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To Assess Prevalence of Type 2 Diabetes Mellitus in a Remote Village of Haryana-Katlupur

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ABSTRACT

Background: Type 2 Diabetes Mellitis (DM)is the major form and involves more than 90% of all cases. Glycemic control in individuals worsens with the duration of disease. The prevalence of DM is found lower in rural areas as the number of patients remains undiagnosed. In view of this study was planned to find out the prevalence of type 2 DM in rural area. **Objective:** To estimate the prevalence of Type2 Diabetes Mellitus in Katlupur village (a remote rural area) in Haryana, increasing awareness of Diabetes related complications and assess the prevalence.

Material and Methods: Data was collected from age group 30- 60 years from the village Katlupur, District Sonepat, Haryana. The American Diabetes Association (2014) Type 2 Diabetes Diagnosis Criteria was used. Data was collected by conducting health camps at Sub centre organized over a period of 5 Months, by home visits and on Polio vaccination days. Instruments used were Infi sphygmomanometer, blood glucose meter, Pulse oximeter and Weighing machine. The prevalence of Diabetes is calculated by measuring the presence of Diabetes in a sample of the population then dividing the number of people with Diabetes by the total number of people in whom it was measured.

Results: The prevalence of Diabetes Mellitus type 2 in studied village was calculated 4.56 %. The total number of people with type 2 diabetes were 34 out of 744 people examined. The prevalence of diabetes was found to be higher in women than men. These findings indicate that the "diabetes epidemic" is growing in rural populations also and prevalence is only little lesser than urban area.

Conclusion: In the present study it is concluded that immediate steps related to screening for DM are required for various setting throughout the country, as prevalence is rising exponentially even in rural areas, mainly due to a large numbers of undiagnosed cases. Thus we need to identify total burden of diseases and act accordingly to prevent complications related to DM at very early stage.

Keywords: Type 2 Diabetes, Rural Population, Prevalence.

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INTRODUCTION

Type 2 Diabetes Mellitis (DM) is the major form and involves more than 90% of all cases.[1]Glycemic control in individuals worsens with the duration of disease. Complications involving neurological, cardiometabolic, nephropathy, retinopathy and foot ulcers occurs as a outcome of poor glycemic control and are very common.[2] Major elements that increases the rates of prevalence of diabetes are rapid urbanization, modernization, easy availability of fast foods, decreased physical activities and sedentary way of living.[3] Diabetes mellitus is a major lifestyle disease and there is no doubt that it is the most demanding public health problem recently, with a prevalence of 387 million (8.3%) and predicted to be 592 million by 2035 throughout world.[2,4] Majority(3/4th) of people developing DM belongs to under or developing countries, having a low gross national income. In India, there are significant number of cases i.e, 61.3 million patients with T2DM in 2011 with predictions of 101.2 million by 2030.[2,5]

Reports of WHO-ICMR National Non communicable disease risk factor surveillance study suggested an overall frequency of self reported diabetes to be 4.5% with rural population having lesser (3.1%), as compared to urban population (7.3%).[6]

During last few decades prevalence of being prone to diabetes had increasing trends in both urban and rural areas. A study was carried out in 2010 at different cities like Chennai, Pondicherry and Goa according to that 43%, 31.2% and 10.3% of the population were at high risk of diabetes respectively.[7,8]

A surveillance data suggested that prevalence was found highest in Meghalaya (45%) as compared to other states. Lowest rate was in Punjab at 9.8% whereas pre diabetes is highest in Chandigarh (14.6%) and lowest in Mizoram (5.8%).[9]

It is predicted that DM will be among the top leading cause of death over the next decade, the rise in complications and death can be exponential.[10]

Indian's phenotype & genetic composition, predispose them to have higher tendency to develop cardiometabolic diseases including DM. They characteristically have high insulin resistance, more fat in abdominal region, higher prevalence of impaired glucose tolerance, higher hs-CRP levels and lower adiponectin, contributing to a greater risk of developing diseases at a relatively younger age.[11] In addition to that epidemiological transition, raising economic, decreasing physical activity, recent dietary patterns, and changes in environmental factors also increases the risk.

As many patients with diabetes remains undiagnosed, the prevalence of DM was found to be low in rural population of India. This is majorly due to lack of availability of screening facilities at grass root level in rural area. Hence this is need of hour to improve the infrastructure in rural area so that exact figures can be calculated.[12]

On basis of above facts, field trials can act as reliable source to obtaining prevalence of disease. Epidemiological studies are instantly required throughout the country to get a baseline against which future trends in risk factor levels can be assessed and preventive strategies be planned. There is also very limited data available on literature review of Haryana state.

