Original Research Article

Risk factors associated with poorly controlled diabetes in a rural population

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International Archives of Integrated Medicine, Vol. 8, Issue 2, February, 2021.
Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 01-01-2021 **Accepted on:** 10-01-2021
Source of support: Nil **Conflict of interest:** None declared.
How to cite this article: Riyas C, Mohammed Ismail. K.K. Risk factors associated with poorly controlled diabetes in a rural population. IAIM, 2021; 8(2): 35-40.

Abstract

Introduction: The worldwide prevalence of diabetes has risen dramatically over the past two decades. India with the highest absolute number of cases has become the diabetes capital of the world. The aim of the study was to identify the factors associated with poorly controlled diabetes and comparing them between poorly controlled and well controlled subjects.

Materials and methods: In a rural population, this was a case-control analysis carried out. The research population included adults over 40 years of age with type II diabetes who were currently under care for a minimum of one year. For the study, 40 poorly controlled and 40 well controlled patients who were willing to participate were enrolled. After having received verbal consent from each participant, a pre-determined questionnaire was used.

Results: Hypertension, physical activity, smoking, tobacco use and alcohol consumption was significant in cases than that of controls. Diabetic duration of > 5 years, irregular check-up, Missed doses and co-mobidites were associated with diabetic which was significant in diabetic group.

Conclusion: Study highlighted a significant burden of diabetic cases in the community in which most of them are poorly controlled. There is need to identify the large pool of cases of DM and offer early treatment in order to avoid complications.

Key words

Diabetic, Hypertension, Physical activity, Smoking.

Introduction

Diabetes is a complex disease of multifactorial origin. Epidemiological and biomedical discourse and research on the Indian diabetes epidemic tend to focus on proximate individual-level factors such as lifestyle, diet, and exercise, and overlook the roles of distal social, cultural, and political-economic forces. As a significant threat to global human health, type 2 diabetes

mellitus is increasingly emerging. 8.3 percent of the world's adult population suffered from diabetes as of 2014, with the majority of this burden being borne by low-income countries in Africa and Asia. India's diabetes prevalence is 7.8 percent and growing, and some regions are experiencing prevalence rates as high as 18 percent. In addition, while historically considered an urban affluent epidemic, diabetes has become a serious concern among rural populations and contributes to widening health gaps [1, 2].

There are few studies that have attempted to understand the problem. There is currently insufficient information available on prevalence of type 2 diabetes and associated factors in North India. Previous community based studies in this region have been limited only to the few area which does not truly represent the south Indian population.

Therefore, this study was conducted out with the primary objective of defining the contributing factors with poorly controlled diabetes in our area.

Materials and methods

A community based case- control study was carried out in a rural population in nearby of medical college. The survey was conducted over a period of two months. A total of 80 diabetic patients were selected for the study. 40 cases and 40 controls included according to selection criteria.

Inclusion criteria: Adults aged 40 years and above, diagnosed with type 2 diabetes for at least one year prior to the initiation of the study. Patients who had been living with poorly glycemic control (FBS - 126-150 mg/dL, PPBS > 200 mg/dL) for at least three months and currently under treatment.

Exclusion criteria: Adults who were diagnosed with diabetes or hyperglycemia for the first time, pregnant women were excluded from the study.

Patients who were above 40 years whose diabetes condition have been under good control (FBS- 80-126 mg/dL, PPBS - 180-200 mg/dL) for a period of at least three months were considered as controls.

Questions included demographic profile, specifics of personal habits, personal and family history of diabetes, diabetes awareness, attitudes and access. Patients with diabetes, along with other diseases undergoing treatment, were followed once a month in their own villages by a team of physicians. Patients with diabetes had their blood glucose tested during their visit to the clinic. Depending on the importance of the blood glucose collected, well-regulated and poorly controlled subjects were enrolled in the study.

Data entry was done in an excel sheet. The analysis was done using SPSS version 20. Descriptive analysis was done for all the variables. Frequencies, percentages were calculated for categorical variables and mean and standard deviation was calculated for continuous variables.

Results

In total of 80 cases mean (SD) age: 45 (18) years were enrolled. A total of 23 (52%) respondents were males and 17(47.3%) were females in diabetic group. Approximately 70% of the individuals had less than secondary-level education. Most of the respondents are of urban origin in both groups. In total 80 cases BMI is significant when compared in groups (**Table – 1**).

Hypertension, physical activity, smoking, tobacco use and alcohol consumption were significant in cases than that of controls (**Table – 2**).

Diabetic duration of > 5 years, irregular check-up, Missed doses and co-morbidities were associated with diabetic which was significant in diabetic group (**Table – 3**).

Table - 1: Demographic profile.

Age in years	**Cases**	**Controls**	**P-Values**
40-45	15(48%)	16(52%)	>0.05
46-50	6(46%)	7(54%)	
51-55	7(64%)	4(36%)	
56-60	5(62.5%)	3(37.5%)	
60-65	4(50%)	4(50%)	
70-75	2(40%)	3(60%)	
>75	1(25%)	3(75%)	
Mean age	45+18		
Gender			
Male	21(48%)	23(52%)	>0.05
Female	19(52.7%)	17(47.3%)	
Education level			
No education	23(70%)	10(30%)	<0.05
Primary	9(30%)	21(70%)	
Secondary	5(50%)	5(50%)	
Higher	3(42.8%)	4(57.2%)	
Place of residence			
Urban	29(57%)	22(43%)	<0.05
Rural	11(40%)	18(60%)	
BMI			
Thin	11(64.7%)	7(45.3)	<0.05
Normal	22(41%)	31(59%)	
Overweight	7(78%)	2(22%)	

Table - 2: Association of variables with poorly diabetes (N=100).

