

PREVALENCE OF DIABETES MELLITUS IN RURAL POPULATION OF DISTRICT SONEPAT, INDIA

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ABSTRACT

Background: Both rural and urban areas in India are currently experiencing a great spurt in lifestyle diseases such as diabetes mellitus, hypertension and ischaemic heart disease. The shift in epidemiology from communicable diseases to non-communicable diseases indicates that the rural population is also at a high-risk for developing diabetes mellitus.

Aims & Objective: The overall objective of present study was to estimate the prevalence of diabetes mellitus in rural population of district Sonapat, Haryana state.

Material and Methods: The study was planned to estimate the prevalence of diabetes mellitus in various age groups by analysing the hospital record based data. Blood for glucose estimation was collected in a fluoride vacutainer and glucose was estimated by kit based GOD -POD method. Fasting plasma glucose ≥ 126 mg/dl and or 2 hour postprandial glucose ≥ 200 mg/dl were taken as the diagnostic criteria for diagnosis.

Results: Gender specific prevalence for diabetes was 19.36% and 16.98% for male and female respectively. Maximum prevalence of diabetes 41.96% was found in the age group of 46-60 yrs. In this age group Mean fasting plasma glucose among males was 149.36 ± 19.51 and among female it was 147.43 ± 18.19 . Mean 2 hour postprandial plasma glucose was 259.94 ± 51.36 & 259.65 ± 51.39 in male and female respectively.

Conclusion: Rural population remains exposed to high level of blood sugar for long time due to lack of screening facility of diabetes at PHC level, and this increases the chance of developing various complication of diabetes mellitus.

Key-Words: Diabetes Mellitus; Screening; Blood Glucose; Rural Population

Introduction

Globally the increasing prevalence of diabetes mellitus is of major concern. Sarah Wild et al. in their report have highlighted the global prevalence of diabetes as 171 million in year 2000 and have predicted that the prevalence will be 366 million by year 2030.^[1] The study also indicated that the absolute increase in the number of people with diabetes would be in India. International Diabetes Federation (3rd edition) Belgium in the year 2006 has stated that in India alone the number of people with diabetes is estimated to be 40.9 million and is expected to rise to 69.9 million by 2025.^[2]

In India, diabetes mellitus is considered to be a disease of grave concern not only because of rapidly increasing prevalence of this disease, but also because various studies have shown rising prevalence of diabetes in young and middle aged people. Increased prevalence of diabetes mellitus would also increase the disease burden and put socio-economic pressure on the most productive age group and health systems in the country.^[3]

Numerous studies have been conducted to estimate the prevalence of diabetes mellitus in the urban population in India data available on the prevalence of diabetes mellitus in the rural population of India are very scarce. Anjana et al. also have expressed their concern on inadequate coverage of Indian rural population in various national studies.^[4] Major population of India resides in the rural area. Data suggest that approximately 742 million people in India (70% of Indian population) live in rural area.^[5,6] It certainly becomes very important to estimate the prevalence of diabetes in rural Indian population to design various strategies to tackle the battle against diabetes mellitus.

In this regard BPS Govt. Medical College for Women, Sonapat has newly started tertiary care hospital located amidst the rural population. A population which has so long been deprived of health care facility. Before start of this tertiary care hospital, health care facilities were available at Primary Health Centers (PHCs) and Sub-centers alone. Unfortunately at these centers screening of diabetes mellitus is not being done due to lack of infrastructure.

The main objective of present study was to estimate the prevalence of diabetes mellitus in rural population of district Sonapat, Haryana state.

Materials and Methods

This study was planned to estimate the prevalence of diabetes mellitus in various age groups by analysing the hospital record based data. Out of all the patients attending the various outpatient departments for any illness, those showing even slightest evidence toward the presence of the diabetes mellitus, either because of their presenting signs and symptoms or because of positive family history, were screened for diabetes mellitus. Those already diagnosed with diabetes or were on treatment were excluded from the study. Blood for glucose estimation was collected in a fluoride vacutainer and glucose was estimated by kit based GOD –POD method. Fasting plasma glucose ≥ 126 mg/dl and or 2 hour postprandial glucose ≥ 200 mg/dl were taken as the diagnostic criteria for diagnosis.

