PREVALENCE OF TYPE II DIABETES MELLITUS AMONG ADULTS OF URBAN AREA IN BAREILLY

Rahul Chandra[1], Piyush Gupta[1], Rakesh Kumar Chakrawarty[2], Shipra Tiwari[3], Pratima Chakrawarty[4]

[1]Assistant Professor, Department of Community Medicine, Index Medical College Hospital and Research Centre, Indore, Madhya Pardesh India
[2]Assistant Professor, Department of Community Medicine, Carrier Institute of Medical Science Lucknow Uttar Pradesh India
[3]Consultant Department of Prosthodontics Crown and Bridge, Dhaatri Dental, Patna, Bihar
[4]Associate Professor, Department of Obs & Gynea, Ankerite Ayurvedic Medical College & Hospital Lucknow Uttar Pradesh India

Abstract

Background: Diabetes mellitus is arising as one of the leading cause of morbidity and mortality of India. The objective is to determine the prevalence of type II diabetes mellitus among adults of urban area in Bareilly **Materials and Methods:** Present cross-sectional study was conducted in the Department of Community Medicine, RMC&H Bareilly among people residing in urban areas of Bareilly. sample size calculated was approximately 450. **Result:** Majority of the study subjects were seen in 30-40 years of age group (58%) with least (17.7%) being above 51 years. Only 23.6% population was having positive family history of type 2 diabetes mellitus. Among all study subjects 10.2% were chewing tobacco while 18% were smokers among these 13.7% were smoking cigarette while 4.3% were consuming beedi. Among all the study subjects 12.9% were alcoholics among them most were occasional drinkers. **Conclusion:** The prevalence of diabetes mellitus was found to be 19.1% in the present study.

INTRODUCTION

The World Health Organization (WHO) defined health in its broader sense in its 1948 constitution as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Now, at the dawn of the third millennium, non-communicable diseases are sweeping the entire globe. There is an increasing trend in developing countries, where the demographic and socio-economic transition imposes more constraints on dealing with the double burden of infectious and non-infectious diseases in a poor environment, characterized by ill-health systems. It is predicted that, by 2020, non-communicable diseases will cause seven out of every ten deaths in developing countries. Among non-communicable diseases, special attention is devoted to cardiovascular disease, diabetes, cancer and chronic pulmonary disease. The burden of these conditions affects countries worldwide but with a growing trend in developing countries. Preventative strategies must take into account the growing trend of risk factors correlated to these diseases.[1,2]

It is predicted that the prevalence of DM in adults of which type 2 DM is becoming prominent will increase in the next two decades and much of the increase will occur in developing countries where the majority of patients are aged between 45 and 64 years.[3] It is projected that the latter will equal or even exceed the former in developing nations, thus culminating in a double burden as a result of the current trend of transition from communicable to non-communicable diseases.[4]

The prevalence of type 2 diabetes rates continue to increase with increasing number of patients at risk of serious diabetes-related complications. Having type 2 diabetes increase the risk of a myocardial infarction two times and the risk of suffering a stroke two to four times. It is also a leading cause of blindness, limb amputation and kidney failure.[5,6,7]

Once regarded as a single disease entity, diabetes is now seen as heterogeneous group of diseases, characterized by a state of chronic hyperglycaemia, resulting from a diversity of aetiologies, environmental and genetic, acting jointly.

While the increase in prevalence is occurring in rural as well as urban areas, the urban areas demonstrate a faster increase. However disturbingly, in recent time an acceleration has been noted in rural areas which probably represents the adoption of unhealthy lifestyles in rural population.

The International Diabetes Federation (IDF) Diabetes Atlas states that in low- and middle-income countries, the number of people with diabetes in urban areas is 181 million, while 122

338

million live in rural areas.[8] The data from the ICMR study also shows that prevalence of diabetes in urban areas ranged from 10.9 to 14.2% while in rural areas the range was 3.0 to 8.3%. A rural-urban gradient has also been observed in a study from Tamil Nadu, where the prevalence of diabetes in peri-urban villages and cities in the state of Tamil Nadu reported as 9.2% and 16.4% respectively.[9]

Tamil Nadu and Maharashtra was 8.3%,7.8% and 6.5% respectively. On the other hand, in the economically less advantaged state of Jharkhand, the prevalence was only 3.0%.[10]

This on looking at the rapid increase of cases of diabetes mellitus in urban area this study was planned to determine the prevalence of type II diabetes mellitus among adults of urban area in Bareilly.

