

Impact of socio-demographic factors on the prevalence of type 2 Diabetes Mellitus among young adults (30-45 years age) in rural area of chargawan Block of Gorakhpur

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Abstract:

Research Question: To Screen out hidden cases and prediabetic for prevention of complication

Objectives: To study the prevalence of type 2 Diabetes Mellitus in rural area among young adults (30-45 years age) in relation to their socio-demographic profile.

Study design: A cross-sectional study

Study Settings: Chargawan block in Gorakhpur District of Uttar Pradesh.

Study subject: People in the age group of 30 -45 years residing in rural areas of Chargawan block:

Study Period: 1st Aug 2021-31st July 2022

Study variable: Age, Gender, Caste, Education, Occupation, Socioeconomic Status, Type of family, Family history of Diabetes Mellitus.

Result: A cross sectional epidemiological study was carried out in rural area of chargawan Block of Gorakhpur. The prevalence of DM II as screened out by WHO "diagnostic criteria of fasting plasma glucose" using a blood glucometer of brand name Accu check was 18.3%. The prevalence of Diabetes increases as the age increases, it was maximum in 41-45 years age group (27.2%). Male in this study shows higher percentage (23.8%) of Diabetes than Female (12.5%). Highest prevalence found in middle class (31.7%) followed by 23.5% in upper middle class. Minimum number of cases are found in Illiterate people (3%), however there is no significant association found. Highest prevalence of diabetes found in those who were doing govt. job (37.5%). With Nuclear type of Family, higher prevalence (30.6%) of type 2 DM found than those who were living in Joint Family (8.7%), which was highly significant.

Conclusion: Out of 30 subjects who were Diabetics 21 subjects were already diagnosed and they were aware about their disease. Out of 30 diabetes mellitus, 09 were newly diagnosed on the basis of Diagnostic criteria of Diabetes recommended by WHO during this study.

Key words: RBS,

Keywords: RDW –Recently delivered woman

Keywords: Homebase newborn care, Tetanus toxoid, Iron folic acid

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I. Introduction

Diabetes has steadily increased in India and around the world over the last three decades, with India accounting for a sizable portion of the global burden. Prevalence of Diabetes has increased more than 2 folds in our country (from 4.1 % in 1980 to 8.6 % in 2014) [1], posing an enormous health problem in the country, which has gone beyond epidemic to take the form of a pandemic. Total 71% of the overall deaths in the world (2016) are attributed to NCD's of which Diabetes ranks fourth among all cause of mortality [2]. The disease, once considered as the problem among the rich, urban habitants, and old age, is now prevalent among all of socioeconomic group and in all ages. The burden of diabetes is high and increasing globally, and in developing

countries like India, mainly fueled by the increasing prevalence of overweight, obesity and unhealthy lifestyles. The risk for diabetes is largely influenced by ethnicity, age, obesity, and physical inactivity, unbalanced diet, and behavioral habits in addition to genetics and family history. According to WHO, the prevalence of diabetes is growing most rapidly in low and middle income countries. The rapid socioeconomic change in conjunction with urbanization and industrialization are the major factors for the global increase in the diabetic epidemic. In India, majority of population reside in rural areas (70%) of which young population contribute 65%. This population going on adapting modern life style, which was not meet earlier among them. By this way, they are becoming more prone to increasing burden of diabetes and associated complications, the surplus of lack of knowledge regarding risk factors and preventive approach also play important role in multiplying cases of diabetes. The prevalence in older age again rises as these young individuals age with increased life expectancies. The young Indian population, which constitutes 65% of the country, is fast adapting to a new lifestyle, which was not known earlier. India having the largest number of diabetic patients after China, the estimated number of diabetic patient in the age group of 20-79 was 74.2 million in 2021 and is likely to increase to 124.8 million by 2045 as said by Shri Mansukh Mandaviya Union Minister of Health & Family Welfare to the Lok Sabha on December 3rd 2021[3].

Across India, the disease burden or DALY (daily adjusted life years) rate in 2016 was 4-fold for diabetes, and when looked at the leading individual causes of DALYs in India, most NCDs have risen in rank since 1990, with diabetes showing a dramatic increase, from 35th place in 1990 to 13th place in 2016.

Rapidly increasing burden of Diabetes in the young might render population to early predisposition to age related disorders which adversely affect the quality of life. Approximately 57% of these individuals remain undiagnosed, therefore

the main purpose for this study, is to detect in its early asymptomatic phase can be managed, controlled and even possibly reversed, resulting into enhanced quality and longevity of life, reduction in the severity & frequency of the immediate effects of diabetes and the prevention or delay of its long term complication. Diabetes is traditionally known as a “silent killer”. There is an urgent need to screen, diagnose and provide appropriate care to people with diabetes. There were several studies done for the prevalence of Type 2 DM but most of them were conducted in urban setting. Present study, therefore has been planned to find out the prevalence of type 2 DM in the rural area of Chargawan block of Gorakhpur district.

