ISSN - Print: 2277 – 1522; Online: 2277 – 3517

ORIGINAL RESEARCH ARTICLE

DOI: 10.26727/NJRCM.2020.9.3.106-110 Year: 2020 Vol: 9 Issue: 3. Jul.-Sep. Page: 106-110

Prevalence of Type 2 Diabetes Mellitus in a Rural Population in Puducherry.

Gomathi A[1], Kamalam.S [2], Jeevaanand.N[3]

Affiliation: 1Associate Professor, College of Nursing, AIIMS, Jodhpur.2 Professor cum Principal, AG Padmavathi College of Nursing, Puducherry.3 Medical Officer (Ayurveda) Primary Health Centre, Ariyur, Puducherry.

***Author for correspondence**: Gomathi A.,Associate Professor, College of Nursing, AIIMS, Jodhpur. E mail :- arumugamg@aiimsjodhpur.edu.in

Date of Submission : 21-07-2020
Date of Acceptance : 26-08-2020
Date of online Publication : 30-09-2020
Date of Print Publication : 30-09-2020

ABSTRACT

Background: Diabetes is traditionally known as a "silent disease," exhibiting no symptoms until it progresses to severe target organ damage. Case detection, therefore, requires active and opportunistic screening efforts. The shift in epidemiology from communicable diseases to non-communicable diseases indicates that the rural population is also at a high-risk for developing diabetes mellitus. **Aims & Objective**: The study was conducted to determine the prevalence of type 2 diabetes mellitus in rural community. **Material and Methods**: A Community based cross-sectional study was conducted at Villiyanoor block of Puducherry district. The three villages were selected randomly by systematic sampling method in the age group of 40-60 years. The study 400 subjects from the three villages. Random blood glucose was determined by glucometer. Data was analysed using SPSS 21. **Results**: The mean age of the study participants were 49.8 years ±7.5 SD. Majority (74.5%) were females and rest (25.5%) were males. Overall, the prevalence of type 2 diabetes was found to be 37 (9.3%) out of which 6 (1.5%) participants were newly diagnosed as diabetes and 57 (14.2%) of them had prediabetes. The mean systolic blood pressure was significantly higher among the diabetes as compared to other groups ($p<0.001$). **Conclusions:** Diabetes prevalence seems to be increasing in rural population of Puducherry as compared to the previous study findings. Interventions focusing on promoting a healthy lifestyle is an effective strategy to control the diabetes epidemic in rural areas.

Key word: Blood glucose, Prediabetes, Rural India, Type 2 diabetes mellitus

INTRODUCTION

Type 2 Diabetes mellitus is the common form of diabetes characterized by hyperglycaemia, insulin resistance and relative insulin deficiency. Interaction between genetic, environmental and behavioural risk factors, more vulnerable to complications, leading to their premature death. Insidious onset and late recognition, leads to increased morbidity and mortality especially in poor resource developing countries.[1] The World Health Organization (WHO) estimated that the diabetes will be the seventh leading cause of death in the next 15 years and the global prevalence of diabetes will be 4.4% in 2030 as compared to 28% in 2000.[2] A systematic review revealed that diabetes is an important risk factor for active tuberculosis, which also adversely affects TB treatment outcomes.[3]

India is the "diabetes capital of the world", and it is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken. "Asian Indian Phenotype", more prone to diabetes and premature coronary artery disease. [4]

Diabetes is traditionally known as a "silent disease," exhibiting no symptoms until it progresses to severe target organ damage. Diagnosis of diabetes requires active and opportunistic screening efforts. [5]

Ghorpade, et.al found that the incidence of T2DM in adults of Puducherry population per year was 2% .This study was carried out in two of the four villages under the Rural Health Centre, namely Ramanathapuram and Pillaiyarkuppam comes under villianur commune. [6] The awareness of the disease was extremely low in the rural areas and the ratio of unknown-to-known diabetes is 3:1 as compared to 1:1 in the urban areas.[7] As 72% of Indians reside in rural areas, more studies are need to be done to identify the type 2 diabetes prevalence and its determinants among rural population.

