Original Research Article

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Prevalence of type 2 diabetes mellitus among adults aged between 30 to 60 years residing in rural area: a cross sectional study

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ABSTRACT

Background: The burden of diabetes mellitus is expected to increase by 58%, from 51 million people in 2010 to 87 million in 2030. In rural India the prevalence rate has increased from 1% to 4-10% over last 20 years. Objective of the study is to know the prevalence of type 2 diabetes mellitus among adults aged between 30 to 60 years residing in rural area.

Methods: This community based cross-sectional study was carried out Agasga, the rural field practice area of Dept. of Community Medicine, among 855 adults aged between 30-60 years by using a predesigned & pretested schedule. Statistical analysis was done using percentages and Chi square test.

Results: In this study, 67.24% participants were in age group 30-49 years, 32.74% between 50 to 60 years. 48.53% were male and 51.54% were female participants. 79% of the participants were heavy workers, 17.5% were moderate workers and rest 3.5% were sedentary type of workers. 10.9% were illiterate, and rest 91.1% was literates. 69.3% are BPL card holders. The prevalence of diabetes was 9.5%; 10.8% were at risk of getting Diabetes Mellitus. This gender wise difference in diabetes mellitus was not found to be statistically significant (p=0.986).

Conclusions: With high degree of heritability, life style factor diabetes could become a major health hazard in India and this underscores the fact that prevention of diabetes must be one of the important health targets for the nation in this century. Early identification of risks will help in prevention and burden of disease.

Keywords: Diabetes mellitus, Rural area, FBS, Multiple logistic regressions

INTRODUCTION

The world today faces an epidemic of non communicable diseases (NCD), which will soon surpass communicable diseases both in developing and developed world. One among such diseases is Diabetes mellitus, which shows an 'iceberg phenomena'. The prevalence of diabetes is rising at an alarming rate. The International Diabetes Federation had estimated that in 2010 the global population with diabetes between the ages of 20-79 was 285 million (6.4%) and it had projected that this would grow to 439 million (7.7%) by 2030. However the Diabetes Atlas, 6th edition figures shows that in 2013

there are 382 million people have diabetes in the world and by 2035 this will rise to 592 million.² Diabetes caused 5.1 million deaths in 2013; every six seconds a person dies from diabetes.² Diabetes caused at least 548 billion dollars in health expenditure in 2013 – 11% of total spending on adults.² The number of people with type 2 diabetes is increasing in every country. 80% of people with diabetes live in low-and middle-income countries and the socially disadvantaged in any country are the most vulnerable to the disease.¹

Numerous studies have been conducted to estimate the prevalence of diabetes mellitus among the urban

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population of India.^{3,4} Very few data are available on the prevalence of diabetes mellitus among the rural population of India and so in Karnataka state. Data suggest that approximately 742 million people in India (70% of Indian population) live in rural area.⁵ 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.

Objective

To know the prevalence of type 2 diabetes mellitus among adults aged between 30 to 60 years residing in rural area.

METHODS

A community based cross-sectional study was carried out between 1^{st} January, 2015 to 31^{st} March, 2015 at Agasga village, the rural field practice area of Dept. of Community Medicine, JNMC, Belagavi. The total population of Agasga village is around 4000. As per voter's list the number of adults aged between 30-60 years residing in this area are approximately 1900.

Sample size

By taking prevalence of family history as 26% (one of the risk factor for diabetes mellitus) the sample size is calculated using the formula: $n = 4 \text{ pq/d}^2$.

n \rightarrow sample size p \rightarrow prevalence of family history = 26% q \rightarrow (100-p) d \rightarrow absolute error = 3%.

Total sample (n)= 855

With help of Standard Random number table, 855 participants were identified and included in the study.

Ethical clearance

The study was approved from Institutional Ethics Committee for Human Subject's Research, Jawaharlal Nehru Medical College, Belgaum.

Data collection procedure

A questionnaire was prepared and pilot study was conducted using the predesigned questionnaire and required modifications were made.

Data was collected on the following aspects.

- 1. Socio Demographic Factors.
- 2. Estimation of fasting blood sugar was done, using a standardized digital glucometer (Accu Check, Roche diagnostic, Germany), using capillary finger prick method. After collecting data on socio demographic

variables and risk factors participants were given a date for estimation of fasting blood sugar. They were informed not to consume anything after 9 pm previous day.

RESULTS

Demographic details of study participants

In our study, 675 (67.24%) participants were in age group 30-49 years, 280 (32.74%) between 50 to 60 years. 48.53% were male and 51.54% were female participants. In the study, 79% of the participants were heavy workers, 17.5% were moderate workers and rest 3.5% were sedentary type of workers. 10.9% were illiterate, and rest 91.1% was literates. 69.3% are BPL card holders.

Distribution of study participants according to previous history of blood examination for diabetes

The overall percentage of study participants who have got their blood examination done was 18%. 82% of population had not got tested their blood sugar level examined previously. More number of women got their blood sugar examined compared to men, the difference was statistically significant with p=0.023.

History of diabetes mellitus

Distribution of study participants according to self reported history of diabetes mellitus.

The overall prevalence of self reported history of diabetes mellitus in our study was 3.3%. There was no difference among men and women.

All the self reported study subjects who were having diabetes mellitus were on treatment.

Distribution of study participants according to family history of diabetes

In the present study, 70 (8.18%) were having family history of diabetes. 65 (7.60%) were not aware whether family history of diabetes was there or not and 720 (84.21) ware not having family history of Diabetes mellitus. There was no difference between men and a woman as far as history of diabetes Mellitus was concerned.

