



Effect of Sociodemographic factors on the Prevalence of Diabetes Mellitus in Rural Agra: A Community Based Study

KEYWORDS

NCD, Diabetes Mellitus, , Prevalence,

Dr Vishal Agarwal

MD, Community Medicine Junior Resident-III

Dr S K MisraProff& Head Department of Community Medicine
S N Medical College, Agra, UP**Dr RenuAgrawal**Associate Proff Department of Community Medicine
S N Medical College, Agra, UP**Dr UmangBhargava**

MD (Pathology) Junior Resident-II

ABSTRACT Background: Diabetes Mellitus indubitably is the Herculean health issue of the 21st century with legion micro and macro vascular complications. In India, DM is growing alarmingly. Evolving lifestyle changes are closing the gap between urban and rural diabetes prevalence. In Uttar Pradesh, a relative dearth of epidemiological studies focusing rural DM makes implementation of health policies arduous. This study was aimed to find the prevalence and risk factors of DM in rural Agra.

Objectives: To estimate the Prevalence and risk factors of Type-II DM in rural population of Agra district.

Material &Method: A cross-sectional, community-based study was conducted in rural blocks of Agra district from July 2013 to June 2014 in the age group ≥ 30 year. Using simple random sampling, one block was selected from which two villages were chosen randomly. An updated list of approximate households in the village was obtained from AWW, from which the first house was randomly selected. House to house data was taken until the desired sample size was accomplished.

Results: The Prevalence of DM in present study was found to be 7.0% (In males 8.6%; in females 5.7%). A significant association was observed between prevalence of DM with age, occupation and socioeconomic status while applying logistic regression only age was found to be strongly associated with DM (OR=1.9). Conclusion: Adopting the transformation in life style in rural areas, acknowledgement should be community-based approach, which is important to create awareness about the risk factors. Meticulous screening program along with primordial prevention is prerequisite to thwart the DM pandemic.

Introduction

Noncommunicable diseases (NCDs), also known as "chronic diseases" are indubitably the Herculean health issue of the 21st century. They have a protracted course and are not passed from person to person. Diabetes mellitus is one of the NCDs, which is gaining a great momentum at present. It is a worldwide malady akin the fact that its co-morbidities are legion that range from hypertension, dyslipidemia, non-alcoholic fatty liver disease, and the metabolic syndrome, all of which are associated with increased cardiovascular disease risk

Most of these cases are preventable. Nearly people living in low and middle-income countries shoulder 80% of this burden of diabetes. In India, Diabetes Mellitus is growing alarmingly, with more than 65.1 million people with the disease in 2013, compared to 50.8 million in 2010.¹ India's economic boom has been accompanied by a meteoric increase in the number of people with diabetes – and those at risk for the disease. A trend of increasing prevalence in rural areas is noticeable with several studies done in the past decade showing prevalence ranging from 9.2-13.3 %. The rural areas of economically backward states have a lower prevalence as reported in the ICMR-INDIAB study.² Despite all knowledge already gained about diabetes, we are still a long way off from preventing, properly treating or fully understanding diabetes in our country. The present study is planned to generate area specific data on Diabetes Mellitus in rural population of Agra with following objectives:

Objectives:

- To measure the prevalence of Type-II Diabetes Mellitus in study population.
- To see the association of socio-demographic factors with Type-II Diabetes mellitus.

Material and method

A Cross-sectional, community based study was conducted from July 2013 to June 2014 among adults in the age group of 30 year and above residing in rural Agra. A sample size of 1102 was calculated by applying:

$$n = z^2 (PQ) / L^2$$

Where: P= Prevalence of 8.3% (from a previous study in Rural Chandigarh)³ Taking L as 20% of P and 10% non-response error 1209 individuals were included in the study.

Rural Agra consists of 15 blocks out of which one block was randomly selected; From the selected block considering the sample size at least two villages were randomly selected. An updated list of all the households in the village was obtained from the Anganwadi worker. All individuals in each household fulfilling the inclusion criteria were interviewed & investigated.

After selecting first house randomly, consequent houses were visited following the left hand rule till the desired sample size was achieved.

After establishing a good rapport and obtaining written consent from participating subjects, the information was recorded in a predesigned and pretested schedule. The subjects were briefed about the procedure of the investigation and a repeat visit was made on the consecutive day early in the morning to measure fasting capillary blood glucose with the help of Glucocard - Vital Glucometer (ARKRAY USA, Inc.). The participants with abnormal blood sugar level were offered detailed counseling and free treatment options at the nearby government health facility. Due ethical clearance from college authorities was received prior to initiation of study. The data was compiled and statistically analyzed using SPSS-22 software (trial version).

