66 (14.54%). Out of 726 study subjects there were 47 known diabetics (6.47%) and we found 59 newly detected diabetic subjects (8.13%) as shown in graph 1.

Graph 1: Prevalence of Diabetes Mellitus in school teachers.

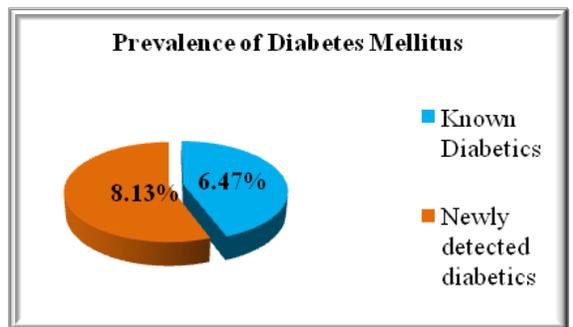


Table 3: Age and gender wise prevalence of diabetes mellitus (DM)

Age (Years)	Study subjects								
	Male			Female			Total		
	N	DM	%	N	DM	%	N	DM	%
20- 30	37	01	0.37	61	02	0.44	98	03	0.41
31- 40	63	02	0.73	130	09	1.98	193	11	1.51
41- 50	101	21	7.72	173	31	6.83	274	52	7.17
51- 60	71	16	5.88	90	24	5.29	161	40	5.51
Total	272	40	14.70	454	66	14.54	726	106	14.60

(N = number of study subjects, DM = number of diabetic subjects).

(Age : < 40 vs > 40 years - $c^2 = 37.33$, $p = 0.0000$, $df=1$), (Gender : Male vs Female - $c^2 = 0.90$, $p = 0.950$, $df=1$)

Table 3 shows age and gender wise prevalence of diabetes mellitus. Above table reveals that the overall prevalence of diabetes mellitus (DM) was 106 (14.60%). In males prevalence of DM was 40 (14.70%) and in females it

was 66 (14.54%). Highest prevalence of DM was observed in 41-50 years of age group in males (7.12%) , however in females it was 6.83% in the same age group. It also reveals that higher proportion 92 (12.86%) of diabetic subjects were in the age group of > 40 years, when these ages were compared then the difference was found to be statistically significant ($\chi^2 = 37.33$, $p = 0.0000$, $df=1$).

However no statistically significant difference was observed in the prevalence of diabetes mellitus in males and females ($\chi^2 = 0.90$, $p = 0.950$, $df=1$).

Discussion:

The present cross sectional study was done to estimate the prevalence of diabetes mellitus among the school teachers in urban area and to study various risk factors associated with diabetes mellitus in them.

Mean age (\pm SD) of study subjects was 42.58 (\pm 9.52) years. This finding is similar with the other studies done by Deepa M (2011),¹² Mohan V (2003),¹³ Shah S K (1999).¹⁴

In this study, overall prevalence of diabetes mellitus was found to be 14.60%. The prevalence was almost similar in males (14.70%) and females (14.54%) as shown in Table 1. Gupta S (2004)¹⁵ studied the prevalence of diabetes mellitus in school teachers in urban area of Nagpur city in 2002. They found that the prevalence of diabetes mellitus in school teachers was 10.0% with 5.3% known diabetics and 4.7% new cases of diabetes mellitus. Studies done in other urban cities of India have reported prevalence from 13% to 20% which is consistent with the findings of present study. Prevalence of diabetes mellitus was reported to be 19.52% by Sawant A et al (2011)¹⁶ in Mumbai, 14.3% by Mohan V et al (2006)⁶ in Chennai city, Ramchandran et al⁵ in their multicentric study, estimated the prevalence of diabetes mellitus in other urban cities of India and reported 16.6% in Hyderabad (2001), 18.6% in Tamilnadu (2008), 12.4% in Bangalore (2001), 11.7% in Kolkata (2001). Ramchandran et al⁵ also observed somewhat lower prevalence of diabetes mellitus in other urban cities like in Mumbai 9.3% (2001) and in New Delhi 10.3% (2001). Mohan et al (2008)⁹ observed 7.3% prevalence of diabetes in their Multicentric study (WHO-ICMR study), Sadikot et al (2004)¹⁷ reported 5.6% prevalence of diabetes in urban India, Shah SK et al (1999)¹⁴ reported 8.3% in Guwahati.

Gadekar RD (2011)¹⁸ reported 14.6% prevalence of diabetes mellitus in state transport bus drivers and conductors. Purty AJ¹⁹ estimated 5.8% prevalence of diabetes mellitus in urban area of Pudduchery in 2009 while Bharti DR²⁰ reported 8.6% in 2011. It is noteworthy that the prevalence is increased to 14.60% over a period of 10 years as compared to the 10% prevalence reported by Gupta S (2004)¹⁵. This suggests that the prevalence of diabetes is increasing in urban area. Difference in prevalence of various studies observed may be because of variation in age group, different diagnostic criteria adopted by authors and cultural factors determining physical activity of individuals in different geographic areas.

Rapid rates of urbanization, modernization, readily available fast foods and sedentary habits have altered the lifestyle of the population. Primary prevention of diabetes is possible by modifying risk factors such as obesity and insulin resistance. National programs promoting healthy lifestyle among the population, starting from a young age, should be given priority in the health care agenda. Indian Diabetes Prevention Program have shown the benefits of lifestyle modification focused on improved physical activity and healthy diet habits to prevent or at least delay the onset of diabetes in high risk subjects.²¹

Conclusion:

In our study, we estimated 14.60% prevalence of diabetes mellitus among school teachers in urban study area. The study was a survey at one period in time at schools so it has the limitations of a cross-sectional study. However, the findings of the study are suggest that the prevalence of diabetes mellitus is increasing in the persons experiencing urban lifestyles. Identifying the high risk groups in various professions and their regular screening for diabetes mellitus should be included in the health care policy of every organization.

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