METHODS

A Community based cross-sectional study was done at Villiyanoor block in Puducherry district. Three villages were selected randomly (Ariyur, Anandhapuram and Pangoor) with the total population of 8950. There were 1400 adults in the age group of 40-60 residing in study area. The sample size was calculated using the formula n = 4 pq / L2, taking into consideration the prevalence of type 2 diabetes as 8.03% (according to Singh PS et al) [8] with absolute precision of 3%. The sample size was calculated as 327. A non-response rate of 15% was added to the total sample size and finally the sample size was fixed as 377. Hence the sample size was rounded of as 400 individuals. The study participants in the age group 40 -60 years were selected using systematic sampling method. Data collection was collected from January 2019 to February 2019. The study was approved by institutional ethical committee of A. G. Padmavathi College of Nursing.

Population of 40-60 years age group of both sexes were included in the study. Subjects who were non –cooperative, migrants, pregnant women or who refused to participate were excluded from the study.

Verbal informed consent was obtained from each participant. Validated interview schedule and glucometer was used for blood glucose estimation. Time taken for each interview was around 10 -20 minutes. Diabetes was defined on fulfilment of criteria laid down by the WHO consultation group report, i.e. 2-hour plasma post-glucose value ≥200mg/dl and known cases of type 2 diabetes mellitus. Prediabetes was diagnosed based on 2hour plasma post-glucose value 140mg/dL to 199mg/dL.[9]

Blood pressure was measured by using standardized blood pressure apparatus in a sitting position and according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) guidelines, the average of two blood pressure recorded 15 minutes apart of >140/90 mm Hg was taken in to hypertensive. [10]

BMI was calculated as weight in kilograms divided by the square of the height in meters (kg/m2) and categorized into four groups according to the Asian-Pacific cut off points underweight (<18.5 kg/m2), normal weight (18.5–22.9 kg/m2), overweight (23–24.9 kg/m2), and obese (>25 kg/m2).[11]

The study participants those who identified with the blood glucose level >200mg/dl with the no history of type 2 diabetes mellitus were given 75gm of glucose dissolved in 250-300ml water which was drunk over a period of 5 minutes and the 2-hour post load capillary blood glucose was estimated to diagnose type 2 diabetes mellitus.

The data was entered into MS excel sheet and SPSS (statistical package for social sciences) version 21 for analysis. The difference between the groups were analysed by one-way ANOVA followed by Bonferroni test value< 0.05 was considered statistically significant.

RESULTS

Table 1: Distribution of Study Participants According to their Age, Sex and Blood glucose level. (n=400)

Age in Years	No of Participants		Status of Blood Glucose Level.	
	Male	Female	Diabetes	Prediabetes
	No (%)	No (%)	No (%)	No (%)
40-50	56 (54.4)	142(47.8)	14(37.8)	22(38.6)
50-60	47(45.6)	155(52.2)	23(62.2)	35(61.4)
Total	103	297	37	57

Table 2: Gender wise Distribution of Diabetes, Pre-diabetes and Non-Diabetic subjects N=400

Groups	Male	Female	Total
	No (%)	No (%)	No (%)
Diabetes	8(7.7)	29(9.8)	37(9.3)
Pre-Diabetes	22(21.4)	35(11.8)	57(14.2)
Normal	73(70.9)	233(78.4)	306(76.5)
Total	103	297	400

Table 3: Comparison of, BMI, SBP and DBP among Pre-Diabetes and Diabetes Subjects (n=400)

Parameter	Non diabetes n=306	Prediabetes n=57	Diabetes n=37	F value	P value
Body Mass Index	25.96±5.71	25.63±4.65	27.32±4.4	1.204	0.301
Systolic Blood pressure(mmHg)	129.51±18.15	129.79±16.86	143.43±22.06	9.566	0
Diastolic Blood pressure(mmHg)	79.12±11.16	80.93±12.04	84.49±11.74	2.996	.051

