Association of Social Demographic Determinants with type II Diabetes Mellitus

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Abstract

Background: Diabetes mellitus is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. **Objective:** To determine the association of social demographic determinants with type II diabetes mellitus. **Material and Methods:** This cross sectional study was conducted among people residing in urban areas of Bareilly under Department of Community Medicine, Rohilkhand Medical College &Hospital Bareilly during November 2015 - October 2016. **Results:** There is a decreasing trend observed in the age wise distribution of the study population. 95.3% study subjects were married while 4% were unmarried; majority of the study subjects were Hindu by religion. 57.6% were graduate. 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%) of the study subjects belonged to the upper middle class with least being 1.6% in the upper lower class.

Conclusion: It was significantly associated with various local socio-demographic factors like religion, caste, occupation. Socio- demographic characteristics revealed that among majority of diabetic type II participants were from 51-60 years, males by gender, Hindu by religion, General by Caste, Graduate, shop-owner/clerical by Occupation and more in socio economic status of upper-middle in study area.

Keywords: Social Demographic Determinants, Type II Diabetes Mellitus, religion, caste, occupation

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Introduction

Diabetes mellitus (DM) is probably one of the oldest diseases known to man. It was first reported in Egyptian manuscript about 3000 years ago. [1] In 1936, the distinction between

type 1 and type 2 DM was clearly made. [2] Type 2 DM was first described as a component of metabolic syndrome in 1988. [3] Type 2 DM (formerly known as non-insulin dependent DM) is the most common form of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. [4] Type 2 DM results from interaction between genetic, environmental and behavioral risk factors. [5,6]

Once regarded as single disease entity diabetes is seen as a heterogeneous group of disease characteristics a state of chronic hyperglycemia, resulting from disease of etiologies, environmental and genetic, acting jointly.

The underlying cause of diabetes is the defective products or action of insulin, a hormone that controls glucose fat and amino acid metabolism. Characteristically, diabetes is long term disease with variable clinical manifestation and progression. Chronic hyperglycemia, from whatever cause leads to a no. of complication- cardiovascular, neurological, occular and others such as infections. [7]

There are mainly two types of diabetes; Type 1 diabetes is immune-mediated and requires daily administration of insulin. The other common type is type 2diabetes and characterized by insulin resistance or relative insulin deficiency. [8] Type 2 diabetes is the most common form and comprises of 90% of people with diabetes around the world. [9]

Type 2 DM is due primarily to lifestyle factors and genetics. [10] A number of lifestyle factors are known to be important to the development of type 2 DM. These are physical inactivity, sedentary lifestyle, cigarette smoking and generous consumption of alcohol. [11] Obesity has been found to contribute to approximately 55% of cases of type 2 DM. [12] The increased rate of childhood obesity between the 1960s and 2000s is believed to have led to the increase in type 2 DM in children and adolescents.

The underlying cause of diabetes is the defective production or action of insulin, a hormone that controls glucose, fat and amino acid metabolism. Characteristically, diabetes is long term disease with variable clinical manifestation and progression. Chronic hyperglycaemia, from whatever cause, leads to a number of complication- cardiovascular, renal, neurological,ocular and others such as inter-current infections.

Hence this study was planned to determine the association of social demographic determinants with type II diabetes mellitus.

Material and Methods This cross sectional study was conducted among people residing in urban areas of Bareilly under Department of Community Medicine, Rohilkhand Medical College &Hospital Bareilly during 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 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.

Methodology

- Selection of study participants was done via multi stage sampling that was applied in urban areas of Bareilly. Pre-tested and pre-designed schedule was used

- 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.

Statistical analysis: The data obtained was compiled using an excel spread sheet. Statistical analysis was done using **SPSS** 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. There is a decreasing trend observed in the age wise distribution of the study population.

As far as the marital status is concerned, 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.

Education wise, 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%

According to the Kuppuswamy classification about (67.1%) of the study subjects belonged to the upper middle class with least being 1.6% in the upper lower class. Also, 1.5% of the subjects belonged to the upper class, 19.6 % to the lower middle class and 11.8% being in the upper middle class.