Inclusion Criteria

All males and females aged 30 years and above, residing in the study area for at least last 6 months.

Exclusion Criteria:

1. Those not giving consent,
2. Seriously ill or not fit enough for blood examination,
3. Juvenile/Type-1 diabetic, pregnant females and
4. Those not residing in the study area since last 6 month

Definitions and Diagnostic Criteria:

Diabetes Mellitus was defined on criteria laid by WHO i.e. Fasting Plasma Glucose ≥ 126 mg/dl for Impaired Fasting Glucose (IFG) =110-125 mg/dl and known Diabetics under treatment.⁴ Modified BG Prasad Classification (2013) was applied to calculate the socioeconomic status⁵.

Results

The prevalence of Diabetes Mellitus was found to be 7.0%; it was 8.6% among males and 5.7% among females. Almost one third (2.6%) were newly diagnosed while the remaining were known diabetics; thus giving a diagnostic gap of 37%. The standardized prevalence (standardized with census 2011 population) of Diabetes Mellitus was calculated to be 7.7%.

Prevalence of Diabetes was observed positively associated ($p < 0.002$) with the age of study subjects. It rose from 0% in the age group of 30-39 to 5% in 40-49 year age group and doubled (12.1%) in the fifth decade (50-59), however the prevalence did not vary much further in the later decades of life (14.2% and 10.7% respectively in the age group 60-69 and ≥ 70 year [Table-1].

Prevalence of Diabetes among males (8.6%) was slightly higher than females (5.7%), though the difference is statistically insignificant ($p = 0.0$) [Table 2].

Prevalence of Diabetes was higher among Muslims than Hindus though the difference is statistically insignificant ($p = 0.09$). Caste wise distribution shows maximum prevalence among Others though the difference again is statistically insignificant as compared to SC and OBC [Table 3].

Prevalence of diabetes was observed to be higher among those who were educated till Intermediate (10.3%) as compared to illiterate and those educated below Intermediate (6.2% and 7.9% respectively). The differences however are statistically insignificant ($p = 0.179$) [Table 3].

Almost similar prevalence of diabetes was among subjects belonging to various occupation viz. service, business/shopkeeper, farmer, and unemployed/retired group. The difference is statistically significant between all groups combined and laborers ($p = 0.02$) [Table 3].

The prevalence of diabetes was highest in class I. The difference is found to be statistically significant ($p = 0.03$) between class I and class IV & V [Table 3].

Variables significant in Univariate analysis were included for binary logistic regression. Age was only found as an independent risk factors for Diabetes Mellitus in binary logistic regression. After 50 years age, unit (decade) increase in age increased the odds of Diabetes Mellitus by 1.98 times. Education, socio economic status did not significantly contribute as risk factors for developing Diabetes mellitus in this study.

Discussion

The prevalence of Diabetes mellitus in the present study was found to be 7.0% and the diagnostic gap was found to be 37%. R M Anjana et al^[3]. conducted a multicentric study and reported prevalence of Diabetes Mellitus that varied between 3.0% to 8.3% in rural population of different regions of India. Present study findings corroborated with the previous studies in prevalence of Diabetes Mellitus as well as in diagnostic gap that also was found to vary between 30% to 50%.

In the present study, the age wise distribution of Diabetes Mellitus reflected a rising trend up to the age of 69 year, followed by a decline, observed due to survival bias, thereafter. Ramachandran A et al⁶ also reported similar findings. The present study showed that occupation is significantly associated with the prevalence of DM. Lower prevalence of Diabetes mellitus was found among labourers as compared to other occupation; similar findings were reported by Ramachandran et al. (2001)⁷ in their National Urban Diabetes Survey and observed a rising trend in the prevalence of diabetes among unemployed and retired subjects (22.5%) when compared with manual laborers. Prevalence of Diabetes in the present study did not show a significant difference among upper class (I) as compared to class II and class III however a significant difference was observed between class I and class IV and V ($p = 0.04$). Similar findings were observed by Vazet al. (2011)⁸ in rural population of Goa. In the present study, diabetes was found to be positively associated with Age. Age is well-known risk factors of diabetes as already presented in various studies, previously. In the present study, Binary logistic regression successfully highlighted Age as Independent risk factor. .

