

A community-based study to estimate the prevalence of type ii diabetes mellitus and its risk factors in 30 years and above age group of urban population in Hapur district

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Abstract

Background: Diabetes is one of the four priority non-communicable diseases identified by the WHO along with cardiovascular diseases (CVDs), which includes heart attack and stroke, cancer, and chronic respiratory diseases. Non-communicable diseases (NCDs) kill 40 million people each year, equivalent to 70% of all deaths globally. Each year, 15 million people die from a NCD between the ages of 30 and 69 years; over 80% of these "premature" deaths occur in low- and middle-income countries. Cardiovascular diseases account for most NCD deaths. The term diabetes mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from lack of insulin (type 1 diabetes), or insufficient insulin and insulin resistance (type 2 diabetes). Diabetes is common, chronic, and costly. **Aims and Objective:** The present study was undertaken to estimate the prevalence of type II diabetes mellitus and associated risk factors in 30 year and above age group of urban population of Hapur city, the magnitude of various risk factors associated with diabetes mellitus among study group and to estimate prevalence of impaired fasting glucose in the population of area. **Materials and Methods:** The present study is a cross sectional type of study which was conducted in the Department of Community Medicine, Saraswathi Institute of Medical Sciences, on persons aged 30 years and above and living in the urban areas of District Hapur. for selection of study subjects a two stage stratified random technique was used, 2 wards and one colony in each ward was randomly chosen to get the desired number of study subjects. **Result:** Prevalence of diabetes mellitus was observed positively correlated ($p = 0.004$) with the age of study subjects. It was 4.9% in the age group of 30-39 year. It rose up to 15.4% in 40-49 year age group, 24.5% and 27.8% respectively in 50-59 years and 60-69 years age group. A statically significant decline (15.4%) however was observed in those aged 70 years and above. no such correlation with the age was observed in the prevalence of impaired fasting glucose. Though, a comparatively less discernible rising trend with each increasing decade (30-39year 3.8%, 40-49year 10.3% and 50-59 year 13.1 %) of life till 50-59 years of age group was observed. **Conclusion:** In the present study Overall and standardized prevalence of diabetes mellitus was found 16.3% and 14.6% respectively. The prevalence of diabetes mellitus increased with increasing age up to 70 years, thereafter significant decline was observed. Prevalence of diabetes mellitus among males (17.8%) was slightly higher than females (14.8%). Prevalence of impaired fasting glucose as per WHO criteria was found 8.8%, whereas 37.0% of study population was found to have impaired fasting glucose as per ADA criteria.

Key Word: Diabetes mellitus, prevalence, risk factors

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INTRODUCTION

The term diabetes mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from lack of insulin (type 1 diabetes), or insufficient insulin and insulin resistance (type 2 diabetes). Diabetes is common, chronic, and costly. It has a genetic component and some people are simply more susceptible to developing diabetes than others. Type 1 diabetes is thought to be triggered by certain viral infections and sometimes by environmental

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toxins. Type 2 diabetes can be triggered by a variety of interrelated factors some of which are non modifiable such as increasing age, ethnicity and family history of diabetes. Approximately 75-80% of people with diabetes die of cardiovascular disease. People with type 2 diabetes have two to four times' higher risk of coronary heart disease than the rest of the population, and their prognosis is poorer. The risk of cerebrovascular and peripheral vascular disease is also significantly higher. All these outcomes and complications are responsible for premature mortality caused by diabetes this result an estimated 12-14 year of life loss. There is a growing epidemic of diabetes in India. Therefore, reliable and informative epidemiological evidence is vital for prevention and control strategies. In U.P. state there is no area specific data available regarding diabetes mellitus with this background. The present study is planned to generate area specific data on type II diabetes in urban population of Hapur city.

METHODOLOGY

Study area: The study was conducted in the urban area of Hapur city. 2 wards and one colony in each ward was randomly chosen to get the desired number of study subjects.

Study design: This is a cross sectional type of study which was conducted on persons aged 30 years and above and living in the urban areas of District Hapur.