Table 1: Association between Age of participants and Type 2 Diabetes mellitus(N=450)

Age group in years	Diabetes Mellitus type 2		Total
	Absent	Present	
30-40	249(95.4%) (68.40%)	12(4.6%) (13.95%)	261(100%) (58.00%)
41-50	76(69.7%) (20.87%)	33(30.2%) (38.37%)	109 (100%) (24.22%)
51-60	39(48.75%) (10.71%)	41(51.25%) (47.67%)	80 (100%) (17.77%)
Total	364(80.8%) (100%)	86(19.1%) (100%)	450 (100%) (100%)

(x^2=97.8; df=2, p=0.000)

Table no.1 depicts that among all the study subject maximum 261(58.0%) were in age group 30-40 years among them 13.95% were having type 2 DM while 24.22% and 17.7% were in age group 41-50 years 51-60 respectively among them 38.37% and 47.6% were having type 2 diabetes mellitus respectively.

On finding the association between age and type 2 Diabetes Mellitus it was found to be statistically significant even at C.I of 99%

Table 2: Association between Gender and Type 2 Diabetes mellitus(N=450)

Gender	Diabetes mellitus Type 2		Total
	Absent	Present	
Male	213(76.9%) (58.51%)	64 (23.1%) (74.41%)	277 (100%) (61.55%)
Female	151(87.27%) (41.48%)	22 (12.3%) (25.58%)	173 (100%) (38.44%)
Total	364(80.8%) (100%)	86(19.1%) (100%)	450 (100%) (100%)

(x^2=7.43; df=1, p<0.05)

Table no.2 shows in study population i.e. 450 among them 61.55% were male in that 64(23.1%)population were having type 2 DM and was absent in 213 (76.9%), while 38.44% were female, among them DM was present in 22(12.3%).

This association between gender of participants and type 2 diabetes mellitus was found as statistically significant.

Table 3: Association between Religion and Type 2 Diabetes mellitus (N=450)

Religion	Diabetes mellitus Type 2		Total
	Absent	Present	
Hindu	347 (81.60%) (95.32%)	78 (18.3%) (90.69%)	425 (100%) (94.44%)
Muslim	15 (75.00%) (4.12%)	5 (25.00%) (5.81%)	20 (100%) (4.44%)
Others	2 (40.00%) (0.54%)	3 (60.00%) (3.34%)	5 (100%) (1.11%)

| Total | 364(80.8%) (100%) | 86(19.1%) (100%) | 450 (100%) (100%) |

(yates x^2=6.01; df=2, p<0.05)

Table no. 3 shows in the study population maximum subjects were Hindus 425(94.44%) by religion among them90.69% Hindus were having diabetes mellitus.

The maximum prevalence of DM was found to be in others 60% i.e Jain, Christian, Sikh etc. The association between religion of participants and DM type 2 was found to be statistically significant.

Table 4: Association between Caste and Type 2 Diabetes mellitus(N=450)

Caste	Diabetes mellitus Type 2		Total
	Absent	Present	
General	135(75.9%) (37.04%)	43(24.1%) (50.00%)	178 (100%) (39.55%)
O.B.C.(Other Backward Class)	107(81.1%) (29.39%)	25(18.9%) (29.06%)	132 (100%) (29.33%)
Others	122(87.1%) (33.51%)	18(12.8%) (20.93%)	140 (100%) (31.11%)
Total	364 (80.88%) (100%)	86 (19.11%) (100%)	450 (100%) (100%)

(x^2=6.47; df=2, p=0<0.05)

Table no.4 depicts that among study group maximum were general category 39.55%, OBC were 29.33% and in others 20.93% by caste.

Among themDM was present in 24.1%, 18.8%, 12.8% in general category, OBC and others respectively.

The Association between the caste of participants and diabetes mellitus type 2 was found statistically significant.

Table 5: Association between Education and Type 2 Diabetes mellitus (N=450)

Education	Diabetes mellitus Type 2		Total
	Absent	Present	
Professor/ Graduate	215(79.3%) (59.06%)	56(20.6%) (65.11%)	271 (100%) (60.22%)
Intermediate	65(82.2%) (17.85%)	14(17.8%) (16.27%)	79 (100%) (17.55%)
High school	51(83.6%) (14.01%)	10(16.3%) (11.62%)	61 (100%) (13.55%)
Illiterate	33(84.6%) (9.06%)	6(15.3%) (6.97%)	39 (100%) (8.66%)
Total	364 (80.88%) (100%)	86 (19.11%) (100%)	450 (100%) (100%)

(x^2=1.16; df=3, p>0.05)

Among study group for education maximum were graduate 60.22%, while among the group in which DM was present maximum were again (65.11%) graduate by education.