Conclusion

On the basis of above findings it can be concluded that prevalence of diabetes mellitus among ≥ 30 years age population of Agra villages is as high as in other villages of India. As is evident from the findings of the present study, more than one-third diabetics are unaware of their diabetic status. Due to this wide diagnostic gap, preventable complications, and avoidable morbidities related to diabetes mellitus is on a steep rise thus further adding to the heavy disease burden

Variables significant in Univariate analysis were included for binary logistic regression. Age was found as independent risk factors for Diabetes Mellitus in binary logistic regression. After 50 years age, unit (decade) increase in age increased the risk of Diabetes Mellitus by 1.98 times. Income, socio economic status did not significantly contribute as risk factors for developing Diabetes mellitus in this study.

Table -1 Age wise Prevalence of Diabetes Mellitus and Impaired Fasting Glucose in study subjects

Age	Hyperglycemic				Normoglycaemic		Total
	Diabetes Mellitus		Impaired Fasting Glucose		N	%	
	N	%	N	%			
30-39	0	0	8	2.4	322	97.6	330
40-49	16	5.0	24	7.3	286	87.8	326
50-59	32	12.1	24	9.0	208	78.8	264
60-69	25	14.2	11	6.2	140	79.6	176
≥70	12	10.7	10	8.9	91	80.6	113
Total	85	7.0	77	6.4	1047	86.6	1209

* chi square for trends is applied

Table – 2 Age and sex wise association of Diabetic and IFG Study Subjects between male and female

Age	Male					Female				
	N	Diabetes		IFG		N	Diabetes		IFG	
		n	%	N	%		n	%	n	%
30-39	117	0	0	4	3.4	213	0	0	4	1.8
40-49	158	4	2.5	12	7.5	168	12	7.1	12	7.1
50-59	118	18	15.2	8	6.7	146	14	9.5	16	10.9
60-69	92	15	16.3	5	5.4	84	10	11.9	6	7.1
≥70	61	10	16.3	2	3.2	52	2	3.8	8	15.3
Total	546	47	8.6	31	5.6	663	38	5.7	46	6.9

* chi square is applied

Table 3:Prevalence of Diabetes by Various Sociodemographic risk Factor

Variable	Category	N	DIABETES MELLITUS (%)	P value
SEX	Male	546	47(8.6)	0.06
	Female	663	38(5.7)	
RELIGION	Hindu	1091	71(6.5)	0.09
	Muslims	112	12(10.7)	
CASTE	Others	6	2(33.3)	0.11
	General	443	40(9.0)	
	OBC	308	21(6.8)	
OCCUPATION	SC/ST	458	24(5.2)	0.02
	Housewife	465	30(6.4)	
	Unemployed / Retired	140	12(8.5)	
	Laborer	288	12(4.1)	
	Farmer	185	18(9.7)	
	Shopkeeper	31	3(9.7)	
EDUCATION	Service/Professional	100	10(10)	0.179
	Illiterate	677	42(6.2)	
	Upto middle class	239	19(7.9)	
	Intermediate	193	20(10.3)	
SES	Graduate / Post-graduate	100	4(4.0)	0.03
	Upper (I)	56	8(14.2)	
	Upper Middle (II)/ Lower Middle	109	6(5.5)	
	Class (IV)/Class (V)	1044	71(6.8)	

REFERENCE

1.International Diabetes Federation Diabetes Atlas, 6th edition 2013 | 2.Prevalence of Diabetes and Pre-Diabetes in India:ICMR – INDIAB study, 2011 | 3.Anjana RM et al.Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: phase I results of the Indian Council of Medical Research-INDIADIABetes (ICMR-INDIAB) study. Diabetologia. 2011 Dec; 54(12):3022-7. doi: 10.1007/s00125-011-2291-5. Epub 2011 Sep 30. | 4.Diabetes Care 23 (Suppl. 2):B5–B10, 2000 | 5.Prasad BG. Social classification of Indian families. J Indian Med Assoc 1961;37:250-1 | 6.AmbadyRamachandran, Simon Mary, Annasami Yamuna, NarayanasamyMurugesan, ChamukuttanSnehalatha.High Prevalence of Diabetes and Cardiovascular Risk Factors Associated With Urbanization in India.Diabetes Care, Volume 31, Number 5, May 2008; 893-8 | 7. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V, Das AK, et al. Diabetes Epidemiology Study Group in India (DES). High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. Diabetologia 2001; 44 : 1094-101. | 8. Vaz NC, Ferreira A M, Kulkarni M S, Vaz FS, Pinto N R. Prevalence of diabetic complications in rural Goa, India. Indian J Community Med 2011; 36:283-6 |