Results

The dataset comprised of total number of patients screened for diabetes based on the hospital records for patients attending various outpatient departments for any illness and showing slightest evidence towards the presence of diabetes mellitus because of signs and symptoms, positive family history. The present study was conducted from September 2011 to February 2012. Data concerning to the total number of patients screened for diabetes in terms of their Age and Gender status is presented in Table-1. Total 4523 patients were screened for diabetes out of which n=2757 were male and n =1766 were female. Majority of patients were in the age group 35-45 years (29.93%) followed by 28.74% in the age group of 46-60 years. The percentages of patients screened for diabetes in terms of Age and Gender is presented in Table-2.

Out of N=4497 patients (26 missing value) screened in this study, 834 (18.43%) were found to be having diabetes. Gender specific prevalence for diabetes was 19.36% and 16.98% for male and female respectively. Out of total patients screened for the disease, maximum numbers of subjects were in the age group of 35-45 yrs. On the other hand, the population showing maximum prevalence of the disease (41.96%) was in the age group of 46-60 yrs. The age-wise and Gender-wise test results based on fasting plasma glucose (FPG) and 2 hour postprandial plasma (PP) glucose is presented in Table-3. In this age group Mean fasting plasma glucose in males was 149.36 ± 19.51 & in

female it was 147.43 ± 18.19 . Mean 2 hour postprandial plasma glucose was 259.94 ± 51.36 & 259.65 ± 51.39 in male and female respectively. Out of total diabetic population, 64.03% were male and 35.97% were female while 60.19% were male and 39.81% were female among non-diabetics.

Table-1: Age-wise and Gender-wise number of patients screened for diabetes

Age Group	Number of people with diabetes		Number of people without diabetes		Total No. of people screened for diabetes	
	Male	Female	Male	Female	Male	Female
< 35	29	4	452	294	481	298
35-45	122	86	734	412	856	498
46-60	217	133	549	401	766	534
>60	166	77	488	359	654	436
Total	534	300	2223	1466	2757	1766

Table-2: Percentage of patients screened for diabetes based on Age and Gender distribution

Characteristics	Diabetic (n=834)		Non-diabetic (n=3663)	
	N (%)	N (%)	N (%)	N (%)
Age (Years)	<35	33 (3.95)	737 (20.12)	
	35-45	208 (24.94)	1144 (31.23)	
	46-60	350 (41.96)	941 (25.68)	
	>60	243 (29.13)	841 (22.95)	
Gender	Male	534 (64.03)	2205 (60.19)	
	Female	300 (35.97)	1458 (39.81)	

Table-3: Age-wise and Gender-wise test results based on fasting plasma glucose (FPG) and 2 hours postprandial plasma (PP) glucose

Age (years)	Gender	FPG (Mean \pm SD)		2 hour PP (Mean \pm SD)	
		(n)	(Mean \pm SD)	(n)	(Mean \pm SD)
<35	Male (n=29)	(n=8)	196.38 \pm 74.80	(n=21)	268 \pm 53.58
	Female (n=4)	(n=1)	176	(n=3)	274.33 \pm 32.71
35-45	Male (n=122)	(n=19)	147.68 \pm 19.46	(n=103)	260.37 \pm 51.6
	Female (n=86)	(n=11)	149.91 \pm 19.63	(n=75)	260.35 \pm 51.82
46-60	Male (n=217)	(n=28)	149.36 \pm 19.51	(n=189)	259.94 \pm 51.36
	Female (n=133)	(n=14)	147.43 \pm 18.19	(n=119)	259.65 \pm 51.39
>60	Male (n=166)	(n=24)	149.63 \pm 20.76	(n=142)	259.75 \pm 51.35
	Female (n=77)	(n=12)	149.25 \pm 18.85	(n=65)	259.09 \pm 51.25

Discussion

There are many strategies to find out the prevalence of diabetes mellitus in a population. These include surveys, national and central registries, school and hospital record based data in various age groups. This study has used hospital records based data for assessing the prevalence of diabetes mellitus in a population. Prevalence of 18.43% is certainly very high and alarming but consideration has to be given to the fact that the population attending the hospital is diseased. One or the other ailment brings them to the hospital and their ailments may or may not be directly related to diabetes mellitus. So one can expect certainly a higher prevalence of diabetes mellitus in a population attending the hospital compared to the general population. Even when we consider this fact then also the prevalence of diabetes mellitus at 18.43% is very high, indicating that this rural population is a high-risk population for development of diabetes mellitus.

