Original Research Article

Study of prevalence of diabetes mellitus Type 2 among adults in a rural area of Kutubullapur Hyderabad

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Abstract

Background: Type 2 diabetes mellitus is a chronic, debilitating disease characterized by insulin resistance, impaired insulin secretion and hyperglycemia. It is the most prevalent metabolic condition and one amongst major health and socioeconomic problems worldwide. It represents more than 90% of total prevalence of diabetes in the world and is responsible for 9% of the global mortality corresponding to four million deaths per year. **Objectives:(**1) To determine the prevalence of diabetes mellitus type-2 in a rural population of age 30 years and above and (2) To study the association of various risk factors with diabetes mellitus type-2. **Methodology:** A community based cross sectional study was carried out in population 30 years and above at kutubullapaur village in the district of Hyderabad, Telangana during the study period of 1st January to 31st December 2016, in which 910 persons aged 30 years or more living in this village were included in study**. Results:** Total sample size in this study was 910 and out of this, 37(4.06%) were found to have type-2 Diabetes Mellitus. The prevalence of Type 2 diabetes was 51.62% sedentary and only 6.45% heavy worker subjects. The prevalence among illiterate, just literate, Primary, secondary, higher secondary and above was 29.09%, 41.94%, 19.35%, 6.45% and 3.23% respectively. Among vegetarians and non-vegetarians the prevalence was 18.91% and 81.09% respectively. Among subjects with type 2 DM, 54.06% were overweight and 72.97 % were hypertensive. Smoking habit was found among 54.05% subjects. Conclusions: This study shows that the prevalence of diabetes is high in the subjects having sedentary lifestyle, Poor literacy status, overweight, non-vegetarians, hypertension and smoking habit. Control of DM mandates lifestyle modification and control of risk factors.

Key Words: Diabetes Mellitus, physical activity, Dietary Habits, Literacy, BMI, Hypertension.

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INTRODUCTION

According to the International Diabetes Federation (IDF), the number of people globally with type 2 diabetes mellitus (T2DM) will increase to 552 million by 2030, over twice the number in 2000.[1] Nearly 21% of these new cases will be from India, which has the highest number of cases in any country.1 India currently has 61.3 million diabetics, a figure that is projected to increase to 103 million by 2030.[2] Several studies from different regions of India have shown that prevalence of T2DM is increasing from 8.2% in 1992 to18.6% in 2008 for urban areas, and from 2.4% in 1992 to 9.2% in 2008 in rural areas.[3,4,5.] The rising prevalence in the developing countries is associated with industrialization, urbanization and socio-economic development indicating the role of not only genetic factors but also environmental factors like quality of life and life style,[6] Obesity is a significant risk factor of diabetes type -2. The association has been repeatedly demonstrated in the different studies.[7, 8]. Sedentary life style appears to be an important risk factor for the development of type-2 diabetes mellitus [8.] Sharma and co-workers studied that almost half of the respondents reported not having fruits, green vegetables or other vegetables daily, about 32.2% students were having junk food and 28.2% were consuming carbonated soft drinks daily[9]. Several prospective cohort studies have

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found that T2DM mellitus was almost 2.5 times as likely to develop in subjects with hypertension as in subjects with normal blood pressure[10, 11]. Earlier study have shown that, the relationship between cigarette smoking and diabetes mellitus and found that men smokers had 45% higher diabetes rate than non smoker men[12]. An upsurge in number of early-onset diabetes cases is also responsible for the development of various diabetic complications due to longer disease duration; however data on the prevalence on diabetic complications across the whole of India is scarce.[13, 14] The early identification of those person who are at-risk and appropriate intervention to increase physical activity, decrease central adiposity and changes in dietary habits could to a great extent help in preventing or delay in the onset of Diabetes Mellitus and thus reduce the burden due to its associated complications in India. There is also a need to improve knowledge and awareness about Diabetes Mellitus in Rural as well as Urban areas through various IEC activities. The objectives of the present study were (1) To determine the prevalence of diabetes mellitus type-2 in a rural population of age 30 years and above, (2) To study the association of various risk factors with diabetes mellitus type-2.

