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Original Research Article

Association of Diabetes Mellitus with Hypertension, in Rural Population in Meerut, Uttar Pradesh, India

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Abstract:

Background: Diabetes is the serious public health problem in all the countries but majorly in developing countries. The prevalence of diabetes is showing an upward trend in most countries. The prevalence of diabetes is rapidly rising in rural population**.** Also there is paucity of data regarding Diabetes Mellitus in rural Meerut.

Aims & Objective: To study the prevalence of Diabetes Mellitus and associated factors with Diabetes Mellitus.

Material & Method: A cross-sectional study was done by taking the prevalence of diabetes mellitus 13% in persons age 30 years & above by various studies & relative precision 20% the sample size come out to be 642, total subjects studied were 700 for uniform coverage in villages selected by systematic random sampling, fasting blood sugar was done to estimate the prevalence of diabetes. Rest of the information was collected on Predesigned and pretested questionnaire.

Results: the prevalence of diabetes were found to be 11.7% in persons aged 30 years & above in rural population of Meerut**.** The prevalence of diabetes was found to be significantly associated with hypertension, coronary heart disease, and dietary habits, fat consumed.

Conclusions: The diabetes mellitus is a significant health problem after 40 years of age in rural population.

Keywords: Diabetes Mellitus, rural Population, Fasting blood sugar, Hypertension, Coronary Heart Diseases.

Introduction

Chronic non-communicable diseases are assuming increasing importance among the adult population in both developed and developing countries. Diabetes is the serious public health problem in all the countries and majority of the developing countries [1]. Diabetes mellitus has been defined by a World Health Organization Study Group (1985) as Diabetes mellitus is a metabolic disorder characterised by chronic hyperglycemias with disturbances of carbohydrate, fat, proteins metabolism due to defect in insulin secretion, insulin action or both. The characteristics symptoms are excessive thirst, polyuria, polyphagia, purities, and otherwise unexplained weight loss, or may be asymptomatic till complications present themselves [2]. The latest data published in the IDF Diabetes Atlas 9th edition shows that 463 million adults are currently living with diabetes. Without sufficient action to address the pandemic, 578 million people will have diabetes by 2030. That number will jump to a staggering 700 million by 2045.[3] The most recent studies suggest prevalence of diabetes has been increased to 15 to 20% in urban areas and about half of that in rural areas [4]. The large number of individuals with poorly controlled diabetes, particularly in rural areas is worrying as this could potentially lead to development of chronic complications in this segment of population, as here diabetic care is currently not available, accessible, or affordable. [5] Diabetic patients develop multiple chronic complications, leading to irreversible disability and death. Coronary heart disease and stroke are more common in diabetics than in the general population [6].

Studies of diabetes mellitus in general population unfold the truth hidden behind it that it is a common disease, which in a mild form can go undetected for many years and can present with complication. Untreated diabetes can lead to a host of serious medical problems including cardiovascular disease.[7] Thus, to gain global attention to this situation World Health Organisation (1991) had decided to devote a day to diabetes as "World Diabetes Day" on "14 November" every year. The first World Diabetes Day was observed on "14 November, "1991" with the theme "Diabetes Goes Public".

Material &Method: A cross- sectional study was conducted in the rural population Khajuri block of district Meerut. There are 11 villages covering the

35692 population in Khajuri block. The population-wise list of all villages was obtained from Community Health Centre, Khajuri.

Sampling size: Prevalence of diabetes mellitus in various studies in rural population was found to be 13% among persons aged 30 years and above. Therefore, by taking the prevalence of diabetes 13% with 95% confidence level and relative precision of 20%, the sample size calculated was 642. A sample of 600 individuals above 30 years of age was taken for uniform coverage from 10 villages selected by systematic random sampling technique.

Period of study: The study was carried out from March 2022 to March 2023.

Study population: The present study was conducted in a Rural Population of 30 years & above who belongs to Khajuri block, Meerut.

Methods

This study was conducted by house to house visit in the selected villages. A population wise list of all the villages covered under Community Health Centre, Khajuri was obtained and divided by number of villages to be studied for obtaining the sample interval. Then random number was drawn from random number table and the village corresponding to that number was selected as first village and then subsequent villages were identified by adding the sample interval. Thus 10 villages were selected by cluster sampling. For selection of houses in the village's investigator went to the centre of the village along with ASHA and village Pradhan and the pencil was dropped and the direction of pencil pointing towards the house was chosen as first house and the next nearest houses were visited continuously without leaving a single house until sample size of 70 persons aged 30 and above was completed in each selected village. Two house visits were done in each family. First to collect the information pertaining to socio-demographic characteristics and other factors associated with diabetes on pre-designed and pretested proforma. And then second visit was done on next day early morning for doing fasting blood sugar of study subject by glucometer. In case any study subject unavailable on first visit, his/her information was collected on second visit along with fasting blood sugar test. However, if any person found unavailable on both the visits or showed non-co-operative attitude was excluded from the study& another subject was included in the study from next house in continuation.

Statistical analysis: The data was checked thoroughly for its consistency and analyzed using Epi -info. Chi-square test was used to determine the statistical significance of association between diabetes mellitus and management of diabetes mellitus.

Results

The prevalence of diabetes were found to be 11.7% in persons aged 30 years & above in rural population of Meerut. The prevalence of diabetes was found to be significantly associated with increasing age, family history, social status and body mass index.