In view to address the need, this study was planned to assess the prevalence of type 2 diabetes mellitus in rural population.

MATERIAL &METHODS

This study was conducted from the village Katlupur, District Sonepat, Haryana. Population of age range 30-60 years residing in Katlupur village, Haryana were included in the study. Sample size was 744. Data was collected by conducting health camps at Sub centre organized over a period of 5 Months, by home visits and on Polio vaccination days. The prevalence of Diabetes is calculated by measuring the presence of Diabetes in a sample of the population

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then dividing the number of people with Diabetes by the total number of people in whom it was measured.

Inclusion Criteria

1. Age group between 30-60 years, were our main focus as this class is considered particularly risky in terms of Diabetes Mellitus Type2.
2. People who came to health camps

Exclusion Criteria

People less than 30 years and above 60 years were excluded from the study. Reasoning for exclusion such population was mainly:

1. Less than thirty years population group is usually more prone to type 1 diabetes mellitus and moreover this group was either a student or working class which was difficult to enroll in our project.

2. Above sixty years was a geriatric group, were unable to visit our centre and some were out of town for treatment in city.

3. Tenants and migratory population

Patient's detailed informed consent of study participation was taken.

Clinical profile of all the patients was studied with special reference to-

1. Name
2. Age
3. Sex
4. Weight
5. Blood Pressure
6. Presenting complaints
7. Personal history : Smoking/tobacco use
8. Drug history
9. Past history: chronic illness, history of hypertension, tuberculosis
10. Knowledge about insulin/diabetes
11. Complication due to diabetes.
12. Family history of diabetes
13. General physical examination
14. Oxygen saturation(Spo2)

Instruments Used

- Infi sphygmomanometer serial number-16JO15
- SD Codefree (blood glucose meter) serial number – M03TB02AAB3921, 2015.12.08
- Pulse oximeter- Dr. Morepen, serial number- 163045702389,07/2016
- Weighing machine- SAMSO, capacity =150kg,error=0.5kg

"Criteria of the American Diabetes Association (ADA) 2014 were applied for the diagnosis of Type2 Diabetes Mellitus as following:

1. A fasting plasma glucose (FPG) level of 126 mg/dL (7 mmol/L) or higher; fasting is defined as no caloric intake for at least 8 hours, or
2. A 2-hour plasma glucose level of 200 mg/dL (11.1 mmol/L) or higher during a75-g oral glucose tolerance test (OGTT),or
3. A random plasma glucose of 200 mg/dL (11.1 mmol/L) or higher in a patient with classic symptoms of hyperglycemia (ie, polyuria, polydipsia, polyphagia, weight loss) or hyperglycemic crisis."

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RESULTS

A small village of state Haryana named Katlupur was selected to study the prevalence of diabetes mellitus type 2 over a period of 5 months. The total population of the village was 2102, (1123 males & 979 female) as per population census 2011. Village has 372 houses. The count of employed individual of Katlupur village is 592 whereas 1510 are non-working. and out of 592 working people, 150 individuals are entirely dependent on farming.

The participants ranged in age from 30-60 years with a mean age of 49.94 years. Maximum number of participants were in the age group of 51-60 years, while mean age for female is 51 and mean age for male is 47.

Clinical profile

Presenting complaints – most common clinical presentation was of numbness in lower limbs (65%).

Symptoms suggesting complications: Hypertension (32%), decreased vision after diagnosis of diabetes (11.76%), diagnosed and confirmed cases of diabetic nephropathy (5.8%) and stroke(5.8%).

Family history: positive family history of diabetes was seen in 2 female patients. Their mother had diabetes.

Past history: none of the patients had past history of myocardial infarction.

Drug history: 76% cases were on treatment for diabetes**. Personal history**: 23 % patients had history of smoking**.**

Associated miscellaneous findings along with diabetes: 2 patients had hypothyroidism as per records available.

Knowledge about Diabetes- All patients screened for diabetes were aware about diabetes.

Knowledge about insulin – 20 patients out of 744 screened for diabetes knew about insulin.