MATERIAL AND METHODS

A community based cross sectional study carried out in population 30 years and above at kutubullapaur village, Hyderabad district during the study period 1st January to 31st December 2016. Kutubullapur village with population of approximately 10,000 is a rural field practice area of Department Of Community Medicine, Mallareddy medical Medical College, Hyderabad.. Voluntary, written consent was obtained from all subjects and prior permission was obtained from the Institutional Ethics Committee, for the study. Data was analyzed using statistical package Epi-info-7. The prevalence of type-2 diabetes mellitus in rural population of India is 2.4% reported by WHO. Based on this the sample size is calculated by adopting the formula:

$$n = \frac{Z^2\alpha½ \times PQ}{\Sigma^2}$$

Where P=prevalence rate of the disease,
Here p=2.4%=0.024
Q=1-P = complement of P
Here Q = 97.6% = 0.0976
∑ = Allowable error 20% of P = 0.048
α = Level of significance (type I error)
Zα/2 = 1.96 = 2 (α = 0.05) z^2=3.84
$\sum^2$= (0.048) = 0.002304
After adopting this formula with degree of confidence 95%, the total sample size was calculated to be 910. Houses that are having at least one or more person of age 30 years and above were numbered serially. Then house survey was undertaken by systematic random sampling technique. The final sample includes 910 individuals with 461 men and 449 women after selective screening methodology. All the information was recorded in the pre-designed and pre-tested schedule. Consent was taken before taking blood samples, and the objective of the study clearly explained in local language to the subjects.The participants were then requested to remain fasting (for at least 8 hrs) on next morning for venous blood sample collection. After taking early morning fasting sample of venous blood, 75gms of anhydrous glucose was given in 200ml of water to drink in 5 minutes. Exactly after 2 hours of taking glucose the venous blood was taken to estimate glucose level. Samples were tested in the laboratory on the same day by Glucose Oxidase – Peroxidase method. The cut off values was used for a subject as Diabetes was according to WHO criteria:

Particulars	Fasting plasma glucose	2hr. after glucose load
Diabetes Mellitus	>126mg/dl	>200mg/dl

OBSERVATION AND RESULTS

In the present study the total sample size was 910 and out of these 37 (4.06 %) was diagnosed as type -2 Diabetes Mellitus (Table 1).

Table 1: Prevalence of Type-2 DM subjects among different age group:

Age group	Type-2 DM	Normal	Total
30-40	6 (16.22%)	153 (17.52)	159 (17.47%)
41-50	9 (24.32%)	410 (46.96)	419 (46.04%)
51-60	16(43.34%)	255 (29.20)	271(25.38%)
61-70	6(16.22%)	55 (6.32)	61(11.11%)
Total	**37(100%)**	**873 (100%)**	**910(100%)**

χ^2 = 11.54, df = 3, p <. 05

The prevalence of DM was 16.22% in 30-40 years age group, 24.32% in 41-50 years age group, 43.34% in 51-60 years age group. The overall prevalence was 4.06%, which was gradually increasing with age. The association between age and prevalence of type 2 DM was statistically significant.

Table 2: Distribution of Type-2 diabetic study subjects in relation to physical activity.

Physical activity	Type-2 DM	Normal	Total
Sedentary	17 (45.94%)	240 (27.49%)	257(28.24%)
Mild	8 (21.62%)	385 (44.10%)	393 (43.18%)
Moderate	7 (18.91%)	228 (26.11%)	235(25.82%)
Heavy	5 (13.53%)	20 (2.30%)	25 (2.76%)
Total	**37 (100%)**	**873 (100%)**	**910(100%)**

χ^2 = 25.42, df = 3, p <. 0001

The prevalence of type 2 diabetes mellitus was highest among sedentary subjects (45.94%) who were gradually decreasing with degree of physical activity and lowest among heavy workers (13.59%). The association between physical activity and DM was statistically highly significant.

Table 3: Distribution of type of literacy among type-2 diabetic abnormal subjects

Literacy status	Type-2 DM	Normal	Total
Illiterate	9 (24.33%)	479 (54.86%)	488(53.62%)
Just literate	12.(32.43%)	342 (39.17%)	354(38.90%)
Primary	6 (16.22%)	19 (2.17%)	25(2.74%)
Secondary	5 (13.51%)	16 (1.83%)	21(2.30%)
Higher secondary and above	5 (13.51%)	17 (1.97%)	22(2.44%)
Total	**37 (100%)**	**873 (100%)**	**910 (100%)**

$\chi^2 = 72.69$, df = 4, p <. 0001

Majority of the subjects in the study group are either illiterate or have low level of literacy. Among total type-2 diabetic, 9 (24.33%) are in the illiterate group, whether 6 (16.22%) are up to the primary school, 5 (13.51%) each in secondary school andin the higher secondary and above literacy group, association of literacy with type-2 diabetes was statistically significant.

Table 4: Distribution of type 2 diabetes mellitus subjects according to their dietary habit

Type of diet	Type-2 DM	Normal	Total
Vegetarian	7 (18.91%)	96 (10.99%)	103(11.31%)
Non-vegetarian	30 (81.09%)	777 (89.10%)	807(88.69%)
Total	**37 (100%)**	**873 (100%)**	**910(100%)**

$\chi^2 = 1.5$, df = 1, p >.05

Out of total type-2 diabetic 7 (18.91%) are vegetarian and 30 (81.09%) are non-vegetarian, and among total vegetarian 6.79 % has type-2 diabetes, relation with diet is statistically insignificant.