Study period: The Study Was Conducted From March 2018 To July 2018. Data Entry, Data Analysis And Report Writing Was Done simultaneously From April 2018 To July 2018.

Study population: The present study was carried out in Hapur District, A preliminary listing and identification of population >30 years of age was carried out in the selected colonies with the help of health workers at UHTC, Hapur. Every consecutive house was listed and everyone >30 years of age was selected for study. This procedure continued until required sample size was met.

Statistical Analysis: Sample size was calculated it comes out to be 633. SPSS version - 20 was used for all statistical analysis

Table 1: Age profile of study group

Age group	Male (%)	Female (%)	Total (%)
30-39	79(43)	105(57)	184(29.1)
40-49	78(50)	78(50)	156(24.6)
50-59	76(50.3)	75(49.7)	151(23.9)
60-69	54(60)	36(40)	90(14.2)
>70	27(52)	25(48)	52(8.2)
Total	314(49.6)	319(50.4)	633(100)

The male and female objects in the study were almost equal (being 49.6% and 50.4% respectively). Although, in 30-39 years age group there were more females subjects.

Table 2: Fasting blood sugar status of study subjects

Fasting blood sugar	Hyperglycemic		Impaired fasting glucose	Normoglycemic	Total
	Diabetes mellitus Known diabetic	Newly diagnosed			
N	52	51	56	474	633
(%)	8.2	8.1	8.8	74.9	100

The overall prevalence of the diabetes mellitus in the present study was found to be 16.3%. Of these, almost half (8.1%) were newly diagnosed while the remaining half were known diabetics. Thus, the diagnostic gap was found to be 50%. 8.8% of the study population was found to have impaired fasting glucose.

Table 3: Age wise prevalence of diabetes mellitus and impaired fasting glucose in study subjects

Age group	Hyperglycemic				Normoglycemic		Total
	Diabetes mellitus		Impaired fasting glucose		N	%	
	N	%	N	%			
30-39	9	4.9	10	5.4	165	89.7	184
40-49	24	15.4	16	10.3	116	74.4	156
50-59	37	24.5	17	11.3	97	64.2	151
60-69	25	27.8	8	8.9	57	63.4	90
≥70	8	15.4	5	9.6	39	75	52
Total	103	16.3	56	8.8	474	74.8	633

Prevalence of diabetes mellitus was observed positively correlated (p- 0.004) with the age of study subjects. It was 4.9% in the age group of 30-39 year. It rose up to 15.4% in 40-49 year age group, 24.5% and 27.8% respectively in 50-59 years and 60-69 years age group. A statically significant decline (15.4%) however was observed in those aged 70 years and above. a comparatively less discernible rising trend with each increasing decade (30-39year 3.8%, 40-49year 10.3% and 50-59 year 13.1 %) of life till 50-59 years of age group was observed.

Table 4: Diabetes Mellitus and its risk factors
Distribution of study subjects according to body mass index (BMI) (WHO classification)

BMI	Male(%)	Female(%)	Total (%)
<18.5 (underweight)	29(9.2)	25(7.8)	54(8.5)
18.5-24.9 (normal)	162(51.6)	139(43.5)	301(47.6)
25-29.9 (overweight)	89(28.3)	94(29.5)	183(28.9)
30-34.9 (obesity 1)	31(9.9)	49(15.4)	80(12.6)
>35 (obesity 2and 3)	3(1.0)	12(3.8)	15(2.4)
Total (%)	314(49.6)	319(50.4)	633 (100)

Overall 15% subjects were found obese and 28.9% overweight in the present study. Obesity was found comparatively higher among females than males (19.2% and 10.9% respectively), however in the overweight category no such difference was observed

Table 5: Association between diabetes mellitus and BMI of the study subjects (WHO classification of BMI)

BMI	N	Diabetes mellitus		Impaired fasting glucose	
		n	%	n	%
<18.5 (underweight)	54	6	11.1	1	1.9
18.5-24.9 (normal)	301	33	10.9	26	8.6
25-29.9 (overweight)	183	41	22.4	14	7.6
30-34.5 (obesity 1)	80	18	22.5	11	13.8
≥35 (obesity 2and3)	15	5	33.33	4	26.7
Total	633	103	16.3	56	8.8

Prevalence of impaired fasting glucose also showed a similar trend of rise with increasing BMI. It rose from 1.9% among those having BMI <18.5 to 13.8% among those having BMI 30-34.9 It further showed a marked increase (26.7%) among those having BMI ≥ 35(due to less subjects were with obesity grade 3, grade and 2 and 3 are presented together).