Misconceptions

a) Diabetes is not a serious disease

b) Only older people get diabetes

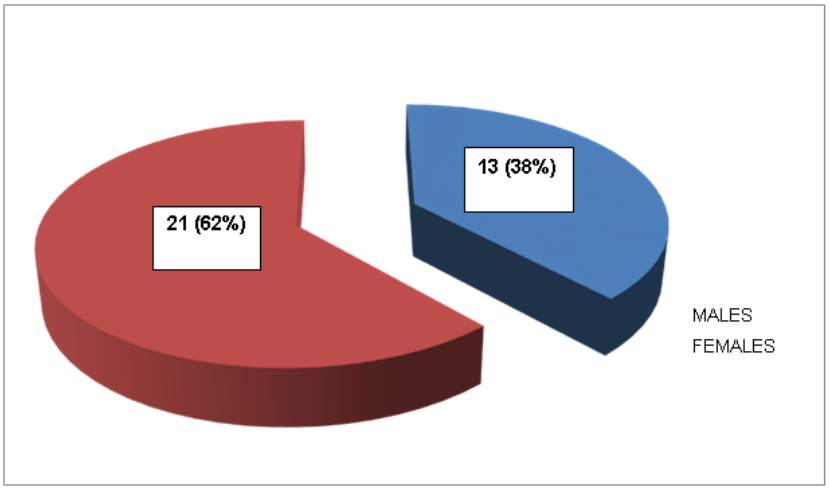
As per inclusive criteria 744 residents were examined. Out of which 34 patients were suffering from Type 2 Diabetes Mellitus.

Prevalence of people having diabetes in village katlupur is calculated as follows

All new and pre-existing cases of type 2 diabetes during a given time period / Total Population during the same time period X 100

= 34/744 X 100

= 4.56 %



Graph 1: Distribution of Patients According ToSex

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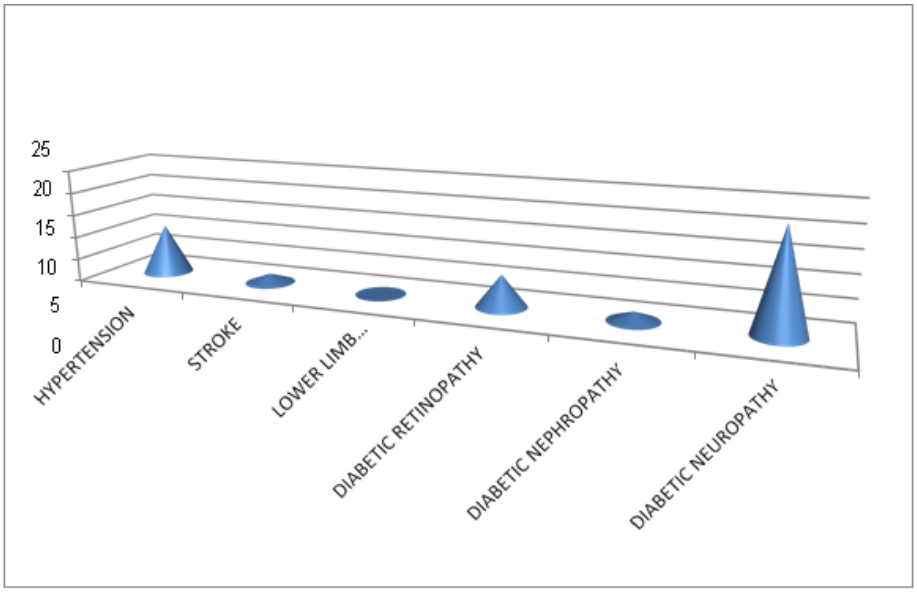
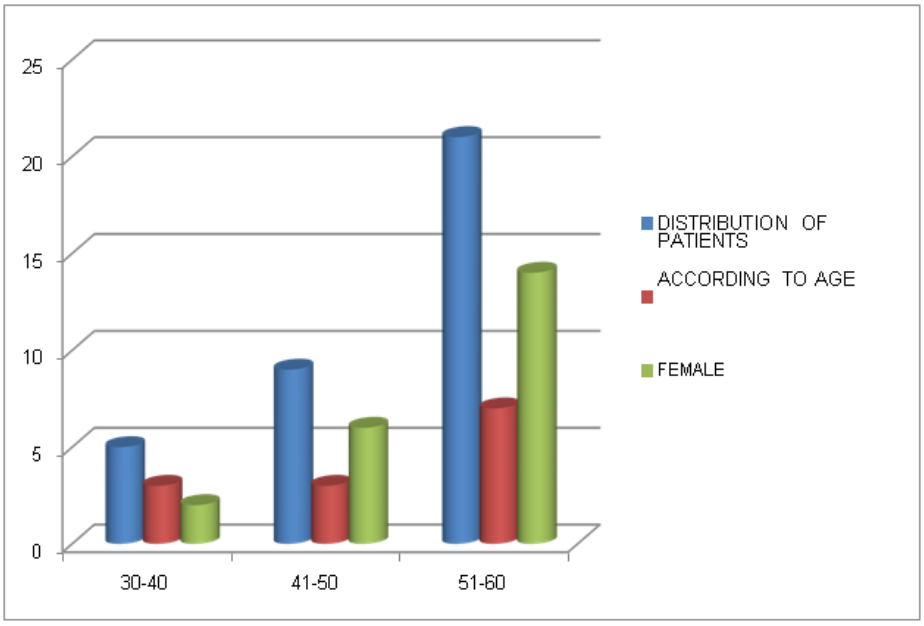