MATERIALS AND METHODS

Present cross-sectional study was conducted in the Department of Community Medicine, RMC&H Bareilly among people residing in urban areas of Bareilly.

Study Period was from November 2015 - October 2016. Ethical clearance was obtained from the institutional ethical committee for the present study.

Inclusion Criteria
• People aged 30-60 years.
• Residing in Bareilly from more than last 6 months.
• Those who give informed consent for the study.

Exclusion Criteria
• Aged below 30 year and more than 60 years.
• Residing in Bareilly from less than last 6 months.
• Those who did not give consent

Sample Size
Sample size for the proposed study was calculated according to India Health Administrator where prevalence of diabetes type 2 use in U.P. was given as 20.1%, therefore the adequate sample size calculated was approximately 450 assuming 10% non-response and considering 20% relative error.
Sample size will be calculated with following assumptions p = prevalence =20.1%.[11]

$q = 1 - p = 79.9$

L (Relative error) = 20% of p

$n = 4pq/L^2$

$= 397.5$

$= 398$

Taking non- response rate as 10%

Final sample size=10x/9

398   10/9 = 442

Sampling Technique
Multistage sampling technique was used for all the study units until the required sample size is attained.

Study Tool: pre-tested and pre-designed schedule.

Methodology
• Selection of study participants was done via multi stage sampling that was applied in urban areas of Bareilly.
• Out of 70 wards in the urban areas of Bareilly, 15 wards will be chosen via simple random sampling, Each ward is having average 900 houses andthus total houses in 15 wards were nearly 13,500 To attain the required sample size of 450 from these wards, 30 houses was chosen again via simple random sampling and from those houses selection of person aged 30 years and above was done, again via same technique till the required sample size was attained.
• If there were two or more person of the same age in the same house, then one person was selected again via same technique.
• After attaining the required sample size, fasting blood glucose level analysis of the study population was done with Glucometer.
• Fasting blood glucose analysis was done by taking early morning blood sample by finger pricking method and the study group was informed one day prior by making the house-to-house visit.

Data processing and Statistical analysis: The data obtained was compiled using an excel spread sheet. Statistical analysis was done using SPSS (Statistical Programming for Social Sciences) version 22.0. The data were summarized using percentages and frequency, Chi-square test and the differences was accepted significant at p value<.05.

RESULTS

Majority of the study subjects were seen in 30-40 years of age group (58%) with least (17.7%) being above 51 years. 95.3% study subjects were married while 4% were unmarried; majority of the study subjects were Hindu by religion; 39.6% belonged to general and 29.3% O.B.C. category while only 31.1% belonged to the S.C./S.T. category.

9.8% were educated up to high school followed by intermediate (17.6%) and middle school (3.6%) and 8.7% being illiterate while 57.6% were graduate.

As far as the occupational classification is concerned only 11.1% being professional and 13.1%were in semi-profession, around one fourth (27.8%) of the study subjects belonged to the category of clerical/shop-owner/farmer while only (3.1%) were semi-skilled and more than a quarter (31.6%) being unemployed. Skilled workers were 13.1%. 67.1% study subjects belonged to the upper middle class with least being 1.6% in the upper lower class.

[Figure 1] This chart shows the distribution of type 2 diabetes mellitus in study population in which 19.12% population is having type 2 DM.

[Figure 2] In total sample only 23.6% population was having positive family history of type 2 diabetes mellitus.

[Table 1] shows the distribution of tobacco, smoking and alcohol consumption among all the study population.

Among all study subjects 10.2% were chewing tobacco while 18% were smokers among these 13.7% were smoking cigarette while 4.3% were consuming beedi.

Among all the study subjects 12.9% were alcoholics among them most were occasional drinkers.

[Figure 3] Depicts among the study population multiple answer are possible whose Fasting Blood Glucose >126mg/dl, where cardinal sign and symptoms noted was increase appetite 14.60%, increase thirst 11.1% and dry mouth 10.2% of population were having urination at night.

Incidence of other symptoms were 3.1% numbness, increase hunger in 1.3% sweating 2.2% and moderate changes seen as night sweat 9.6%, weakness 7.6% and high RBS is 5.8%.

