Original Research Article

Prevalence of Diabetes Mellitus in Rural Ahmedabad of Gujarat - A Camp Based Cross-Sectional Study

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ABSTRACT

Context: Diabetes mellitus (DM) ranks twelfth in all-cause mortality worldwide. India is emerging as a 'diabetic capital' of the world. Though Diabetes is considered as a disease of urbanites, several studies have documented prevalence of diabetes from 2 - 10% among adult rural people. The rise is mainly attributed to change in the life style and environment. The baseline data at local level regarding the prevalence of diabetes and factors contributing to its genesis can help for better planning, implementation, monitoring and evaluation of National Program for control of Cancer, Diabetes, Cardio-vascular diseases and Stroke (NPCDCS). **Aims**: To determine the prevalence of Diabetes Mellitus in the rural population and to identify risk factors associated with diabetes mellitus in study group. **Settings and Design**: This was a camp based cross- sectional study conducted at 5 randomly selected taluka villages in rural Ahmedabad. **Materials and Methods**: A total of 230 visitors of medical camps with the age of above 20 years were selected by systematic random sampling for study purpose. Predesigned and pre tested performa was used for data collection. A drop of blood from the finger tip of each participant was collected for measuring random blood sugar by the use of rapid diagnostic kits. **Statistical analysis used**: Data was analyzed in Epi Info 7 version. **Results**: The prevalence of diabetes mellitus was 2.6 % in the study population. The prevalence was highest (6.7%) in age group 21-30 and 51-60 years. Diabetes was significantly associated with hypertension, family history of diabetes and sedentary working. Diabetes was not significantly associated with smoking, diet habit, caste and socio economical class. **Conclusions**: In rural India, lack of awareness and specialist care may lead to more complications and economic burden. Awareness and early diagnosis by screening are the need of the hour to prevent epidemic of diabetes in rural population.

Key-words: Blood Pressure, BMI ,Diabetes, Family history, Blood Pressure.

INTRODUCTION

Diabetes mellitus (DM) ranks twelfth in all-cause of mortality worldwide. [1] The epidemiology of diabetes in India has an extensive history. The earliest national study reported an overall prevalence of 2.1 % in urban areas and 1.5% in rural areas. [2] India is emerging as a 'diabetic capital' of the

world. It has been projected that by 2025, India will have more than 60 million people with diabetes. [3] India and China have large rural population and hence the increased prevalence of diabetes in rural areas has contributed to the overall national increase in the prevalence of diabetes in these countries. [4] Though Diabetes is considered as a disease of urbanities, several studies documented prevalence of diabetes more than 10% among adult rural people. [5-6] The rise is mainly attributed to change in the life style and environment. India has more than 70% of its population in rural areas; hence it is important to measure the prevalence in rural areas from where people are migrating to urban areas. Therefore it is very necessary to collect baseline data at local level regarding the prevalence of disease and factors contributing to its genesis for better planning implementation, monitoring and evaluation of National Program for prevention and control of Cancer, Diabetes, Cardio-vascular diseases and Stroke (NPCDCS). [7]

MATERIALS AND METHODS

This cross –sectional study was done by random sampling method at rural area of Ahmedabad district of Gujarat. Visitors of rural health and medical camps at 5 block of the Ahmedabad district, who were of more than 20 years of age, were included in the study. An approval by Institutional Ethics Committee (IEC) was granted for this study. Verbal consent was taken from each participant. The subjects were interviewed with the help of a structured, pre- tested questionnaire. This was followed by clinical examination and anthropometry. A drop of blood was collected from the finger tip of each participant. Diabetes was detected by rapid diagnostic kit and those with random blood sugar level $\geq$ 200 mg/dl were classified as Diabetes Mellitus type – 2 as per the guideline of NPDCS [7] WHO's

Standard definitions were used to measure physical activity, Body Mass Index (BMI) and hypertension. Data was analyzed using Epi Info 7. The statistical tests used were chi square test, Z test, odds ratio with 95% confidence interval.

RESULTS

A total of 230 visitors of medical camps with more than 20 years of age participated in this study. There were 123 (53.48%) males and 107 (46.52%) females who participated in the study. It was observed that 220 (95.7%) participants were married & 225 (97.8%) participants followed Hindu religion. The overall prevalence of diabetes was 2.6% (6/230) in study subjects. The prevalence was 2.4% in males and 2.8% in females.

Table 1: Age distribution table of diabetic patients.

Age group (in years)	Total	No of individuals diagnosed by DM(%)
21-30	15(6.5%)	1(6.7%)
31-40	49(21.3%)	1(2%)
41-50	46(20%)	0
51-60	45(19.6%)	3(6.7%)
>60	75(32.6%)	1(1.3%)
Total	230(100%)	6(2.6%)

Table-1 shows that 6.7% were diabetic in the age group 21-30 years & 51-60 years each. Majority (32.6%) participants were aged more than 60 years, only 1.3% were diabetic. Thus highest prevalence was found in two age groups i.e. 21-30 years and 51-60 years of age.