Table 6: Association between waist circumference and blood sugar status

Waist circumference	Diabetes mellitus	Impaired fasting glucose		Normal	Total (%)
		n	%		
High	44(24.3)	24(13.3)	113(62.4)	181(28.6)	
Normal	59(13.1)	32(7.1)	361(79.9)	452(71.4)	
Total	103(16.3)	56(8.8)	474(74.9)	633(100)	

Prevalence of diabetes mellitus and impaired fasting glucose both were found significantly higher among centrally obese subjects (24.3% and 13.3% respectively) as compared to those having normal waist circumference (13.1% and 7.1% respectively).

Association of Diabetes Mellitus with Risk Factors

Table 7: Binary logistic regression analysis of risk factors for diabetes mellitus

Variable	Odds ratio	CI (95%)		p-value
		Lower	Upper	
Age	3.85	1.81	8.17	.000
Family history	0.25	0.14	0.43	.000
WC	1.87	1.04	3.39	.027
SES	0.52	0.24	1.10	.088
Income	0.71	0.36	1.40	.325
BMI	1.40	0.68	2.90	.304
WHR	1.18	0.60	2.31	.006

Variables significant in univariate analysis were included for binary logistic regression, age, waist circumference, SES, BMI, WHR and family history of diabetes mellitus were independent risk factors for diabetes mellitus in binary logistic regression. After 30 years age, unit (decade) increase in age increased the odds of diabetes mellitus by 3.84 times. The odds of developing diabetes mellitus was 1.87 times among waist circumference > 88 cm for female and >102cm for male compared those with less waist circumference. Income and socio-economic status were not statistically significant risk factors for developing diabetes mellitus in this study.

DISCUSSION

The present study of Type II diabetes mellitus in urban population of Hapur city" was carried out to estimate the prevalence of diabetes mellitus and associated risk factors in 30 year and above age group population of Hapur city. Intended for this purpose 633 subjects were interviewed and fasting blood sugar was measured by using a standardized glucometer. In the present study statistically significant association is observed between prevalence of diabetes mellitus with age, socioeconomic class, obesity and family history. Prevalence of diabetes is also higher among those having sedentary' life style. All these risk factors are directly or indirectly related to diabetes mellitus through an unhealthy life style which includes stressed out routines, empty calories rich fast food, lack of exercise and sedentary work routine. Life style modifications from early age, with regard to physical activity, for individuals with family history of diabetes, so that the occurrence of diabetes can be prevented / postponed. Behavior change communication strategy should take a vital role in improving lifestyle of the community as most of these risk factors are modifiable.

CONCLUSION

Overall and standardized prevalence of diabetes mellitus was found 16.3% and 14.6% respectively. The prevalence of diabetes mellitus increased with increasing age up to 70 years, thereafter significant decline was observed. Prevalence of diabetes mellitus among males (17.8%) was slightly higher than females (14.8%). Prevalence of impaired fasting glucose as per WHO criteria was found 8.8%, whereas 37.0% of study population was found to have impaired fasting glucose as per ADA criteria. Prevalence of diabetes mellitus and IFG both were found significantly higher among centrally obese subjects (24.3% and 13.3% respectively) as compared to those having normal waist circumference (13.1% and 7.1% respectively). Prevalence of diabetes mellitus was found higher (18.3%) among those having higher WHR as compared to those having normal WHR (14%). Age, waist circumference and family history of diabetes mellitus were found independent risk factors for diabetes

mellitus in binary logistic regression. As is evident from the findings of the present study, half of the diabetics are unaware of their diabetic status. Due to this wide diagnostic gap, preventable complications and avoidable morbidities related to diabetes mellitus is on a steep rise thus further adding to the heavy disease burden.

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