II. MATERIAL & METHODS

The present study was carried out in Chargawan block of Gorakhpur District. 164 participants of age 30-45 years were included. Among the study participants 80 were males (48.8%) & 84 were females (51.2%) participants. Charagawan Block in Gorakhpur district consist of 1 block PHC and 4 additional PHC's. Out of these 1 block PHC Chargawan & 1 APHC Maniram were selected randomly. One sub centre was selected from block PHC Chargawan (7 subcentre) & from APHC Maniram (6 subcentre) randomly, therefore, a total of 2 sub centre Maheshra (4 village) & Narayanpur (8 village) were selected. 2 villages from each sub centre, i.e. a total of four villages selected randomly. Four lists from 4 villages (1 from each village) of 30 to 45 years of age obtained by the help of village development officer of the gram panchayat. The list of study population (containing name of participants and village name) from four villages were compiled in a single list. The participants name was sorted alphabetically. A list of 175 participants as a sample population was prepared by simple random sampling (40 participants from village 1, Shekhpura, 50 participants from village 2, Moharipur, 44 participants from village 3 Mirzapur, 42 participants from village 4 Narayanpur). The selected participants were located with the help of health worker (ASHA & Aganwadi worker) and local people. Before collection of the data from the study subjects, written consent was taken in Hindi language after explaining the procedure and purpose of the study. Random blood sugar (RBS) was measured with digital glucometer, if RBS of study participants was raised, it was further confirmed for diagnosis for type 2 DM by other test viz. fasting blood glucose on next day. Each participant of the sample population was directly interviewed with the help of a pre-designed, pretested questionnaire. Data obtained after the interviews of the participants were entered in to the Microsoft office excel sheet. Data was analyzed and appropriate statistical test was applied. All the necessary help, advice and counseling was given to the subjects who were found Diabetic. Ethical clearance from the ethical committee, BRD Medical College has been taken.

Sample Size estimation is based on the National Family Health Survey (NFHS-5) [83], 2019-21 & recent studies where the prevalence of type 2 Diabetes Mellitus is around 10-14 per cent in age group of 30-45 years, therefore taking the prevalence of 12% and allowable error of 5%, sample size was calculated by using Cochran formula. A sample size of 163 is obtained. Taking 5% of non responsive rate, a total of 175 samples was taken of which 11 were non respondent & final study participants was 164.

WHO diagnostic criteria of fasting plasma glucose

Result	Fasting Plasma Glucose (FPG)
Normal	less than 100 mg/dl
Pre diabetes	100 mg/dl to 125 mg/dl
Diabetes	126 mg/dl or higher

TABLE : 1 Distribution of Study participants on the basis of their Diabetic Profile

	Frequency	Percent
Non Diabetic	87	53 %
Pre Diabetic	47	28.7 %
Diabetic	30	18.3 %
Total	164	100 %

Table 1 depicts that among the study participants 30 subjects (18.3%) were found Diabetic ,28.7 % were Pre Diabetics. Out of 30 subjects who were Diabetics 21 subjects were already diagnosed and they were aware about their disease. 09 were newly diagnosed on the basis of Diagnostic criteria of Diabetes recommended by WHO during this study.

Table:2 Association of Diabetes Mellitus with Age

Age (Years)	Group	Non -Diabetic	Pre Diabetic	Diabetic	Total
30-35		10(83.3%)	1(8.3%)	01 (8.3%)	12(100%)
36-40		5(58.3%)	21 (35%)	4 (6.7%)	60(100%)
41-45		42(45.7%)	25(27.2%)	25(27.2%)	92(100%)
Total		87(53.7%)	47(28.7%)	30(18.3%)	164(100%)
<i>Chi square</i>	$\chi^2=39.710, \quad p\text{-value}= 0.05$				

Table 2 shows that the prevalence of Diabetes increases as the age increases ,it is maximum in 41-45 years age group (27.2%) , 8.3% & 6.7 % in 30-35 years & 36-40 years age group respectively. Cross tabulation calculated chi square was significant with a p value 0.05 .

TABLE:3 Association of Diabetes Mellitus with Gender

Gender	Non Diabetic	Pre Diabetic	Diabetic	Total
Male	40 (47.6%)	24 (28.6%)	20(23.8%)	84(100%)
Female	48 (60%)	22 (27.5%)	10(12.5%)	80(100%)
Total	88 (53.7%)	46 (28.0%)	30(18.3%)	164(100%)
<i>Chi square</i> (χ^2) test	$\chi^2=4.051 \quad p\text{-value}=0.132$			

Table :3 shows association of Diabetes Mellitus with gender It reveals the picture that Male in this study shows higher percentage (23.8%) of Diabetes than Female (12.5%).