Graph 2: Distribution of Patients According To Complications



Present study clearly indicates complications of type 2 DM were evident in study population. It also clearly indicates that if this rise is can be exponential and, it can cause serious epidemic, if not controlled and screened timely

DISCUSSION

The prevalence of Type 2 DM among the study population of katlupur village (a rural area) comes out to be 4.56%. Only 76 % among these were aware of their disease and only 28.57 % had controlled blood glucose status, rest were having uncontrolled blood sugar levels. The elderly population was more affected with DM.

In India very few large community based studies related to prevalence of DM are available. One of the study reported an overall prevalence of DM to be 4.3% which was very low, among this 5.9%was urban and 2.7% in rural areas respectively.[13]

In a national level survey of six large metro politancities an age standardized prevalence of 12.1% for DM was calculated.[14]

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In another study a higher prevalence of type 2 diabetes (10.8%) among adults population (>19 years) in rural parts of South India was reported.[15]
Overall it is seen that although the prevalence of DM varies according to locations, this is definitely quite high and justifies at once quick steps to control the increasing trend.
Among the studies available related to prevalence of DM, most of them suggest expanding pattern of disease, not only in urban but also in rural area also. In India more than 2/3rd of the population is from rural area and factors like illiteracy, unemployment, lack of information and poor approach to health care especially in terms of screening are familiar, this is a matter of high concern. The present study reported gender difference in terms of females: males (62:38) in the prevalence of DM, although a some studies have shown a male preponderance.[16,17]
Similar to present study, Ahmad et al have shown higher prevalence of diabetes among female. Their study showed the prevalence of diabetes in female was 8.3 % and in male it was only 3.6%.[18]
In present study nearly 1/4th of subjects with DM were previously undiagnosed in comparison to total number of cases. Although significant but the ratio was much lower as compared to another study in rural areas of state Tamil Nadu where nearly half the cases were undiagnosed previously. 16 Further on one-third of the patients with DM were aware of their condition in a different study at Delhi, thereby intimating the urgent steps to be taken for actively screening the population.[19]
Associated factors of diabetes that were tested in adult rural population of Haryana were low physical activity, positive family history of diabetes, and high Waist hip ratio (WHR). The prevalence of newly detected diabetes was 7.3%, whereas the overall prevalence of known and newly detected diabetes was13.3%. Even in the rural population of Haryana the prevalence of diabetes is rising constantly.[20]
In an old study although the prevalence of diabetes increases with age, it does not exceed 3.5%.[21] but in present studies clearly indicates higher prevalence. An increase in diabetes prevalence among rural population at a rate of 2.02 per 1000 population per year was found with a secular treand.[22]
Another study from Haryana also showed the highest prevalence of diabetes in the age group of 46-60 yrs, which should be taken very seriously, as higher prevalence of diabetes in this economically productive age group certainly imposes the burden on economic growth of the society. Due to lack of screening facility of diabetes at PHC level, rural population remains exposed to high level of blood sugar for a long time and this increases the risk of developing various complication of diabetes mellitus. This in fact increases the mortality and morbidity that should be viewed very seriously, Change 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.[23]
This study has taken in terms of near to exact number of patients having diabetes, prevalence, male female data and complication , higher prevalence in female could be due to increase access of female to sub centre , decreased physical activity and increased modern machines for cutting fodder, better availability of water facilities as earlier they use to go far away for drinking water from wells, better electricity appliances for grinding of wheat as compared to hand machines, better electric facilities for ghee making/lassi making and villagers especially females are less commonly seen playing outdoor games.