Almost two decades earlier, Wander et al in their diabetes prevalence study on rural Punjab population documented prevalence of 4.6% from Pohir, a rural area in Punjab⁷. Prevalence of 4.6% was certainly much higher than the other surveys done in that decade. This rural area, where current survey has been done, comes under Haryana, a state adjacent to Punjab in geographic terms. In another study in 2006, a high prevalence of diabetes mellitus from Godavari rural area was detected. Overall prevalence of known and undiagnosed diabetes mellitus in this rural population was found to be 13.2 %. This study provided an early indication of likely huge burden of diabetes mellitus in the rural population.^[8]

Mishra et al have analyzed the secular trend and revealed an increase in diabetes prevalence among rural population at a rate of 2.02 per 1000 population per year.^[9] The rate of increase was higher in males (3.33 per 1000 per year) as compared to females (0.88 per 1000 per year). Ahmad et al have shown that the prevalence of diabetes mellitus increases significantly with the advancing age. They showed in their studies that there is almost 3 times increase in the prevalence of diabetes after age of 60 years (5.8 % vs 16.66% for 40-60 years vs > 60 years).^[10] But our study has shown the highest prevalence of diabetes in the age group of 46-60 yrs. The highest prevalence of diabetes mellitus in age group of 46-60 years is again the fact which should be taken very seriously, as higher prevalence of diabetes in this younger and economically productive age group certainly imposes the burden on economic growth of the society.

In this study gender specific prevalence for diabetes was 19.36% and 16.98% for male and female respectively. This higher prevalence of diabetes among male participants in our study is in line to various other studies. Nayak et al in their study have shown the prevalence of 16.9% and 11.1% in male and female respectively in urban population of Gujarat.^[11] Shah et al have shown the gender distribution of diabetes mellitus as 8.7% & 7.8% respectively in male and female.^[12]

Contrary to this, Ahmad et al have shown higher prevalence of diabetes among female.^[10] Their study showed the prevalence of diabetes in female was 8.3 % and in male it was only 3.6%. Factors responsible for such high prevalence should be seriously discovered. Access to medical health care has remained neglected so far in this population before the start of this tertiary care hospital may be one important reason which may have left the diabetes undetected and their blood sugar uncontrolled. However the present study has its limitation in terms

generalizability of its results because of using hospital records based information such as patients attending various outpatient facilities due to any illness.

Modernization of life style as for example using modern techniques for agricultural practices may be one thing which is making this population rather more sedentary compared to those rural population which are still dependent on traditional methods of farming. In this study all types of diabetes have been included in the statistical counting whether it is of type 1 or type 2 or any other type of diabetes mellitus. This may be one factor for such high prevalence of diabetes in this study, moreover the population selected in this study is hospital based and it may be one factor for such high prevalence of this study. Diabetes exposes the individual for many short and long term complications, and effective management of the diabetes at an early stage certainly reduces the severity as well as the incidence of occurrence of such complication.

Conclusion

Rural population remains exposed to high level of blood sugar for long time due to lack of screening facility of diabetes at PHC level, and this increases the chance of developing various complication of diabetes mellitus. This in turn increases the morbidity and mortality of the population which should be viewed very seriously. More and more studies are needed to find out the prevalence of Diabetes mellitus in rural area which in turn will reflect the true overall picture of the prevalence of diabetes mellitus in Indian population. Early diagnosis and effective management of diabetes mellitus at PHC level in developing countries like India is the need of hour as this will certainly reduce the burden of this disease.

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