Variables	**Cases**	**Controls**	**p-values**
Hypertension			
Yes	13(68%)	6(32%)	
No	27(44.6%)	34(55.4%)	<0.05
Physical activity			
Yes	15(75%)	5(25%)	<0.05
No	25(42%)	35(58%)	
Smoking			
Yes	25(78%)	7(22%)	<0.05
No	15(40%)	23(60%)	
Tobacco use			
Yes	28(70%)	22(30%)	<0.05
No	12(40%)	18(60%)	
Alcohol consumption			
Yes	12(67%)	6(33%)	<0.05
No	28(45%)	34(55%)	

Table - 3: Association of related other variables with poorly controlled diabetes.

Variables	Cases	Controls	p-values
Diabetic duration			
>5 years	25(78%)	7(22%)	<0.05
<5 years	15(40%)	23(60%)	
Irregular check up			
Yes	28(70%)	22(30%)	<0.05
No	12(40%)	18(60%)	
Missed doses			
Yes	11(40%)	18(60%)	<0.05
No	29(57%)	22(43%)	
Co-morbidities			
Yes	28(70%)	22(30%)	<0.05
No	12(40%)	18(60%)	

Discussion

Present case-control study was carried out with the aim to identify factors associated with poorly controlled diabetes. Participants aged 40 years and above who had been diagnosed with type II diabetes for a minimum of 1 year and under treatment were enrolled for the study.

A descriptive observational study was performed in a multi-specialty hospital in Tamil Nadu by C. Moorthi, et al. [3]. Sixty percent of the poorly controlled diabetic population and 47 percent of the controlled patients were male in this sample. The present study, on the other hand, reveals that 52 percent of the cases and 47.3 percent of the control subjects were female.

In total of 80 cases mean age is 45 (18) years were found in present study. Barik, et al. in a large cross-sectional survey in rural West Bengal, which is situated in the eastern region of the country, found that the prevalence of diabetes and pre-diabetes among adults >18 years was 2.95 and 3.34% respectively [4]. In another study, Little, et al. [5] reported a high prevalence of type 2 diabetes (10.8%) among adults population (>19 years) in rural parts of South India

In our study, total of 23 (52%) respondents were males and 17(47.3%) were females in diabetic group. Globally, age-standardized prevalence of DM was found to be 9.8% in men and 9.2% in women with observed regional disparity, as a high prevalence of DM was found in South Asia, Caribbean, Central Asia, North Africa, and the Middle East [6]. Disparity within country was observed in India as in urban areas the prevalence of DM is from 5.9% to 12.1% (North: 8.6% to 11.6%; South: 13.5% to 19.5%) [7, 8]. A nationwide survey across India showed 1.3% prevalence of self-reported DM, which was more in men (1.5%) as compared to women (1.0%).

In present study Most of the respondents are of urban origin in both groups. Evidence from South Africa observed that the hypertension was positively associated with urbanization. In India, it was found that the prevalence of DM was two and half times higher in urban than in rural area [2]. The National Urban Diabetes Survey showed an age-standardized prevalence of 12.1% for diabetes and 14% for IGT in six large metropolitan cities [9]. The Prevalence of Diabetes in India Study (PODIS) reported lower diabetes prevalence of 5.9 and 2.7% in urban and rural areas respectively with an overall prevalence of 4.3% [10]. Two studies in Chandigarh, a very prosperous city in North India, showed high prevalence of diabetes. In the INDIAB study, the city was found to have the highest prevalence of diabetes (13.6%) [11]. The Chandigarh Urban Diabetes Survey (CUDS) also

reported high prevalence of diabetes and prediabetes i.e. 11.1 and 13.2% respectively [12].

In present study hypertension, physical activity, smoking, tobacco use and alcohol consumption are significant in cases than that of controls. According to Moorthi, et al. [3] about 73% of the poorly controlled patients were also having hypertension while only 27% controls had hypertension and it was significant. (p value <0.001). An assessment showed that both current and past smoking are associated with a risk of diabetes mellitus essentially in men, but much less in women with the relationship between fasting glucose and smoking.

Diabetic duration of > 5 years, irregular check-up, Missed doses and co-morbidities are associated with diabetic which is significant in diabetic group. A study carried out by Gopinath B, et al. in Karnataka shows that 60.2% of the diabetic population had been having diabetes for more than 5 years [13]. In the current study, 60% of the diabetic population (425 cases and 185 controls) was having diabetes for more than 5 years. There is a significant association of increased duration of diabetes with poorly controlled diabetes (OR 2.8, p value=0.009). Our study findings were congruent with Moorthi, et al. [3] showing that missing of doses of medication was more in poorly controlled diabetic patients (p value <0.01). Our study found a significant association between missing doses and poorly controlled diabetes.

Conclusion

The factors most responsible for the regulation of diabetes by patients have been collectively established in this research. It was found that factors such as diabetes length, co-morbidities, primarily hypertension, missed dosage, lack of exercise, and irregularity of patient doctor visits were correlated with poorly regulated diabetes. This research highlights the need to inform patients about preventive measures and to inspire them to make an effort to follow a healthier lifestyle. The study warrants the need to change the diabetes treatment focus to keep the sugar levels under control in order to prevent early complications.

Diabetes education and encouragement for seeking further educational information from sources outside the health center should be considered as a potential intervention to improve quality of diabetes care among similar populations in Ecuador.

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