CONCLUSION

In the present study it is concluded that immediate steps related to screening for DM are required for various setting throughout the country, as prevalence is rising exponentially even

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in rural areas, mainly due to a large numbersof undiagnosed cases. Thus we need to identify total burden of diseases and act accordingly to prevent complications related to DM at very early stage.

REFERENCES

1. Ozougwu J, Obimba KC, Belonwu CD, Unakalamba CB. The pathogenesis and pathophysiology of type 1 and type 2 diabetes mellitus. J Physiol Pathophysiology 2013;4:46-7.
2. Kaveeshwar SA, Cornwall J et al. The current state of diabetes mellitus in India. Med J Aus2014;7:45-8,.
3. Ramachandran A, Snehalatha C, Shetty AS, Nanditha A. Trends in prevalence of diabetes in Asian countries. World J Diabetes. 2012;3(6):110-17.
4. International Diabetes Federation. IDF diabetes atlas. In: IDF, eds. A Book. 6th ed. Brussels, Belgium: International Diabetes Federation;2013.
5. Mohan V, Madan Z, Jha R, Deepa R, Pradeepa R. Diabetes social and economic perspectives in the new Millennium. Int J Diab Dev Countries.2004;24:29-35.
6. Global Forum Health. Risk factor surveillance for non-communicable diseases (NCDs): the multi-site ICMR-WHO collaborative initiative,2015.
7. Gupta SK, Singh Z, Purty AJ. Diabetes prevalence and its risk factors in rural area of Tamil Nadu. Indian J Community Med 2010;35: 396-9,.
8. Vaz NC, Ferreira A, Kulkarni M, Vaz FS, Pinto NR. Prevalence of diabetic complications in rural Goa, India. Indian J Community Med 2011;36: 283-6.
9. Kumar D, Mukherjee K. Economic impact of type-2 diabetes mellitus on households in Hisar district of Haryana state, India. The Health Agenda .2014;2: 125-129,World Health Organization. 10 facts about diabetes,2013.
10. Radha V, Mohan V. Genetic predisposition to type 2 diabetes among Asian Indians. Indian J Med Res.2007;125(3):259-74.
11. Madaan H, Aggarwal P, Garg R, Sachdeva A, Kumar S, Nair R.Prevalence of Diabetes Mellitus in Rural population of District Sonipat, India. Int J Med Sci and Public Health.2014;3:261-4.
12. Sadikot SM, Nigam A, Das S, Bajaj S, Zargar AH, Prasannakumar KM, et al. The burden of diabetes and impaired glucose tolerance in India using the WHO 1999 criteria: prevalence of diabetes in India study (PODIS). Diabetes Res Clin Pract. 2004;66(3):301–7.
13. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V, Das AK, et al. High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. Diabetologia.2001;44(9):1094–101.
14. Little M, Humphries S, Patel K, Dodd W, Dewey C. Factors associated with glucose tolerance, pre-diabetes, and type 2 diabetes in a rural community of south India: a cross-sectional study. Diabetol MetabSyndr. 2016;8:21.
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 Indian Council of Medical Research-India DIABetes (ICMR-INDIAB) study. Diabetologia. 2011;54(12):3022–7.
16. Meshram II, Vishnu Vardhana Rao M, Sudershan Rao V, Laxmaiah A, Polasa K.
17. Regional variation in the prevalence of overweight/obesity, hypertension and diabetes and their correlates among the adult rural population in India. Br J Nutr. 2016;115(7):1265–72.

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18. Ahmad J, Masoodi MA, Ashraf M, Rashid R, Ahmad R, Ahmad A, Dawood S. 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.
19. Singh AK, Mani K, Krishnan A, Aggarwal P, Gupta SK. Prevalence, awareness, treatment and control of diabetes among elderly persons in an urban slum of Delhi. Indian J Community Med.2012;37(4):236–9.
20. Rajput R, Rajput M, Singh J, Bairwa M. Prevalence of diabetes mellitus among the adult population in rural blocks of Haryana, India: a community-based study. Metab Syndr Relat Disord. 2012Dec;10(6):443-6.
21. Bierman EL. Atherogenesis in diabetes. ArteriosclerThromb1992;12:647-56,.
22. Misra P, Upadhyay RP, Misra A, Anand K. A Review of the epidemiology of Diabetes in Rural India. Diabetes Res Clin Pract. 2011;92(3):303-311.
23. Madaan H, Agrawal P, Garg R, Sachdeva A, Partra SK, Nair R. Prevalence of diabetes mellitus in rural population of district Sonepat, India. Int J Med Sci Public Health2014;3:261-264.