[Table 2] depicts that majority of population 93.6% were aware about diabetes mellitus medication, in that 45.3% knew that only allopathic medicines are available for diabetes mellitus type 2 while and only 5.1 % knows about homeopathic medicine that can help in management of DM 2. 1.3% believes that all the three basic modalities like allopathic, ayurvedic and homeopathic can treat DM 2 still 1.3% were unaware about the treatment modality. 2.9% were unaware about the place of treatment while among the rest of study population 2.2% know about specialist D.M. clinic and rest believes that treatment is available at various place like medical college, district and private hospitals.

[Table 4] depicts that 9.3% were using self -test method for investigation

Among the study population 72.20% subjects were non-vegetarian while only 27.8% subjects were taking vegetarian food.

Among study population of 450 subjects' majority of population 76.20% were not taking outside food whereas 17.10% were taking lunch outside and 4.4% were taking dinner from outside source

Among study population majority of people were using refined oil in their daily routine of cooking oil

while 33.3% were using mustard oil and only 6.2% were using olive oil.

Among study population 76.40% were taking added fat in their daily routine diet, while 23.60% were not taking added fat.

Among study population 58.20% were using ghee as extra added fat, 11.15 using butter and only 7.10% using chees in their routine diet.

Among study population only 17.3% were doing physical exercise and out of them all were doing morning walk were as 82.7% were not doing any physical activities.
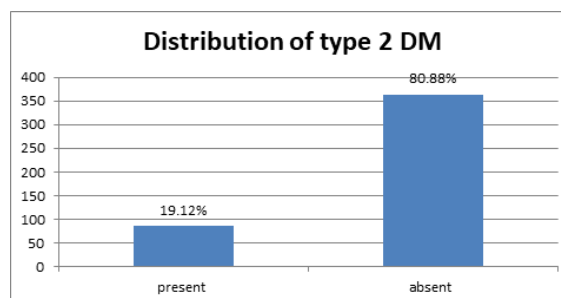

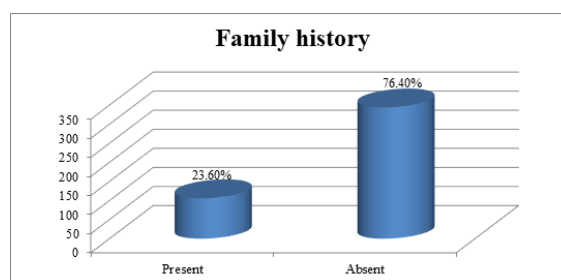**Figure 1: Distribution of type 2 Diabetes Mellitus in study subject (N=450)**

Figure 2: Distribution of Family history of type 2 Diabetes Mellitus in study subject (N=450)
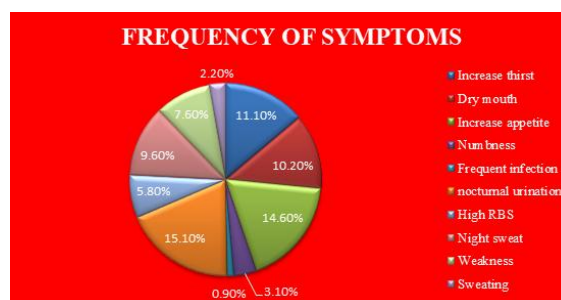
Figure 3: Distribution of the presence of cardinal signs and symptomof DM among study subject (N=450)

Table 1: Distribution of tobacco, smoking and alcohol consumption in study population (N=450)

Smokeless Tobacco consumption		Frequency	Percentage
No		404	89.8%
Yes		46	10.2%
Smoking			
Yes	Bidi	21	4.3%
	Cigarette	60	13.7%
	Total	81	18%
No		369	82%
Alcohol intake			
Yes	Daily	4	0.9%
	Weekly	20	4.4%

	Occasional	34	7.6%
	Total	58	12.9%
No		392	87.1%

Table 2: Distribution of study subject as per their belief on treatment modality (N=450)

Awareness about availability of Diabetes mellitus medicine	Yes	421	93.6%
	No	29	6.4%
Type of medicine	Allopathic	204	45.33%
	Ayurvedic	46	10.22%
	Homeopathic	23	5.1%
	Allopathic +ayurvedic	165	36.6%
	Allopathic+ayurvedic +homeopathic	6	1.3%
	Not known	6	1.3%
Place of treatment	Don't know about place	13	2.9%
	Medical college	64	14.2%
	District hospital	32	7.1%
	Private hospital	67	14.9%
	D.M clinic	10	2.2
	Medical-college+ District hospital	193	42.9%
	Medical-college+ District-hospital +Private hospital	59	13.1%
	District-hospital +Private hospital	12	2.7%