Table 5: Distribution of type 2 diabetes mellitus subjects according to their BMI

BMI	Type-2 DM	Normal	Total
Normal	17 (45.94%)	723 (82.81%)	740(81.31%)
Overweight	20 (54.06%)	150 (17.19%)	170(18.69%)
Total	**37 (100%)**	**873 (100%)**	**910(100%)**

$\chi^2 = 29.39$, df = 1, p<.0001

Out of total type 2 DM subjects, 54.06% were overweight as comparison to 45.94 % normal subjects. The association between Body mass index and type 2 DM was statistically significant.

Table 6: Distribution of type 2 diabetes mellitus subjects according to Hypertension

Blood Pressure	Type-2 DM	Normal	Total
>140/90	27 (72.97%)	160 (18.32%)	187 (20.54%)
<139/90	10 (27.03%)	713 (81.63%)	723 (79.46%)
Total	**37 (100%)**	**873 (100%)**	**910 (100%)**

$\chi^2 = 61.62$, df = 1, p<.0001

The prevalence of Hypertension among subjects with type 2 DM was high (72.97%) as comparison to normal subjects (27.03%). The association between type 2 DM and Blood pressure was statistically significant.

Table 7: Distribution of type 2 diabetes mellitus subjects according to their smoking habit

Smoking	Type-2 DM	Normal	Total
Yes	20 (54.05%)	257 (29.43%)	277(30.43%)
No	17 (45.95%)	616 (70.57%)	633(69.57%)
Total	**37 (100%)**	**873 (100%)**	**910(100%)**

$\chi^2 = 9.03$, df = 1, p<.05

The prevalence of type 2 DM was high (54.05%) among smokers as comparison to non-smokers (45.95 %) The association of smoking with type 2 DM was statistically significant.

DISCUSSION

In this study the prevalence of type 2 diabetes mellitus was 4.06%. Almost similar results 3.67% diabetes was obtained by Kokiwar PR *et al* in a community based cross section study.[7]Anjana RM *et al* reported in a study that prevalence of diabetes was 10.4% in Tamilnadu, 8.4% in Maharashtra, 5.3% in Jharkhand and 13.6 in Chandigarh[15]. In this study the prevalence of type 2 Diabetes mellitus was high among sedentary subjects. Different studies showed that a physically active lifestyle is associated with a lower incidence of type-2 diabetes. Majgi SM *et al* reported in a study that the prevalence of Diabetes is more in people who are engaged in light physical activity work and it was found statistically not significant.[16] Ahmad J *et al*in study revealed that, less physical activity was significantly associated with increased risk for DM.[17] Higher percentage of type-2 diabetes could be due to their lack of knowledge about nutritive value of different foods, about saturated fat intake and effect of sedentary lifestyle etc.Majgi SM *et al* found in a study the prevalence of type-2 Diabetes was low in the subject whose education qualification was post-secondary, graduate and above.[16] The distribution of type-2 diabetes is high in non-vegetarians than vegetarians. In a study Ayana DA *et al* reported that the prevalence of type 2 diabetes mellitus was less among those who consumed fruits and vegetables ≥3 days/week as compare to who consumed fruits and vegetables ≤ 2 days /week.[18] In this study among the subjects with type 2 diabetes mellitus 54.05% were having overweight, the finding consistent with a study by Kokiwar PR.[7, 8] Studies suggested that current smoking was associated with a 44% increased risk of diabetes[12], which is similar to finding of my study.

CONCLUSION

This study shows that the prevalence of diabetes is high in the subjects having sedentary lifestyle, those who are non-vegetarians, Overweighed, Hypertensive and smokers, regular exercise and intake of more fibrous diet, vegetable, fruits can reduce the prevalence of type-2 diabetes and IGT. This study also shows the high prevalence of type-2 diabetes in illiterate and just literate subjects. This may be due to lack of knowledge of nutritive value of food, and intake of high saturated fat. So if we increase in the knowledge and awareness levels, about the nutritive value of different food in community can reduce the prevalence of type-2 diabetes.

STRENGTH

The strength of the study was that it was a population based cross-sectional study to find the prevalence of Type -2 DM among adults in rural area. Bias was taken care of by random sampling. In the present study an attempt was made to increase the knowledge and awareness level on the hazards of Type -2 DM among the study population. The results obtained from this study can be utilized on a broader scale to enhance community awareness about the health consequences of type – 2 DM and also to impart some knowledge on the modifiable risk factors of Type -2 DM.

