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Original Research Article

Analytical study of demographic factors in relation to abnormal glucose tolerance in Diabetes Mellitus type 2

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Abstract

India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the diabetes capital of the world. The present study was aimed to know the prevalence of type-2 diabetes mellitus in a rural population aged 40 years and above and to determine relation between socio economic status and prevalence of diabetes. The present study was carried out in the village Hebbal, which is a designated rural field practice area of Community Medicine Department, M R Medical College, Gulbarga for duration of one year from 2008 to 2009. There was no significant difference in prevalence rates among men and women. It was also noted that there was upward trend in diabetes prevalence with increasing age in both males and females. The present study also found positive association between age, high socioeconomic status and occupation were significantly associated with abnormal glucose tolerance. It was also found that religion and education levels were not significantly associated with abnormal glucose tolerance.

Keywords: demographic profile, abnormal glucose tolerance, Diabetes Mellitus type 2, Hebbal village

1.Introduction

Demographic transition combined with urbanization and industrialization has resulted in drastic changes in life style globally but the impact is felt more in developing countries because of their more rapid pace of growth. One of the consequences of this transition is change in disease patterns with communicable disease being replaced by non-communicable or life style related diseases like diabetes, obesity, cardiovascular disease and cancer.[1] India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the diabetes capital of the world. According to the diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken.[2] Since 1975, there is a steady increase in the prevalence of diabetes mellitus in rural dwellers of India. The prevalence has increased from 0.6% in 1975 to 2.4% in 1995. WHO expert committee on diabetes has issued a clarion call to workers around the world to carry out epidemiological survey of diabetes with a view to identify, before it is too late, the cultural, social and other factors which may contribute to diabetes. Population survey is the best means to detect large numbers of hitherto undiagnosed diabetics, as well as to create awareness regarding the disease among the masses. It is also possible to identify the high – risk group by simple parameters such as anthropometry, presence of family history of diabetes and assessment of the physical activity.[3]

The present study was aimed to know the prevalence of type-2 diabetes mellitus in a rural population aged 40 years and above and to determine relation between socio economic status and prevalence of diabetes. It would be important and worthwhile to determine the role of various risk

factors in the causation of type II diabetes in local epidemiological setup. So using WHO diagnostic criteria for diagnosis of diabetes, a community based cross – sectional study was carried out to determine the prevalence of diabetes and its associated factors in village Hebbal which is rural field practicing area of M.R. Medical college, Gulbarga.

2. Materials and Methods

The present study was carried out in the village Hebbal, which is a designated rural field practice area of Community Medicine Department, M R Medical College, Gulbarga for duration of one year from 2008 to 2009. It has a total population of 4178. The study population included all subjects who were aged 40 years and above. This population serves as denominator to know the prevalence of diabetes. The present study was a population based cross – sectional study. Values of diagnosis of diabetes using glucometer (WHO 1999 criteria)[4].

The percentage of Population aged 40 years and above of age is 24.80%.[5] The sample size in our study area with a total population of 4178 was estimated as 1036. In the present study a total of 1000 People were screened for diabetes, as on repeated visits the remaining 36 people could not be contacted. The data was collected by house to house visit, those person who were aged 40 years and above were interviewed using pre-designed and pre-tested Proforma. This was followed by a detailed clinical examination, anthropometric measurements and investigations.

3. Results and Discussion

It was observed from table no 1, shows prevalence in age and sex in study group. Increase in prevalence of both diabetes and IGT was observed with increase in age in both sexes. Also Statistical analysis, using Chi-square, showed strong association between age and abnormal glucose tolerance, both in males and females. (P=0.001) It was found that educational level is not significantly associated with abnormal glucose tolerance. (P>0.05). (Table 2) Socioeconomic class difference in the prevalence of abnormal glucose tolerance within study population was found to be significant. (P<0.001) (Table 3) Type of occupation was found significantly associated with abnormal glucose tolerance. (P<0.05) (Table 4) IGT prevalence among Hindus and Muslim's was 4.8% and 8.1% respectively. Religion was found not to be significantly associated with the abnormal glucose tolerance. (P<0.05) (Table 5)