Table 3: Distribution of duration of blood glucose testing among study population(N=450)

Glucose testing	No test	256	56.9%
	Yearly	68	15.1%
	3rd monthly	87	19.3%
	Monthly	29	6.4%
	Every 15th day	10	2.2%

Table 4: istribution of modality of self-blood glucose testing among study population (N=450)

Self- test	Yes	42	9.3%
	No	408	96.7%

DISCUSSION

Through this study, an attempt has been made to look at some important aspects of prevalence of type 2 diabetes mellitus in the urban area of Bareilly which is geographically located at the western part of Uttar Pradesh State.

The age of study population also differs. In this study, age ≥ 30 years was taken which was similar to studies done by Chow et al, Jonas et al and Kokiwar et al.[12,13,14]

In studies done by Deo et al,[15] and Zaman et al,[16] age group included were ≥20years. While study by Rajput et al,[17] and Vijayakumar et al,[18] included people aged ≥ 18 years, ≥ 15years was taken as study population by Mohan et al.[19]

Present study showed that majority 60.22% of the participants were having education status of graduate while illiterates were only 8.66 % similarly Patel et al,[20] observes that majority of their patients had graduate education and illiterates formed a mere one percent in their study. While in contrast Rana HM et. Al. shows that majority of the patients were either educated upto primary or they were illiterate.[21] Majority of population (69.76%) were of upper-middle class. Similarly, Robbins et al.[22] & Mainous et al.[23] also found that upper-middle class is more prominent.

The prevalence of Diabetes in my study was 19.12%. The prevalence in other studies from urban areas varies from 15% to 20.1%.[24,25] In the present study the fasting blood glucose ≥126mg/dl was considered as criteria for diagnosis of diabetes.

Similarly, studies done by Chow et al,[12] and Vijayakumar et al,[18] had taken the fasting blood glucose ≥126mg/dl as criteria for diagnosis of diabetes while V Mohan et al,[19] consider diabetes on self-reported basis while Jonas et al, defined diabetes as postprandial blood glucose concentration ≥200 mg/dL, glycosylated haemoglobin ≥6%, or self-reported medical diagnosis. Gupta et al,[26] has chosen Indian Diabetic Risk Score (IDRS) for seeing the prevalence of diabetes.

CONCLUSION

The present study provides reliable and recent epidemiological information regarding the high burden of diabetes mellitus among the adult population in a representative North Indian population. Around 19.1% of the general adult population have diabetes or pre-diabetes, calling for an urgent attention. This study also highlights a significant burden of un-diagnosed cases of DM in the community; most of them are poorly controlled. There is need to identify the large pool of undiagnosed cases of DM and offer early treatment in order to avoid complications.

341

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556

REFERENCES

1. Boutayeb A. The Burden of Communicable and Non-Communicable Diseases in Developing Countries. Handbook of Disease Burdens and Quality of Life Measures. 2010:531–46. doi: 10.1007/978-0-387-78665-0_32.

2. Boutayeb A. The double burden of communicable and non-communicable diseases in developing countries. Trans R Soc Trop Med Hyg. 2006;100(3):191-9. doi: 10.1016/j.trstmh.2005.07.021.

3. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care. 2004;27(5):1047-53. doi: 10.2337/diacare.27.5.1047.

4. Yach D, Hawkes C, Gould CL, Hofman KJ. The global burden of chronic diseases: overcoming impediments to prevention and control. JAMA. 2004;291(21):2616-22. doi: 10.1001/jama.291.21.2616.

5. Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, Al Kaabi J. Epidemiology of Type 2 Diabetes - Global Burden of Disease and Forecasted Trends. J Epidemiol Glob Health. 2020;10(1):107-111. doi: 10.2991/jegh.k.191028.001.

6. Martín-Timón I, Sevillano-Collantes C, Segura-Galindo A, Del Cañizo-Gómez FJ. Type 2 diabetes and cardiovascular disease: Have all risk factors the same strength? World J Diabetes. 2014;5(4):444-70. doi: 10.4239/wjd.v5.i4.444.

7. Hippisley-Cox J, Coupland C. Diabetes treatments and risk of amputation, blindness, severe kidney failure, hyperglycaemia, and hypoglycaemia: open cohort study in primary care. BMJ. 2016;352:i1450. doi: 10.1136/bmj.i1450.