TABLE: 4 Association of Educational Status of study participants with Diabetes Mellitus

Educational Status	Non Diabetic	Pre Diabetic	Diabetic	Total
Illiterate	34 (66.7%)	14 (27.5%)	3 (5.9%)	51 (100%)
Primary	15 (45.5%)	9 (27.3%)	9 (27.3%)	33 (100%)
Middle	5 (62.5%)	3 (37.5%)	0	8 (100%)
High School	4 (33.3%)	5 (41.7%)	3 (25%)	12 (100%)
Intermediate	10 (62.5%)	2 (12.5%)	4 (25%)	16 (100%)
Graduation & above	20 (45.5%)	13 (29.5%)	11 (25.0%)	44 (100%)
Total	88 (53.7%)	46	30	164 (100%)

		(28%)	(18.3%)	
Chi square (χ^2) test	$\chi^2=15.307$ P-value=0.121			

Table 4 shows that maximum number of cases of Diabetes (27.3%) are found in those who were having only primary level of education followed by Graduate & above in which prevalence is 25 %. Minimum number of cases are found in Illiterate people (3%), however there is no significant association found.

TABLE: 5 Association of Diabetes mellitus with occupational status

Occupation	Non Diabetic	Pre Diabetic	Diabetic	Total
Agriculture	11 (78.6)	1 (7.1%)	2 (14.3%)	14 (100%)
Housewife	29 (53.7%)	19 (35.2%)	6 (11.1%)	54 (100%)
Govt. job	3 (37.5%)	2 (25%)	3 (37.5%)	8 (100%)
Pvt. Job	12 (42.9%)	11 (39.3%)	5 (17.9%)	28 (100%)
Skilled work/occupational work	5 (55.6%)	3 (33.3%)	1 (11.1%)	9 (100%)
Unskilled /Dailyworker (laborer)	18 (51.4%)	8 (22.9%)	9 (25.7%)	35 (100%)
Shopkeeper	10 (62.5%)	2 (12.5%)	4 (25%)	16 (100%)
Total	88 (53.7%)	46 (28.0%)	30 (18.3%)	164 (100%)
Chi square(χ^2) test	$\chi^2=14.106$ p-value =0.294			

Table 5 depict the picture that max. prevalence of diabetes found in those who were doing govt. job (37.5%) followed by unskilled/daily labourer (25.7%). Least affected were housewives (11.1%) & farmers (14.3%). However the association was found to be insignificant (p value =0.294) by cross tabulation.

TABLE: 6 Association of Diabetes Mellitus with Socio-Economic Status

Class	Non Diabetic	Pre diabetic	Diabetic	Total
Upper Class	3 (60%)	1 (20%)	1 (20%)	5 (100%)
Upper middle class	8 (47.1%)	5 (29.4%)	4 (23.5%)	17 (100%)
Middle class	17 (41.5%)	11 (26.8%)	13 (31.7%)	41 (100%)
Lower middle class	26 (59.1%)	11 (25.0%)	7 (15.9%)	44 (100%)
Lower class	34 (59.6%)	18 (31.6%)	5 (8.8%)	57 (100%)
Total	88 (53.7%)	46 (28.0%)	30 (18.3%)	164 (100)
Chi Square(χ^2) test	$\chi^2=17.155$ p-value=0.271			

Table 6 shows the association of socio economic status with Diabetes..Highest prevalence found in middle class (31.7%) followed by 23.5% in upper middle class . In lower middle class it was 15.9 %.The lowest prevalence of 8.8% found in lower class. Though, there was difference present but no significant association found in Prevalence of Diabetes in relation to socioeconomic status .

TABLE : 7 Association of Diabetes Mellitus in relation to their Family type

Type of Family	Non Diabetic	Pre Diabetic	Diabetic	Total
Nuclear	30 (41.7%)	20 (27.8%)	22 (30.6%)	72 (100%)
Joint	58 (63.0%)	26 (28.3%)	8 (8.7%)	92 (100%)
Total	88 (53.7%)	46 (28.0%)	30 (18.3%)	164 (100%)
Chi square(χ^2) test	$\chi^2= 13.994$ p- value=0.001			

Table 7 shows that the study participants with Nuclear type of Family has higher prevalence (30.6%) of type 2 DM than those who were living in Joint Family (8.7%).there was significant association seen in relation to family structure.