The mean age of the study participants was 49.8 ±7.5 years. Majority (74.5%) were females and rest (25.5%) were males. There was more diabetes (62.2%) and prediabetes (61.4%) subjects in the age group of 50 -60 years. (Table 1)

Nine percent of the participants were diabetes and 14.2% were prediabetes. More than 3/4th of the diabetes were females (78.4%). There was more prediabetes among males (21.4%) than females (11.8%). (Table 2)

The mean BMI of study participants in diabetes and prediabetes were 27.32 and 25.63 respectively. The mean systolic blood pressure was high among the diabetes as compared to other groups and was found to be statistically significant p<0.001.Post hoc test with Bonfereni showed that significant difference was observed between prediabetes and diabetes group (0.001)and normal and diabetes(0.00) group. (Table 3)

Among the 103 male participants 15(6.8%) had the habit of smoking, 22 (21.3%) were alcohol consumers, 7(14.7 %) were tobacco use and 4 (3.8%) had hypertension.

DISCUSSION

In the present study, among the diabetes 38% were in 40-50 years of age group and 62%were in 50-60 years of age group. Bhalerao et.al reported in their study, prevalence of diabetes as 30.4% in 40-49 years age group from rural Karnataka in 2014. [12] Madaan H,et.al in 2014 from rural Hariyana also found maximum prevalence of diabetes (41.96%) in the age group of 46-60 yrs. [13] These findings show that increasing age is a risk factors for diabetes.

Overall prevalence of type 2 diabetes in the study was found to be 37 (9.3%) out of which 6 (16.2%) participants were newly diagnosed as diabetes. These findings were similar to the findings reported by Rathod et.al [14](9.1%) in 2014 from rural Pune. The prevalence of type 2 diabetes in the rural population of Puducherry was found to 5.8% [15] in the year 2012.Another population-based, longitudinal study from rural Puducherry in 2013 reported type 2 diabetes incidence as 2% per year in adults.[16] In this study 14% had prediabetes and the proportion was more in 50-60 years age group. The findings show that increasing age is a risk factor for prediabetes. The study by Padmanabha et.al in 2017 from rural Mangalore had reported the prevalence of prediabetes was 11.5%.[17] These persons were asked to have further follow up in primary health centre (PHC).

None of the participants who were either smoker or alcoholic had diabetes. One had prediabetes. However, as all these persons are at risk of developing diabetes mellitus in future. They were advised to adopt healthy lifestyle behaviour and follow up in PHC periodically.

The mean systolic blood pressure was high among the diabetes as compared to other groups and was found to be statistically significant p<0. 001.These findings were similar to the findings reported by Padmanabha et.al in 2017 from rural Mangalore where the blood pressure was found to be statistically significant (p<0.001) among diabetes group.[17]

In the present study body mass index of the study participants were not found be a significant, however all the participants were in obese category (>25 kg/m2). It signifies that the non-pharmacological and preventive measures need to be initiated in their day today practice of life to maintain appropriate weight. In the present study the mean Random blood sugar was found to be significantly higher 286.27±91.04**.** So, in addition to pharmacological measures there is an urgent need of mainstreaming of lifestyle modifications (exercise, diet) in their day today activities.

In conclusion, Diabetes prevalence seems to be increasing in rural population of Puducherry as compared to the previous study findings. This could be due to diffusion of urban lifestyle in rural areas. Interventions focusing on promoting a healthy lifestyle among high risk groups may be an effective strategy to control the diabetes epidemic in rural areas.

Ethical approval: The study was approved by the Institutional Ethics Committee.

Acknowledgements: We would like to thank the study participant**,** medical officers and staffs working in Primary Health Centre,Ariyur, Puducherry for their help during the data collection and special thanks to Dr. K. V. Raman, former Director of Health and Family welfare, Govt of Puducherry. We also thank Dr. Srikanth Srinivasn Associate Professor, AIIMS Jodhpur & Dr. Maithili Karpaga Selvi, Assistant Professor AIIMS Jodhpur for their valuable suggestions in the analysis of the data.