In the present study highest prevalence (11.5%) was in age group of >70 years and above. While, lowest prevalence (1.8%) was found in 40-49 years of age group. Thus, we found an upward trend in diabetes prevalence with increasing age. It was true in both males and females. (Table no 1) Prevalence of IGT also showed similar trend with high prevalence (15.4%) in 70 years and above age group and low prevalence (3.1%) in 40-49 years of age group. Increasing age was found significantly associated with abnormal glucose intolerance. A study done by Mohan *et al*[6] found that the prevalence of diabetes at age <30 years was 0.6%, at age 31-40 years : 4.8%, at 41-50 years : 15.2%, at 51-60 years: 22.9%, at 61-70 years : 34.2% and in those >70 years of age,22.4% had diabetes. Prevalence of diabetes thus increased with increase in age until 70 years (trend chi square - 119.4, p<0.001). The prevalence of undiagnosed diabetes and known diabetes also increased with increase age until 70 years. Increasing age was significantly associated glucose intolerance. Hamit *et al*[7] also observed similar patterns of diabetes prevalence in different age groups. The prevalence was 1.28% in 30-39 years age group, 5.03% in 40-49, 5.59% in 50-59 and 7.59% over 60 years; the prevalence of type 2 DM increased by the increases at ages (P=0.0001). Increase in prevalence with age is well documented and this could be attributed to the accumulated effects of various risk factors.

The present study showed that prevalence of diabetes in males and females was 4% and 3.57% respectively. It was also found that prevalence of IGT in males and females was 4.5% and 5.36% respectively. It was found that sex was not significantly associated with abnormal Glucose Tolerance (P>0.05) (Table no 1). Similarly study conducted by Dhadwal *et al*[8] in Shimla showed prevalence of diabetes was 5.17% in males and 4.38% in females. Also Amos *et al*[9] found that that the overall prevalence of diabetes was same in males and females. Sex was not significantly associated with diabetes. (P=0.777).

Maximum prevalence of diabetes was in study population with secondary (6.35%) and primary level (5.29%).Minimum prevalence was among illiterates (2.41%). It was found in the present study that educational level was not significantly associated with abnormal glucose tolerance. (Table no 2) Similar findings were observed by Dutt *et al*[10] also found that no significant association between educational status and diabetes (p>0.05) Also in a study done by Hamit *et al*[7] the prevalence of type 2 DM was 4.96% in illiterate

persons 2.87% among people who graduated from primary or secondary schools and 3.36% among those who graduated from high school or university. No significant association between educational status and diabetes (P= 0.08)

In the present study maximum prevalence was in Class- III (7.07%) and minimum prevalence (2.28%) in Class-V. In our study, significant association between socioeconomic class and abnormal glucose tolerance was established (P<0.001). (Table no 3) The National Urban Diabetes Survey was done by Ramachandran *et al*[11] also revealed that monthly income of an individual was positively related to risk to diabetes mellitus (p<0.0001). Prevalence of diabetes among less than 5000, 5000 -10000 and more than 10000 per month earners was 12.5%, 18.5% and 21.6% respectively. Kokiwar *et al*[3] also found that prevalence was high in those belonging to upper socioeconomic classes (23.68%) as compared to lower socioeconomic status (8.96%).(p<0.001).

It was observed that as socioeconomic status increases, the risk of diabetes increases. This could be due to, as the person's income increases they are more likely to engage in sedentary lifestyle. On the other hand persons with low socioeconomic status are more likely to eat the traditional diet and engage in increased physical activity in their daily life as a part of their occupational or to earn their livelihood.

In the present study prevalence of diabetes was higher in professionals (7.02%) and clerical/ businessmen (7.89%). Lowest prevalence (2.79%) was in unskilled occupation. So we noticed upward trend in diabetes, prevalence as the occupational status increased. And also occupation was significantly associated with abnormal glucose tolerance (P<0.05). (Table no 4). The National Urban Diabetes Survey conducted by Ramachandran *et al*[11] in India showed a higher prevalence of diabetes among the persons doing office jobs compared to those doing unskilled jobs. (10.6% vs 15.5%; p<0.001). Kelestimur *et al*[12] found significant difference in prevalence rates between low occupational (4.1%) and high occupational activity (9.7%) (p<0.0001).

Present study revealed the prevalence of diabetes in Hindu community was 3.6% and in Muslim community prevalence was 8.1%. Prevalence of IGT was 4.8% and 8.1% in Hindus and Muslim respectively. It was found that religion was not significantly associated with abnormal glucose tolerance. (Table no 5) Similarly no association between religion and type 2 diabetes was observed in a study done by Dutt *et al*[10] (P>0.05).

