

Prevalence of self-reported diabetes mellitus in an urban population

Mohammad Shibly Khan¹, Zulfia Khan², Ali Amir²

¹Department of Community Medicine, FH Medical College, Firozabad, Uttar Pradesh, India.

²Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India.

Correspondence to: Mohammad Shibly Khan, E-mail: shibly001@gmail.com

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Abstract

Background: Noncommunicable diseases (NCDs) are now becoming major public health issues in developing and developed countries. Type 2 diabetes mellitus, being a part of the NCD group, is also showing an upward trend globally. It has been classified as the third leading cause of premature mortality worldwide. India and China share the greatest burden of diabetes mellitus globally.

Objectives: (1) To estimate the prevalence of self-reported (or already diagnosed) type 2 diabetes mellitus among the study population; (2) To determine the association between self-reported diabetes mellitus and certain sociodemographic factors.

Materials and Methods: This study is a part of larger cross-sectional community-based study carried out in employees of the Aligarh Muslim University for 1-year duration (June 2012 to May 2013). The estimated sample size was 540. The subjects were taken from all the sections of the employees, that is, teaching, clerical, technical, and class four staff, as per probability-proportionate-to-size (PPS) method and the individual subject chosen randomly from among these sections. Data were presented as proportions and percentages, and appropriate statistical test was used wherever applicable. The study was approved by the institutional ethics committee, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India.

Result: The prevalence of self-reported diabetes mellitus among study population was found to be 7.96% (43/540). More men than women were found have diabetes mellitus. It was found to be significantly associated with the increasing age, positive family history, and higher educational status. The association of diabetes mellitus with socioeconomic status was not found to be significant.

Conclusion: The prevalence of self-reported diabetes mellitus among study population was found to be high considering the fact that a large proportion of patients with diabetes mellitus usually tend to remain unaware of their diabetic status.

KEY WORDS: Self-reported diabetes mellitus, prevalence, community-based study

Introduction

The epidemiological transition that follows the economic growth has affected the health status of nations in a way that the noncommunicable diseases (NCDs) are now becoming major public health issues in developing and developed countries.^[1] The prevalence of diabetes mellitus, which is included in the NCD group, is also showing an upward trend globally.^[2] Earlier it was considered to be a disorder affecting the elderly but now it is one of the major causes of morbidity and mortality.^[3]

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As per recent estimates, approximately 387 million people worldwide are living with diabetes mellitus, whereas southeast region is home to 75 million people with diabetes mellitus.^[4] According to the International Diabetes Federation, 4.9 million people died because of diabetes mellitus in 2014, and at every 7 s one person dies because of it.^[4] Of the total burden of diabetes mellitus, 80% is from the developing countries, of which the largest contribution is from India and China.^[5] Industrialization, rapid economic growth, urbanization, changing food habits, and increased level of stress are some of the factors related to changing lifestyle, which are being implicated in the development of type 2 diabetes mellitus.

Diabetes mellitus or raised blood sugar is included in the list of risk factors for NCDs along with other metabolic and behavioral risk factors^[6] that are interrelated, promoting the development of each other. It has been classified as the third leading cause of premature mortality worldwide.^[7] It is a significant cause of mortality and morbidity, individually or along with other NCDs. For instance, the mortality because of coronary heart disease has been found to be two to four times higher in patients with diabetes mellitus as compared with those without diabetes mellitus.^[8] Similarly, the chances of stroke are increased by two times in patients with diabetes mellitus.^[9]

Various community-based studies have been conducted in India to describe the prevalence of diabetes mellitus in different population groups. This study was taken up among the employees of a university with the following aims and objectives:

- 1 To estimate the prevalence of self-reported (or already diagnosed) type 2 diabetes mellitus among the study population.
- 2 To determine the association between self-reported diabetes mellitus and certain sociodemographic factors.

Materials and Methods

This study is a part of larger cross-sectional community-based study conducted on the NCD risk factors among the employees of Aligarh Muslim University, Aligarh, Uttar Pradesh, India, during June 2012 to May 2013.

