

An Epidemiological Study of Diabetes Mellitus and Associated Risk Factors in an Urban Resettlement Area, District Gautam Budh Nagar, Uttar Pradesh

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Abstract:

Introduction: Non-communicable diseases (NCDs) are one of the major health and development challenges of the 21st century, in terms of both the human suffering they cause and the harm they inflict on the socioeconomic fabric of countries, particularly low- and middle-income countries. No government can afford to ignore the rising burden of NCDs. In the absence of evidence-based actions, the human, social and economic costs of NCDs will continue to grow and overwhelm the capacity of countries to address them.

Aims and Objectives: (1) To assess the prevalence of diabetes mellitus in the Resettlement Colonies of urban field practice area of School of Medical Sciences & Research (SMS&R), Gautam Buddha Nagar. (2) To study the prevalence of risk factors of diabetes mellitus in the study population and their association with Diabetes Mellitus

Material and Method: The study design was Community Based Cross sectional study from January 2017 - January 2018. The study was conducted among urban field practice area of SMS&R. Statistical analysis used: Data analysis was carried out utilizing IBM SPSS (Statistical Package for Social Sciences developed by International Business Machines). 20.0 version and MS Excel sheet.

Results: Overall prevalence of Diabetes was found to be 21.7%. In present study significantly higher prevalence of Diabetes (23.8%) was found in those consuming Fruit and vegetables in Diet, similar pattern seen in IFG glucose also (57.3%) The prevalence of diabetes (30.8%) and impaired fasting glucose (69.2%) was higher in those who had family history of diabetes and this association was statistically not significant. Prevalence of Diabetes males (22.8%) was slightly higher than females (20.5%). The prevalence of Diabetes showed significant association with family income. Prevalence of Diabetes was found significantly higher among unemployed / unskilled subjects (26.4% and 24.7% respectively) as compared to professionals (15.1%).

Conclusions: Overall prevalence of Diabetes was found to be high.

Keywords: Diabetes Mellitus, NCD, Fruits & Vegetables, Family History.

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Introduction

Non-communicable diseases (NCDs) are one of the major health and development challenges of the 21st century, in terms of both the human suffering they cause and the harm they inflict on the socioeconomic fabric of countries, particularly low- and middle-income countries. No government can afford to ignore the rising burden of NCDs. In the absence of evidence-based actions, the human, social and economic costs of NCDs will continue to grow and overwhelm the capacity of countries to

address them [1]. Diabetes is one of the four priority non-communicable diseases (NCDs) identified by the WHO along with cardiovascular disease (CVD), which includes heart attack and stroke, cancer, and chronic respiratory disease. In 2012, the age-standardized NCD death rate was 539 per 100 000 population globally. The rate was lowest in high-income countries (397 per 100 000) and highest in low-income countries (625 per 100 000) and lower-

middle-income countries (673 per 100 000) [2]. Regionally, age-standardized death rates for NCDs ranged from 438 per 100 000 in the WHO Region of the Americas to over 650 per 100 000 in the WHO African, South-East Asia and Eastern Mediterranean Regions. Cardiovascular diseases were responsible for the largest proportion of NCD deaths under the age of 70 years (37%), followed by cancers (27%), and chronic respiratory diseases (8%). Diabetes was responsible for 4% and other NCDs were responsible for approximately 24% of NCD deaths under the age of 70 years [3]. India contributes 61% of death from NCDs and there is 23 % risk of premature death from target NCDs [4]. The family physician is in a unique position of influencing and treating people with diabetes, toward the adoption of lifestyle changes and the prevention of disease complications. However, family physicians confront numerous challenges when caring for people with diabetes, which are similar across international and health system borders. [5]

Aims and Objectives:

1. To assess the prevalence of diabetes mellitus in the Resettlement Colonies of urban field practice area of School of Medical Sciences & Research (SMS&R), Gautam Buddha Nagar.
2. To study the prevalence of risk factors of diabetes mellitus in the study population and their association with Diabetes Mellitus

Material and Methods:

Study Design: The study design was Community Based Cross sectional study from January 2017 - January 2018. The study was planned and conducted among urban field practice area of SMS&R covering 6 colonies namely Jeetram, Goel, Kunda Bhatta, Rajeev, Salarpur.

Sample size and sampling procedure: As per the ICMR-INDIAB (2011) [4] study, prevalence is

14%. Taking the same prevalence, the sample size is calculated by the following formula:

$$N = 4PQ/L^2$$

P= population, Q= 100-P, L= absolute precision

$$\text{Where } P=14, \quad Q=100-P=86, \quad L=4, \quad N=4*14*86/4*4= 301.$$

So, considering 10% non-respondent rate, 350 study subjects were covered.

Study Population: The study was carried out in Bhangal which has total population of 10800 and is urban field practice area of SMS&R covering 6 colonies namely Jeetram, Goel, Kunda Bhatta, Rajeev, Salarpur. People aged 18 year and above living in the study area were eligible to participate in the study.