Table no 1: Age and sex specific prevalence rates

Age	Male				Female				Total		
	Total (T_1)	DM	IGT	NGT	Total (T_2)	DM	IGT	NGT	Total ($T_1 + T_2$)	DM	IGT
40-49	189	2(1.05%)	9(4.8%)	178(94.2%)	202	3(1.5%)	3(1.5%)	196(97.0%)	391(39.1%)	7(1.8%)	12(3.1%)
50-59	200	7(3.5%)	7(3.5%)	186(93.0%)	109	2(1.83%)	3(2.7%)	104(95.4%)	309(30.9%)	11(3.5%)	10(3.2%)
60-69	104	5(4.8%)	3(2.8%)	96(92.3%)	118	7(5.93%)	12(10.2%)	99(83.8%)	222(22.2%)	11(4.9%)	15(6.7%)
≥ 70	59	8(13.5%)	6(10.2%)	45(76.3%)	19	4(21.1%)	6(31.6%)	9(47.3%)	78(7.8%)	9(11.5%)	12(15.4%)
Total	552	22	25	505	448	16	24	417	1000(100%)	38	49
	χ^2=24.883(df=6);p=0.001				χ^2=63.667(df=6);p=0.001						

Table no 2: Association between educational status and abnormal glucose tolerance

Education	Abnormal glucose tolerances						Total
	NGT	*%*	*IGT*	*%*	*DM*	*%*	
Illiterate	458	92.15	27	5.43	12	2.41	497(49.7%)
Primary	203	89.43	12	5.29	12	5.29	227(22.7%)
Secondary	115	91.27	3	2.38	8	6.35	126(12.6%)
PUC/Diploma	57	95.00	1	1.67	2	3.33	60(6%)
Graduate / PG	80	88.89	6	6.67	4	4.44	90(9%)
Total	913	91.3	49	4.9	38	3.8	1000(100%)
χ^2=8.113; df=8, P=0.229							

Table no 3: Association between socio economic class and abnormal glucose tolerance

Class	Abnormal glucose tolerances						Total
	NGT	*%*	*IGT*	*%*	*DM*	*%*	
I	28	100.00	1	3.30	1	3.30	30 (3%)
II	76	88.37	6	6.98	4	4.65	86 (8.6%)
III	80	80.81	11	11.20	7	7.07	98 (9.8%)
IV	240	91.95	6	2.30	14	5.40	260 (26%)
V	489	92.97	25	4.75	12	2.28	526 (52.6%)
Total	913	91.30	49	4.9	38	3.80	1000(100%)
Inference	Socio economic class is significantly associated with Abnormal glucose tolerances with χ^2=22.135; df=8; P<0.001						

Table no 4: **Association between occupation class and abnormal glucose tolerance**

Occupation	Abnormal glucose tolerances						Total
	NGT	*%*	*IGT*	*%*	*DM*	*%*	
Professional	50	87.7	3	5.26	4	7.02	57 (5.7%)
Business/managerial	102	89.5	3	2.63	9	7.89	114 (11.4%)
Skilled /Clerical	30	100.0	0	0.00	0	0.00	30 (3%)
Semi skilled	73	90.1	3	3.70	5	6.17	81(8.1%)
Unskilled	658	91.6	40	5.57	20	2.79	718 (71.8%)
Total	913	91.3	49	4.9	38	3.8	1000 (100%)
Inference	Occupation is significantly associated with Abnormal glucose tolerances with χ^2=12.104; df=8; P<0.05						

Table no 5: Association between Type of religion and abnormal glucose tolerance

Type of religion	Abnormal glucose tolerances						Total
	NGT	*%*	*IGT*	*%*	*DM*	*%*	
Hindu	882	91.6	46	4.8	35	3.6	963 (96.3%)
Muslim	31	83.8	3	8.1	3	8.1	37 (3.7%)
Christian	0	0	0	0	0	0	0 (0%)
Others	0	0	0	0	0	0	0 (0%)
Total	913	91.3	49	4.9	38	3.8	1000(100%)
Inference	Religion is significantly not associated with the Abnormal glucose tolerances With χ^2=2.921 df=6; P=0.232						

4. Conclusion

1. There was no significant difference in prevalence rates among men and women. It was also noted that there was upward trend in diabetes prevalence with increasing age in both males and females.

2. The present study also found positive association between age, high socioeconomic status and occupation were significantly associated with abnormal glucose tolerance.

3. It was also found that religion and education levels were not significantly associated with abnormal glucose tolerance.

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