Sample Size

The sample size was estimated based on the prevalence of self-reported diabetes mellitus to be approximately 14% (rounded off) as reported by a study conducted in Chandigarh.^[10] Applying this into the formula $N = 4pq/p^2$ (where p is the prevalence, i.e. 14%, and $q = 1 - p$) taking 95% confidence interval and 3% precision, the final sample size was found to be 540.

Sampling Method

The subjects were taken from all the four sections of university staff, that is, teaching, clerical, technical, and grade four staff. The number of employees to be taken from each category was calculated as per probability-proportionate-to-size (PPS) method. Individual subject was then selected

through simple random sampling from the respective lists of these four groups. If the selected study subject did not give consent or found to be absent, then the next employee from the list was selected and the sample size was completed.

Employees of Aligarh Muslim University, Aligarh, aged 20–59 years, and individuals giving informed consent were included in the study, whereas individuals below 20 years and more than 59 years of age and those who did not give consent were excluded. It is based on self-reported diabetes mellitus diagnosed by the physician.

Statistical Analysis

Data were recorded and tabulated and presented as percentages and proportions, and appropriate statistical test was used wherever applicable.

Ethical Issues

The study was approved by the institutional ethics committee, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. Informed verbal consent was taken from all the subjects. Health education was provided to all the subjects.

Result

The age–sex composition of study subjects is shown in Table 1. Majority of study subjects were men (79%) and from the age group of 50–59 years.

Prevalence of Self-Reported Diabetes Mellitus

Of the total study subjects, approximately 43 were found to have type 2 diabetes mellitus (diagnosed by the physician), giving rise the prevalence of self-reported diabetes mellitus

Table 1: Age–sex distribution of study subjects

Age group (year)	Male	Female	Total
20–29	54 (12.7%)	18 (15.9%)	72 (13.3%)
30–39	91 (21.3%)	36 (31.9%)	127 (23.5%)
40–49	129 (30.2%)	30 (26.5%)	159 (29.5%)
50–59	153 (35.8%)	29 (25.7%)	182 (33.7%)
Total	427 (79.1%)	113 (20.9%)	540 (100%)

Table 2: Fasting blood sugar level among subjects with diabetes mellitus (N = 43)

Category	Frequency	%
Ideal (80–110 g%)	23	53.5
Satisfactory (101–125 g%)	13	30.2
Unsatisfactory (>125 g%)	07	16.3
Total	43	100

Table 3: Self-reported diabetes mellitus with certain sociodemographic factors

Variable	Self-reported diabetes mellitus		Significance
	Yes (<i>n</i> = 43)	No (<i>n</i> = 497)	
Age (year)			
20–29 (<i>n</i> = 72)	0 (0%)	72 (100%)	$\chi^2 = 18.56$, <i>df</i> = 3, <i>p</i> < 0.00, significant
30–39 (<i>n</i> = 127)	03 (2.36%)	124 (97.64%)	
40–49 (<i>n</i> = 159)	20 (12.58%)	139 (87.42%)	
50–59 (<i>n</i> = 182)	20 (10.98%)	162 (89.01%)	
Sex			
Male (<i>n</i> = 427)	37 (8.67%)	390 (91.33%)	$\chi^2 = 1.373$, <i>df</i> = 1, <i>p</i> > 0.05, not significant
Female (<i>n</i> = 113)	06 (5.31%)	107 (94.69%)	
Family history			
Present (<i>n</i> = 84)	16 (19.05%)	68 (80.95%)	$\chi^2 = 16.67$, <i>df</i> = 1, <i>p</i> < 0.00, highly significant
Absent (<i>n</i> = 456)	27 (5.92%)	429 (94.08%)	
Socioeconomic class			
I (<i>n</i> = 161)	18 (11.18%)	143 (88.82%)	$\chi^2 = 9.257$, <i>df</i> = 4, <i>p</i> > 0.05, not significant
II (<i>n</i> = 114)	12 (10.52%)	102 (89.48%)	
III (<i>n</i> = 140)	09 (6.43%)	131 (93.57%)	
IV (<i>n</i> = 87)	01 (1.15%)	86 (98.85%)	
V (<i>n</i> = 38)	03 (7.89%)	35 (92.11%)	
Educational status			
Illiterate (<i>n</i> = 21)	02 (9.52%)	19 (90.48%)	$\chi^2 = 11.1$, <i>df</i> = 3, <i>p</i> < 0.05, significant
Primary/middle school (<i>n</i> = 80)	04 (5.00%)	76 (95%)	
High school/intermediate/diploma (<i>n</i> = 175)	06 (3.43%)	169 (96.57%)	
Graduate/postgraduate (<i>n</i> = 264)	31 (11.74%)	233 (88.26%)	

to be 7.96% (43/540). Among men it was found to be 8.6%, whereas approximately 5.3% women reported to be previously diagnosed with type 2 diabetes mellitus.