Diabetes Mellitus and Alcohol Intake

Table-1 shows that the maximum (71.4%) numbers of study population were non-alcoholic and only 28.6% were alcoholic.

Table 1: Prevalence of diabetes mellitus among study population in relation to alcohol intake

Alcohol Intake	Total Population		Diabetes Mellitus	
	Number	Percentage%	Number	Percentage%
Mild (Alcoholic)	77	12.8	10	11.2
Moderate(Alcoholic)	59	9.8	9	13.2
Severe(Alcoholic)	36	6.0	12	29.2
Non-Alcoholic	428	71.4	51	10.2
Total	600	100	82	11.2

$X^2 = 9.41$ df = 03 (p= 0.02), Table 1 clearly shows that prevalence of diabetes mellitus was maximum (29.7%) in severe alcoholics, 13.2% in moderate alcoholic and 11.2% in mild alcoholic population as compared to 10.2% in non-alcoholic population. This difference in prevalence of diabetes mellitus in relation to alcoholic status of population was found to be statistically significant (P< 0.05).

Diabetes Mellitus and Smoking Status: Table-2 shows the distribution of the study population in relation to smoking, 39.2 % subjects were found smokers while 60.8% subjects were non-smokers.

Table 2: Prevalence of Diabetes mellitus among study population in relation to smoking status

Smoking	Total Population		Diabetes Mellitus	
	Number	Percentage%		Number
Smoker	235	39.2	57	23.7
Non-Smoker	365	60.8	25	5.5
Total	600	100	82	11.7

X^2= 50.5 df = 1(P<0.01). In the study, prevalence of diabetes mellitus was higher (23.7%) in smokers as compared to non-smokers (5.5%). This difference in the prevalence of diabetes mellitus in relation to smoking status was found to be statistically significantly (P <0.01)

Diabetes Mellitus and Coronary Heart Disease (CHD): Table 3 shows the distribution of CHD among the study population. It may be seen that only 9.0% of the persons were having history of suffering from CHD and rest 91.0% were not having any history of CHD.

Table 3: Prevalence of diabetes mellitus with history of coronary heart disease among study population

Coronary Heart Disease	Total Population		Diabetes Mellitus	
	Number	Percentage	Number	Percentage
Present	54	9.0	13	24.1
Absent	546	91.0	69	10.7
Total	600	100	82	11.7

X^2 = 8.64 df=1 (P<0.01). A higher prevalence of diabetes mellitus was found among the individuals having history of CHD (24.1%) as compared to 10.7% among individuals not having history of CHD (Table 19). The difference in the prevalence of diabetes mellitus in relation to history of CHD was found to be statistically significant (p<0.01.)

Diabetes Mellitus and Hypertension

Table-4 provides the distribution of hypertension among the study population.

It may be seen that 84.3% of subjects were not having hypertension and 15.7 % subjects had hypertension.

Table 4: Prevalence of Diabetes mellitus among study population in relation to hypertension

Hypertension	Total Population		Diabetes Mellitus	
	Number	Percentage%	Number	Percentage%
Present	94	15.7	27	28.7
Absent	506	84.3	55	9.1
Total	600	100	82	11.7

X2 = 30.37 df = 1 (P <0.01). The prevalence of diabetes mellitus was higher among the subjects having hypertension (28.7%) as compared to only 9.1% in subjects not having hypertension. This difference in the prevalence of diabetes mellitus in relation to hypertension was found to be statistically significant (P<0.01)

Discussion

In the present study the prevalence of diabetes mellitus was significantly associated with alcohol intake as the prevalence of diabetes mellitus was significantly higher among persons who were taking severe amount of alcohol (29.2%) as compared to moderate alcoholics (13.2%), mild alcoholics (11.2%) and non-alcoholics (10.1%).

WHO (1985) (8) also reported that excessive intake of alcohol was associated with increased prevalence of type-2 diabetes. Similar findings were also observed by Chaddha et al (1997) [9], Walia et al (1999) (10), Singh et al (1998) [11] and Carlssion et al (2003) [12] in different studies carried out in different rural and urban Indian populations.

In present study 28.3% individuals were found to be alcoholics which is higher than 10.1% as reported by Singh et al (1992) [13] in rural population of Meerut In the present study 34.4% individual were found to be smoker which is comparable to 35.0% as reported by Singh et al (1992) [13] in rural population of Meerut Hypertension was found in 15.7% among study population. Which is higher than 6.9% and 4.0% as reported by Singh et al (1992) [13] in rural population of Meerut and Sinha et al (1987) [18] in rural population of Varanasi respectively.

In the present study 9.0% individuals were found to be suffering from coronary heart disease which is higher than 2.6% as reported by Prem et al (1998) [14] in rural populations of Meerut.

The prevalence of diabetes Mellitus was found to be significantly associated with hypertension and/or coronary heart disease in the present study. Bansal et al (1993) [16], Parasher et al (1995) [15] and Prem et al (1998) [14] have also shown associations between hypertension, diabetes mellitus and coronary heart disease in their studies in different communities. Peter W.F et al (1998) [17] the prevalence of diabetes mellitus rises with age in men and women in the United States and in westernized regions, and the risk of coronary heart disease is typically increased twofold in diabetic men and threefold in diabetic women. Diabetes is the risk factor for coronary heart disease.

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