8. Deepa M, Bhansali A, Anjana RM, Pradeepa R, Joshi SR, Joshi PP, et al. Knowledge and awareness of diabetes in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. Indian J Endocrinol Metab. 2014;18(3):379-85. doi: 10.4103/2230-8210.131191.

9. Ranasinghe P, Jayawardena R, Gamage N, Sivanandam N, Misra A. Prevalence and trends of the diabetes epidemic in urban and rural India: A pooled systematic review and meta-analysis of 1.7 million adults. Ann Epidemiol. 2021;58:128-148. doi: 10.1016/j.annepidem.2021.02.016.

10. 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. doi: 10.1007/s00125-011-2291-5.

11. Bhupathiraju SN, Hu FB. Epidemiology of Obesity and Diabetes and Their Cardiovascular Complications. Circ Res. 2016;118(11):1723-35. doi: 10.1161/CIRCRESAHA.115.306825.

12. Chow CK, Raju PK, Raju R, Reddy KS, Cardona M, Celermajer DS, et al. The prevalence and management of diabetes in rural India. Diabetes Care. 2006;29(7):1717-8. doi: 10.2337/dc06-0621.

13. Jonas JB, Nangia V, Joshi PP, Matin A, Panda-Jonas S. Diabetes mellitus in rural India. Epidemiology. 2010;21(5):754-5. doi: 10.1097/EDE.0b013e3181e66201.

14. Kokiwar PR, Gupta S, Durge PM. Prevalence of Diabetes in rural area of Central India. Int J Diab Dev Ctries. 2007; 27: 8-10.

15. Deo SS, Zantye A, Mokal R, Mithbawkar S, Rane S, Thakur K. To identify the risk factors for high prevalence of diabetes and impaired glucose tolerance in Indian rural population. Int J Diab Dev Ctries. 2006, 26 (1): 19-23.

16. Zaman FA, Pal R, Zaman GS, Swati IA, Kayyum A. Glucose indices, frank and undetected diabetes in relation to hypertension and anthropometry in a South Indian rural population. Indian J Public Health. 2011;55(1):34-7. doi: 10.4103/0019-557X.82545.

17. Rana HM, Chavda P, Rathod CC, Mavani M. Socio-Demographic and Anthropometric Profile of Diabetic Patients Attending Diabetes Clinic in Tertiary Care Hospital of Central Gujarat. Ntl J of Community Med. 2015; 6(4):554-557.

18. Vijayakumar G, Arun R, Kutty VR. High prevalence of type 2 diabetes mellitus and other metabolic disorders in rural Central Kerala. J Assoc Physicians India. 2009;57:563-7.

19. Mohan V, Mathur P, Deepa R, Deepa M, Shukla DK, Menon GR, et al. Urban rural differences in prevalence of self-reported diabetes in India--the WHO-ICMR Indian NCD risk factor surveillance. Diabetes Res Clin Pract. 2008;80(1):159-68. doi: 10.1016/j.diabres.2007.11.018.

20. Patil RS, Gothankar JS. Prevalence of type 2 diabetes mellitus and associated risk factors in an urban slum of Pune city, India. Natl J Med Res. 2013;3(4) 345-9.

21. 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. 2012;10(6):443-6. doi: 10.1089/met.2012.0067.

22. Robbins JM, Vaccarino V, Zhang H, Kasl SV. Socioeconomic status and type 2 diabetes in African American and non-Hispanic white women and men: evidence from the Third National Health and Nutrition Examination Survey. Am J Public Health. 2001;91(1):76-83. doi: 10.2105/ajph.91.1.76.

23. Mainous AG 3rd, King DE, Garr DR, Pearson WS. Race, rural residence, and control of diabetes and hypertension. Ann Fam Med. 2004;2(6):563-8. doi: 10.1370/afm.119.

24. Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. Indian J Ophthalmol. 2021;69(11):2932-2938. doi: 10.4103/ijo.IJO_1627_21.

25. Sengupta P, Benjamin NS, Benjamin AI. Some observations on diabetes mellitus in Ludhiana, Punjab. Indian J Public Health. 2010;54(1):46-7. doi: 10.4103/0019-557X.70556.

26. Gupta SK, Singh Z, Purty AJ, Kar M, Vedapriya D, Mahajan P, et al. Diabetes prevalence and its risk factors in rural area of Tamil Nadu. Indian J Community Med. 2010;35(3):396-9. doi: 10.4103/0970-0218.69262.

342

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556