Glycemic Control among Patients with Diabetes Mellitus

The fasting blood sugar level was categorized according to the Indian Council of Medical Research guidelines,^[11] and it was found that the fasting blood sugar level among majority of subjects with diabetes mellitus was in the ideal range, whereas only 16.3% had their fasting blood sugar level in the unsatisfactory range [Table 2].

Self-Reported Diabetes Mellitus with Certain Sociodemographic Factors

With respect to age, the proportion of patients with diabetes mellitus was found to be maximum in the age group of 40–49 years [Table 3]. The association between diabetes mellitus and increasing age was found to be statistically significant (*p* < 0.05).

Although men accounted for the major chunk of the subjects with diabetes mellitus, the association was not found to be statistically significant (*p* = 0.241). Similarly, majority

of the patients with diabetes mellitus was from the higher socioeconomic classes, but this was also not found to be statistically significant (*p* = 0.055).

Discussion

This study was conducted among the employees of a university in an urban area of north India, and the prevalence of self-reported type 2 diabetes mellitus among the study subjects was found to be 7.96%. A prevalence of self-reported diabetes mellitus to be 7.3% in the urban areas has also been reported by the National NCD risk factors surveillance conducted in different geographical locations (north, south, east, west/central) in India.^[12] The National Family Health Survey-3 reported prevalence of diabetes mellitus in the age group of 35–49 years as to be 2.1% among women and 2.7% among men.^[13]

In a community-based study conducted in Chandigarh, the overall prevalence of self-reported diabetes mellitus was found to be 13.4%, which was more in men (15.2%) than in women (11.5%).^[10] The prevalence of diabetes mellitus has

been reported to be 10.5% in a study conducted among middle-class population in Delhi.^[14] In a study conducted among affluent population in Lucknow,^[15] the prevalence of diabetes mellitus has been reported to be 24.6%. Similar to this study, higher prevalence among men has been reported by all the earlier-mentioned studies. In Indian context, the cardiovascular risk factors including diabetes mellitus are generally reported to be associated with higher socioeconomic status,^[16] whereas in developed countries they have been found to be associated with lower socioeconomic status.^[17] The association of diabetes mellitus with family history was found to be significant ($p < 0.05$).

With respect to educational status, the proportion of subjects with diabetes mellitus was found to be higher among higher educational status. This association was found to be statistically significant ($p < 0.05$). The association of self-reported diabetes mellitus with graduate-level educational status has also been reported by the National NCD urban and rural surveillance locations in northern, southern, eastern, and western/central India.^[12]

Limitations

Because the study was conducted on a specific population, the results cannot be generalized. There remains a possibility of underreporting by the study participants, so the actual burden may be more than that reported among the study population in this study.

Conclusion

Diabetes mellitus is a major public health concern in the context of modern epidemic of NCDs. The results shown in the study represent only tip of the iceberg. Taking into consideration the fact that majority of the patients with diabetes mellitus remain unknown or hidden, this study shows a high prevalence of self-reported diabetes mellitus. In this study, diabetes mellitus was found to be associated with the increasing age, positive family history, and higher educational status. The nonsignificant association between diabetes mellitus and socioeconomic status indicates that it is no longer a disease of affluent alone, it is also making its presence felt in lower classes also. Among the majority of subjects with diabetes mellitus, the fasting blood sugar level was found to be ideal and satisfactory, which reflects the good attitude of the subjects with diabetes mellitus toward the adherence to the treatment.

There is an urgent need to adopt intervention at all levels to stop its progression. Health education should be disseminated on its prevention through lifestyle modifications, such as physical exercise and healthy diet, and avoiding stressful lifestyle.

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