Distribution of study participants according to family history of diabetes (n=855)

In the present study, 720 (84.2%) did not have family history of diabetes, 53 (6.1%) had either of parents having diabetes, 8 (0.93%) had both parents having diabetes, 4 (0.46%) and 5 (0.5%) had their brothers and sisters having diabetes respectively. 65 (7.6%) of study population were not knowing their family history of diabetes. More number of men had history of either of the

parents having diabetes mellitus compared to women, this difference was statistically significant with p=0.026.

Table 1: Distribution of the selected participants according to FBS categories (N=855).

FBS categories (in mg/dl)	Men (%)	Women (%)	Total (%)
≤109	332 (80)	350 (79.5)	682 (79.8)
110 –125	44 (10.6)	48 (10.9)	92 (10.8)
≥126	39 (9.4)	42 (9.5)	81 (9.47)
Total	415 (100)	440 (100)	855 (100)

 χ^2 =0.029, Df=2, p=0.986.

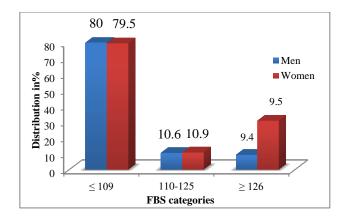


Figure 1: Distribution of the study participants according to FBS categories.

Table 2: Multiple logistic regressions for risk factors associated with Diabetes Mellitus.

	Univariate			Multivariate				
Variables	Prevalence (%)	Unadjusted OR	95% CI	P value	Adjusted OR	95% CI	P value	
Age								
30-49	13 (2.3)	13.86	7.51-25.62	< 0.001	5.92	2.98-11.87	< 0.001	
≥ 50	68 (24.3)							
Literacy								
Illiterate	16 (17.2)	2.24	1.22-4.09	0.009	0.99	0.39-2.51	0.992	
Primary	9 (8.7)	1.03		0.935	0.95	0.42-2.17	0.921	
Secondary and plus	56 (8.5)	1*	0.49-2.15		1*			
Marital status	•	•		•	•			
Unmarried+Widow	11 (47.8)	9.98	4.25-23.44	< 0.001	5.38	1.83-15.81	0.002	
Married	70 (8.4)							
Socio economic status								
Class I&II	11 (4.3)	6.62	1.76-25	0.005	11.17	2.68-52.63	0.001	
Class III	5 (8.8)	4.00	0.92-17.84	0.064	3.89	0.64-18.18	0.155	
Class IV	62 (10.5)	4.85		0.008	6.09	1.71-21.73	0.005	
Class V	3 (2.3)	1* 5.19	1.5-15.87					

Fasting blood sugar (FBS)

In the present study the prevalence of Diabetes was 9.5%; 10.8% were at risk of getting diabetes mellitus.

This gender wise difference in diabetes mellitus was not found to be statistically significant (p=0.986).

DISCUSSION

A study conducted to assess prevalence of Diabetes and its risk factors in rural area of Tamil Nadu showed that, a total of 1936 respondents were interviewed, among them, 40% were males and 60% were females. 76% of study participants were in age group 20-49 and 24% above the age of 50. 25% of study population were illiterate, 45% had education up to primary, 30% up to secondary level and above. 48% of study population were house wives, 40% were agriculturists, laborers & others and rest 12% were either in service, Business, retired or students.

32.8% belonged to V, 20% each in class III and class IV. Most of the respondents 90% consumed mixed type of diet.⁷

In our study the overall prevalence of fasting blood sugar \geq 126 mg/dl was seen in 9.47% of participants. It was in 9.5% men and 9.4% in women. 10.8% had impaired glucose tolerance. There was no significant difference between men and women as far as blood sugar level were concerned.

A study was conducted in year 2004, in 77 centers (urban & rural) to determine the prevalence of diabetes mellitus (DM) and impaired glucose tolerance (IGT) in subjects aged 25 years and above in India. The standardized prevalence rate for DM in the total Indian, urban and rural populations was 4.3, 5.9 and 2.7%, respectively. The corresponding IGT rates in the three populations were 5.2, 6.3 and 3.7%, respectively. This was less compared to our study.

Another study conducted by ICMR- INDiab showed the prevalence of diabetes (both known and newly diagnosed) was 10.4% in Tamil Nadu, 8.4% in Maharashtra, 5.3% in Jharkhand, and 13.6% in Chandigarh. The prevalence of prediabetes (impaired fasting glucose and/or impaired glucose tolerance) were 8.3%, 12.8%, 8.1% and 14.6% respectively.

A study conducted in North India, prevalence of type 2 diabetes in the rural population was found to be 8.03%. Prevalence was higher in female population (9.91%) as compared to males (6.79%). 19.74% of participants over 70 yrs of age were diabetics while diabetes was present only in 2.95% of participants in the age group of 25-39 year. The maximum number of diabetes were in the age group of 50-59 years. ¹⁰

CONCLUSION

In this study the overall prevalence of diabetes in the study population was 9.47%, which included 6.17% undiagnosed diabetic subjects who were detected during the study, while the prevalence of impaired glucose tolerance was 10.8%. The prevalence of diabetes mellitus was higher among subjects with family history of diabetes mellitus, who had sedentary or light grade physical activity (but statistically not significant), subjects >50 years of age, unmarried & widowed, belonging to higher socio-economic status (SES), and class IV, higher BMI (Asian & WHO classification), Hypertension, higher waist circumference.

With high degree of heritability, life style factor diabetes could become a major health hazard in India and this underscores the fact that prevention of diabetes must be one of the important health targets for the nation in this century. It is utmost important to create awareness among public about the risk factors of diabetes and thereby other non communicable diseases associated with it and reduce the associated mortality and morbidity and also educate them about screening to detect for Diabetes Mellitus.

Implications

Early identification of risks will help in prevention and burden of disease. Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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