The association between education of study group and type 2 diabetes mellitus was found to be statistically not significant.

Table 6: Association between Occupation and Type 2 Diabetes mellitus (N=450)

Profession	Diabetes mellitus Type 2		Total
	Absent	Present	
Professional / semi-professional	85(77.98%) (23.35%)	24(22.01%) (27.90%)	109 (100%) (24.22%)
Clerical / shop owner/ farmer	92(73.6%) (25.27%)	33(27.4%) (38.37%)	125 (100%) (27.77%)
Skilled / semi-skilled	60(81.4%) (16.48%)	14(18.9%) (16.27%)	74 (100%) (16.44%)
Unemployed	127(89.4%) (34.89%)	15(10.5%) (17.44%)	142 (100%) (31.55%)
Total	364 (80.88%) (100%)	86 (19.11%) (100%)	450 (100%) (100%)

$(x^2=11.60; df=3, p<0.001)$

Out of total 450 study participants 19.11% were having type 2 DM and among these 38.37% were clerical/shop owner/farmer by occupation followed by 27.90% professional/semiprofessional,16.27% skilled/semi-skilled worker and 17.44% were unemployed.

Association between occupation of study subject and type 2 diabetes mellitus was found to be statistically highly significant.All the study subject maximum were 302(67.11%) belonging from upper-middle socio-economic status among them maximum 60(69.76%) were having type 2 diabetes mellitus.

On finding the association between socio-economic status andtype 2 diabetes mellitus was to be found statistically not significant.

Marital status was observed in that majority of the population 95.33% were married among them 94.18% were found type 2 diabetes mellitus

Discussion

Because of existence of strong correlation of local socio-cultural characteristics with type 2 diabetes mellitus, an attempt was made to study the role of various socio-demographic factors associated with type 2 diabetes mellitus.

In the present study it was found that 13.95% were of age group 30-40 years. Similarly Mohan et. al., also found that same age group were predominantly involved. [13]

In present study more or less both genders were involved i.e.23.1% male and 12.3% female. Similar trend are also observed by Ramchandranet. al. [14]

Majority of population (69.76%) were of upper-middle class. Similarly, Robbins et al., Rabi et al. &Mainous et al. also found that upper-middle class is more prominent. [15,16,17]

34.88% of study population were smokers having type 2 diabetes. Similar relation was found in study Cho NH et al. & Jee SH et al. that cigarette smoking is an independent factor for type 2 diabetes mellitus. [18,19]

In present study 17.44% were tobacco chewers who were having type 2 diabetes mellitus. Similar result found by Carole et al. that tobacco chewing is risk factor for diabetes mellitus type 2. [20]

Among the entire study subjects 34.4% were having type 2 diabetes mellitus similarly Moradabad study also has found that current alcohol intake was significantly associated with diabetes mellitus. A study in Manipur, India has found a significant association between alcohol and diabetes mellitus. [21]

In the present study 42.8% were taking junk food. Similar study was found by Ramchandran et al. The 'fast-foods' that are fat and calorie rich are easily available in the numerous food joints. As a majority of the immigrants in Indian cities depend on these unhealthy 'junk' foods, this may be a major factor in the rising prevalence of diabetes. [22]

The present study was found that 20.75% were having type 2 DM who used added fat in their food and 29.48% who were not doing any physical activity were found type 2 diabetes mellitus. Same study done by V. Mohan et al., Patil RS et al. &Kapoor D that higher fat diets and decreased physical activity and sedentary occupational habits have accompanied the process of modernization which has resulted in the doubling of the prevalence of obesity and type 2 diabetes in less than a generation. [23,24,25]

Conclusion

It was evident from this study that type II diabetes mellitus is widespread non-communicable disease in this age group in urban area of Bareilly. It was significantly associated with various local socio-demographic factors like religion, caste, occupation. Socio- demographic characteristics revealed that among majority of diabetic type II participants were from 51-60 years, males by gender, Hindu by religion, General by Caste, Graduate, shop-owner/clerical by Occupation and more in socio economic status of upper-middle in study area.

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