TABLE: 8 Association of Diabetes Mellitus with Family History

Family History	Non Diabetic	Pre Diabetic	Diabetic	Total
Present	80 (53.7%)	45 (30.2%)	24 (16.1%)	149 (100%)
Absent	8 (53.3%)	1 (6.7%)	6 (40%)	15 (100%)
Total	88 (53.7%)	46 (28.0%)	30 (18.3%)	164 (100%)
<i>Chi square(χ^2) test</i>	$\chi^2= 6.944$ p - value=0.031			

Table 8 shows a significant association (p-value =0.031) of positive family history with Diabetes. Study Subjects who have positive family history of Diabetes shows greater prevalence (40%) than with negative family history.

III. Discussion

In present study association of type 2 Diabetes mellitus with age, gender, educational status, occupational status, Socio economic status, type of family and family history of Diabetes was explored.

This study revealed the prevalence of Diabetes mellitus is 18.3% in study subjects (total 30 subjects out of 164 subjects), of which 21 were known diabetics, 09 were newly diagnosed in this study. A report made by Priyanka Rana singh et al through systemic review & meta analysis of 69 studies conducted from 1972-2017 reveals a prevalence of diabetes increased in rural India from 2.3% to 15.0% in the year 2015-2017[4]. Similar studies carried by Hetal K Rathod et al has found prevalence of 9.1% in age group of 36-40 years. [5] This study also reports 6.7% prevalence of diabetes in the same age bracket. National Non communicable Disease monitoring survey (NNMS) conducted in the year 2017-2018 estimated the prevalence of Diabetes to be 9.3% in the age group of 18-69 years.[6]

In our study the prevalence of Diabetes increases as the age increases, it was 8.3% in 30-35 years age group but 27.2% in the age group of 41-45 years. Mean age of the participants was 41.73 years in our study. Similar trend is seen in various other studies viz. A article published by Sanyukta Kanwal in Jan 17 2023 reported diabetic prevalence of 6.7% in below 19 years old, 9.3% in 30-44 years old, 25% in 45-59 years old.[4] A study shows that Indians develop diabetes at a very young age, at least 10-15 years earlier than the white population.

In our study higher socio economic classes were more affected by Diabetes Mellitus as compared to lower classes, However high socio economic classes shows no association (p-value >0.2), the result is very similar to other studies which was carried through out the country. A study carried by G Vijayakumar et al with a topic “ High Prevalence of Type 2 DM and other metabolic disorders in Rural Central Kerala” reported high socio economic has only a weak association. [5] They explained it by the homogeneity of life style across the socio economic spectrum, a characteristic feature of life in Kerala.

A Study carried out by Mohanraj Rathinavelu et al with a topic “ Association between socioeconomic status and diabetes in rural settings of India” in Andhra Pradesh concluded the fact that prevalence of type 2 DM was higher in upper socio economic class.[7]

Family history of diabetes is one of the most important non modifiable risk factor for diabetes mellitus, in our study subjects were asked about diabetic status of his/her mother, father or siblings. The association of diabetes mellitus with family history of the same was found to be significant in this study (p=0.031). The prevalence of diabetes among individuals who have a first-degree relative with diabetes was significantly higher than that of individuals without a positive family history. Fifteen study participants out of 164 have positive family history of DM of which 06 were found diabetic (40%) in contrast to only 16% in negative family history.. Family history of diabetes was shown to be a significant predictor of diabetes prevalence in the adult population.

A Study carried out by Geetha A, Gopalkishnan et al at Chennai on the impact of family history of diabetes among type 2 diabetes mellitus patient in an urban area of Kancheepuram district. This study shows that person with positive family history of Diabetes are more prone to early onset of diabetes and developing complication. [8]

IV. Conclusion And Recommendation

Overall prevalence of Diabetes Mellitus found to be 18.3%; however it was higher in males (23.8%) than females (12.5%). Prevalence increases as age of the subject increases, it was highest in 41-45 years age group (27.2%) & lowest in 30-35 years age group. Among the study participants the subjects belong to Middle Class(III) have higher prevalence (31.7%) than any other class; it is lowest in lower class(8.8%). People dwelling in nuclear type of Family and of government Sector have Among the female study participants 54 out of 84 were housewives & 6 were diabetics (11.1%). The study participants who involved in agriculture & their

occupational work /skilled work shows lesser prevalence 14.1 per cent & 11.1 per cent respectively as compared to overall prevalence. Study participants who had family history of Diabetes mellitus have higher prevalence (40%) .

This study recommends routine screening along with diagnostic test for type-2 diabetes mellitus for all adults aged 30 years & above. The frequency of such screening must be conducted frequently , so as to detect the disease early and take appropriate measures timely.

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