REFERENCES:

1.Nicolucci A, Kovacs Burns K, Holt RIG, Comaschi M, Hermanns N,Ishii H, et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2TM): Cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med J Br Diabet Assoc .2013; 30:767-77.

2...Diabetes. World Health Organization Media Centre (2015): Available on www.who.int/mediacentre/factsheets/fs312/en/. Accessed on January 26th 2020.

3.. Tankeu AT, Bigna JJ, Nansseu JR, et al. Globalprevalence of diabetes mellitus in patients with tuberculosis: a systematic review and metaanalysisprotocol. BMJ Open 2017; 7:e015170. Doi: 10.1136/bmjopen-2016-015170. Accessed on January 22nd, 2019.

4. MohanV, SandeepS, Deepa.R, Shah.B ,Varghese.C.Epidemiology of type 2 diabetes: Indian scenario, Indian J Med Res .2007; 175: 217-30.

5. International Diabetes Federation. The human, social and economic impact of diabetes. Available from: http://www.idf.org/home/index.cfm?node=41. Accessed on May 26th 2020.

6.Ghorpade et al.: Diabetes in rural Pondicherry, India, WHO South-East Asia, Journal of Public Health .2013 ;2:3–4:1:49-53.

7..Kovacs B. K, Nicolucci A, Holt R.I, Willaing I, Hermanns N, Kalra S, et al., DAWN2 Study Group. Diabetes Attitudes, Wishes and Needs second study (DAWN2TM): Cross-national benchmarking indicators for family members living with people with diabetes. Diabet Med 2013; 30:778-88.

8. Singh PS et al., Prevalence of type 2 diabetes mellitus in rural population of India- a study from Western Uttar Pradesh, Int J Res Med Sci.2017;5(4):1363-67.www.msjonline.org. Accessed May 25h, 2019.

9. Report of a WHO consultation. Definition, diagnosis and classification of diabetes mellitus and its complications. Available at http://www.who.int/NCD/NCS/99.2. Accessed on January 22nd, 2019.

10. Thomas L, Schwenk MD,Thomas L, Schwenk,MD ,Chobanian AV.The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 report. JAMA 2003; 289:2560-72.

11. Pan WH, Yeh WT. How to define obesity? Evidence-based multiple action points for public awareness, screening, and treatment: an extension of Asian-Pacific recommendations. Asia Pac J Clin Nutr. 2008; 17(3):370–374.

12 Bhalerao D.S, Somannavar M,, Vernekar S.S, Ravishankar R, Gouda S.S. Risk factors for type 2 diabetes mellitus in Rural population of North Karnataka: A community-based cross-sectional study. Int. J. Pharm. Med. & Bio. Sc. 2014;3(1):1-14.

13. 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 Health.2014; 3:261-64.

14. Rathod HK, Darade SS, Chitnis UB, Bhawalkar JS, Jadhav SL, Banerjee A. Rural prevalence of type 2 diabetes mellitus: A cross sectional study. J Soc Health Diabetes 2014; 2(2):82-86.

15. Majgi SM, Soudarssanane BM, Roy G, Das AK, Risk Factors of Diabetes Mellitus in Rural Puducherry.Online J Health Allied Scs2012;11:1:4URL: http://www.ojhas.org/issue41/2012-1-4.htm Open Access Archives: http:/ /cogprints .org/view/subjects/OJHAS.html and http://openmed.nic.in/view/subjects/ojhas.html. Accessed on May 25h, 2020.

16.Ghorpade AG, Majgi SM, Sarkar S, Kar SS, Roy G, Ananthanarayanan PH. et al. Diabetes in rural Pondicherry, India: a population-based study of the incidence and risk factors. WHO South-East Asia J Public Health 2013; 2(3-4):149–155.

17. Padmanabha UR, Nalam U, Badiger S,Nagarajaiah P. Prevelence and Risk Factors of Type 2 Diabetes Mellitus in the Rural Population of Mangalore,South India.Natl J Community Med 2017;8(8):456-461.

Conflict of Interest : None
Source of funding support : Nil

NJRCM: **www.njrcmindia.com** **www.commedjournal.in**