LIMITATIONS

In spite of the best efforts to convince all the study subjects to participate in the study, some of them did not cooperate. There was difficulty to convince some of the subjects to cooperate in the study and also at time members were not present at their houses so alternative persons had to be put in place which required more time.

RECOMMENDATIONS

It was also felt during the study that there is a need to increase awareness of type – 2 diabetes mellitus in the general population. Such an awareness programme may develop means for the self-management of diabetes and would be a valuable gain in terms of lesser dependence on outside support.

REFERENCES

1. IDF, 2011. http://www.idf.org/diabetesatlas - accessed 14 February 2014.
2. World Health Organization, Regional Office for South East Asia. Health situation in the South-East Asia Region 1998-2000. New Delhi: WHOSEAR 2002. Document No. SEA/HS/222. http://209.61.208.233/LinkFiles/Health_Situation_toc+forward.pdf - accessed 14 February 2014.
3. Ramachandran A, Snehalatha C, Dharmaraj D, Viswanathan M. Prevalence of glucose intolerance in Asian Indians: urban-rural difference and significance of upper body adiposity. Dia Care. 1992 Oct 1;15(10):1348–55.
4. Ramachandran A, Snehalatha C, Baskar ADS, Mary S, Sathish Kumar CK, Selvam S, et al. Temporal changes in prevalence of diabetes and impaired glucose tolerance associated with lifestyle transition occurring in the rural population in India. Diabetologia. 2004 May 1;47(5):860–5.
5. Ramachandran A, Mary S, Yamuna A, Murugesan N, Snehalatha C. High prevalence of diabetes and cardiovascular risk factors associated with urbanization in India. Diabetes Care. 2008 May;31(5):893–8. 21. Kokiwar PR, Gupta S, Durge PM. Prevalence of diabetes in rural area of central India. Int J Diab Dev Ctries. March 2007; Vol- 27(1); Page: 8-10.
6. Community Medicine with recent advances. A.H Suryakantha by Jaypee Brothers Medical Publishers private limited 3rd edition page No-545-546.
7. Kokiwar PR, Gupta S, Durge PM. Prevalence of diabetes in a rural area of central India. International Journal of diabetes in developing countries; 2007; Vol- 27(1); Page:8-10.
8. Dutt D, Roy G, Chattcrjee P. Risk factor assessment for type II diabetes mcllitus in a tertiary Hospital in Kolkata; Indian Journal of Community Medicinc,2004; Vol- 29(4), Page: 169-170.
9. Sharma R, Grover VL, Chaturvedi S. Recipe for diabetes disaster: a study of dietary behaviors among adolescent students in south Delhi, India. International Journal of Diabetes in Developing Countries. 2011; Vol-3, Page: 4-8.
10. Petersen M, Pedersen H, Major-Pcdcrsen A, et al Effect of Fish Oil Versus Com oil Supplementation on LDL and HDL Subclasses in Type 2 Diabetic Patients. Diabetes Care, 2002, Vol-25,Page:1704-1708.
11. Eschvvcge E, The dismetabolic syndrome, insulin resistance and increase cardiovascular morbidity and mortality in type 2 diabetes: etiological factors in the development of CV complications. Diabetes metabolism,2003;Vol-29,Page:6S19-6S27.
12. Julie CW, Deborah AG, Earl SF, Ali MM, Eugenia EC. Cigarette smoking and diabetes mellitus: evidence of a positive association from a large prospective cohort study. International Journal of Epidemiologv.(2001)Vol.30(3);Page:540-546.
13. Mohan V, Shah S, Saboo B. Current glycemic status and diabetes related complications among type 2 diabetes patients in India: data from the A1chieve study. JAPI (Suppl) 2013; 61:12–15.
14. Mohan V, Seshiah V, Sahay BK, Shah SN, Rao PV, Banerjee S. Current status of management of diabetes and glycaemic control in India: Preliminary results from the DiabCare India 2011 Study. Diabetes. 2012; 61:a645–a677.
15. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, 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 India Council of Medical Research – India DIAbetes (ICMR _ INDIAB) study. Diabetology 2011;54:3022-7

16. Majgi SM, Soudarssanane BM, Roy G, Das AK. Risk factors of diabetes mellitus in rural Puducherry. Online J Health Allied Scs. 2012; 11(1): 4
17. Ahmad J, Masoodi MA, Ashraf M, Rashid R, Ahmad R, Ahmad A et al. Prevalence of diabetes mellitus and its associated risk factors in age group of 20 years and above in Kashmir, India. Al Ameen J Med Sci 2011; 4(1): 38-44.
18. Ayana DA, Bacha YD, Roba KT, Kebede DA. Type 2 diabetes mellitus among government employees in Harar, Eastern Ethiopia: a cross-sectional study. Research and Report in Endocrine Disorders 6 July 2015

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