Table-2 shows that 172 (74.8%) participants were not over weight, of whom only 3(1.7%) were diabetic while out of 58 (25.2%) overweight people 3 (5.2%) were diabetic. Out of 10% of participants who were hypertensive (systolic blood pressure more than 140 mm of Hg), 17.39% were diabetic when compared to non hypertensive which was statistically significant. Similarly, Out of 1.7% of participants who were having family history of diabetes, 50% were diabetic when compared to those without

having family history of diabetes which was statistically significant. Out of 44.8% of the participants who were engaged in sedentary work, 4.9% were diabetic when compared to those who were engaged in non sedentary work which was statistically significant. Diabetes was not significantly associated with smoking, dietary habits, caste and socio economical class.

Table – 2: Association of risk factors with diabetes mellitus in study group.

No	Risk Factors	Total (n = 230)	Diabetic (n = 6)	Non Diabetic (n = 224)	p value
1	Body Mass Index (kg/m^2)				
	< 25	172 (74.8%)	3(1.7%)	169 (98.3%)	-
	> 25	58 (25.2%)	3(5.2%)	55 (94.8%)	0.15
2	Blood Pressure (mm of Hg)				
	<140/90mm of Hg	207(90%)	2(0.96%)	205(99.03%)	-
	>=140/90mm of Hg	23(10%)	4(17.39%)	19(82.60%)	0.005
3	History of Tobacco Use				
	No	125(54.38%)	3(2.4%)	122(97.6%)	-
	Yes	105(45.62%)	3(2.9%)	102(97.1%)	0.84
4	Family history of diabetes				
	No	226(98.3%)	4(1.76%)	222(98.23%)	-
	Yes	4(1.7%)	2(50%)	2(50%)	0.001
5	Diet Habit				
	Vegetarian	189(82.2%)	5(2.64%)	184(97.35%)	-
	Non vegetarian / Mix	41(17.8%)	1(2.4%)	40(97.6%)	0.94
6	Caste				
	SC	45 (19.6%)	2 (4.4%)	43(95.6%)	0.59
	ST	16 (7%)	0 (0%)	16 (100%)	
	SEBC	138 (60%)	4(2.9%)	134(97.1%)	
	OTHERS	31 (13.5%0	0 (0%)	31 (13.5%)	
7	Socio economic Class				
	APL	65 (28.3%)	3 (4.6%)	62 (95.4%)	0.23
	BPL	165 (71.1%)	3 (1.8%)	162 (98.2%)	-
8	Physical Activity				
	Sedentary Work	103 (44.8%)	5 (4.9%)	98 (95.1%)	0.05
	Non Sedentary Work	127 (55.2%)	1 (0.8%)	126 (99.2%)	-

Table – 3: Anthropological measurement and Diabetes in study group.

No	Risk factor	Diabetic (mean value + SD)	Non diabetic (mean value + SD)	P value
1.	Age group (in years)	54.16 ± 20.68	52.80 ±15.36	> 0.05
2	Height (in cm)	150 ± 8.36	154.31 ± 10.88	> 0.05
3.	Weight (in kg)	61.16 ± 9.88	52.50 ± 11.97	< 0.05
4	BMI (>25 kg/m^2)	27.49 ± 5.9	22.04 ± 4.51	< 0.01

Table – 3 shows that the mean age (54.16 years) and BMI (27.49) of diabetics were more when compared to age (52.80 years) and BMI (22.04) of non diabetics. The mean height of diabetics (150cm) was less than non diabetics (154.31cm) but the mean weight (61.16 kg) was more than non diabetics (52.50 kg) in the study group. Here, the BMI and weight were statistically significant.

DISCUSSION

The prevalence of diabetes type - II was 2.6% in our study, 2.4% in males and 2.8% in females. Vaz N.C. et al [5] in their study at rural Goa reported 10.3% prevalence of diabetes (8.4% male vs. 12% female). Deo et al [8] reported a prevalence of 8.9% in their study in Indian rural population. Equal (6.7%) prevalence of diabetes was found at two poles of age group i.e. 21-30 years and 51-60 years in our

study which is not in agreement with Vaz N.C. et al and Deo et al who found relation of age with prevalence of diabetes. In our study 17.3% hypertensive had diabetes and 50% of those who had family history of diabetes were diabetic. Prabhakaran *et al.* [9] also reported the association between diabetes mellitus and hypertension (11.8%). Mohan et al [10] reported that the prevalence of diabetes was higher among subjects who had a positive family history of diabetes (18.2%). Prevalence of diabetes is higher in sedentary workers (4.9%) as compared to non sedentary workers (0.8%) in our study. Mohan *et al.*also reported an association between physical activity and diabetes. Vaz N.C. et al didn't find such association. [11] In our study the mean BMI (27.49 kg/m^2) of diabetics was more when compared to BMI (22.04 kg/m^2) of non diabetics. This was statistically significant. Vikram *et al* in their study in North India observed a strikingly high prevalence of obesity and type 2 diabetes. The main cause of any disease is ignorance. Singh A. et al [12] in their study about Awareness and attitude toward diabetes in the rural population of Arunachal Pradesh reported that only 21% of people were aware about Diabetes.

Limitations:

There is a limited room for extrapolation of this study but in the absence of representative data on prevalence of diabetes in rural area, this kind of study can help for the correction and better implementation of NPCDCS in future.

CONCLUSION

Majority of Indian population are residing in rural areas where there is a lack of awareness and specialist care for Diabetes. This would mean more complications of diabetes and more economic burden. Education (by innovative method), early diagnosis (by screening in medical camp) and early treatment (at sub centre level) are the need of the time to prevent the epidemic of diabetes in rural population.

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