Data Collection: Household having >18yr individuals were selected through family's database of the UHTC SMS&R. Head of the household was contacted for consent and identification of the subject. One person was identified randomly in each household Interview of the study subject was carried out through pretested questionnaire. Whole sampling unit was screened for fasting blood glucose blood glucose through glucometer.

Statistical Analysis: Data analysis was carried out utilizing IBM SPSS (Statistical Package for Social Sciences developed by International Business Machines). 20.0 version and MS Excel sheet. Data was analyzed by using statically method (mean, standard deviation for quantitative data and proportion, X2 test. For all the tests P value <0.05 is considered as statically significant.

Ethics Consideration: The study received Ethical approval from the Institute Ethics Committee of Sharda University, Greater Noida.

Results:

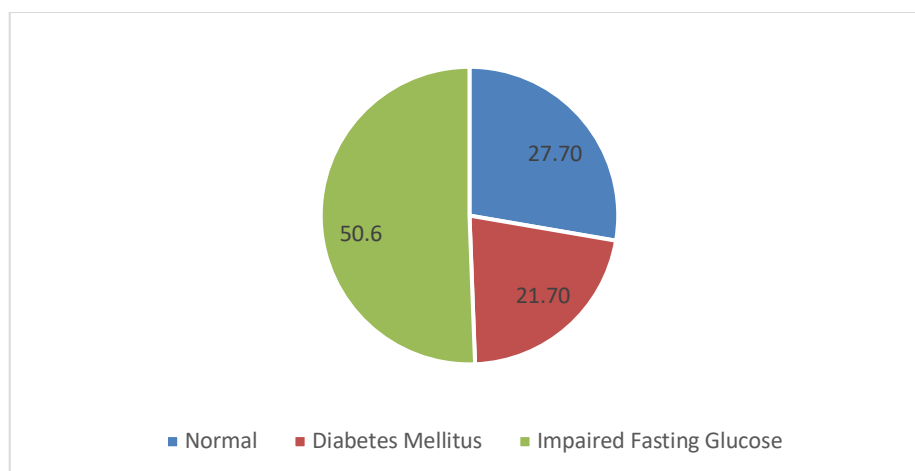


Figure 1: Prevalence of Diabetes in study participants

Table 1: Association of Diabetes in study participants according to their socio demographic characteristics

S.No	Characteristics	FBG			Total N=350 (%)	χ^2 Value	P-value
		Diabetes N=76 (%)	Impaired fasting glu- cose N=177 (%)	Normal N=97 (%)			
1	Age					53.6	.000
	a) 18-29 year	6 (7.1)	46(54.8)	32(38.1)	84 (24)		
	b) 30-39 years	15 (14.7)	55(53.9)	32(31.4)	102 (29.1)		
	c) 40-49 years	27 (25.0)	53 (49.1)	28(25.9)	108 (30.9)		
	d) 50-59 years	11(35.5)	17(54.8)	3(9.7)	31 (8.9)		
	e) \geq 60 years	17(68.0)	6(24.0)	2(8.0)	25 (7.1)		
	Total	76(21.7)	177(50.6)	97(27.7)	350 (100)		
2.	Gender					.474	.789
	a) Male	42(22.8)	90(48.9)	52(28.3)	184 (52.6)		
	b) Female	34(20.5)	87(52.4)	45(27.1)	166 (47.4)		
	Total	76(21.7)	177(50.6)	97(27.7)	350 (100)		
3.	Religion					3.375	.185
	a) Hindu	75(21.6)	177(51)	95(27.4)	347 (99.1)		
	b) Muslim	1(33.3)	0(0)	2(66.7)	3 (0.1)		
	Total	76(21.7)	177(50.6)	97(27.7)	350(100)		
4.	Marital status					7.577	.023
	a) Ever Married	75(23.1)	164(50.6)	85(26.2)	324 (92.6)		
	b) Never Married	1(3.8)	13(50.0)	12(46.2)	26 (7.4)		
	Total	76(21.7)	177(50.6)	97(27.7)	350 (100)		
5.	Education					17.12	.072
	a) Illiterate	8(21.1)	23(60.5)	7(18.4)	38 (10.9)		
	b) Primary	19(25)	29(38.2)	28(36.8)	76 (21.7)		
	c) Middle	8(14)	31(54.4)	18(31.6)	57 (16.3)		
	d) School	16(37.2)	17(39.5)	10(23.3)	43 (12.3)		
	e) High school	14(18.9)	42(56.8)	18(24.3)	74 (21.1)		
	Intermediate						
	f) Graduate/post graduate	11(17.7)	35(56.5)	16(25.8)	62 (17.7)		
Total	76(21.7)	177(50.6)	97(27.7)	350(100)			
6.	Current Occupation						
	a) Un-Employed	19 (26.4)	39(54.2)	14(19.4)	72 (20.6)		
	b) Unskilled worker	20 (24.7)	41(50.6)	20(24.7)	81 (23.1)		
	c) Semi-skilled work	11 (19.0)	23(39.7)	24(41.4)	58 (16.6)		
	d) Skilled worker	13 (18.8)	35(50)	21(30.4)	69 (19.7)		
	e) Clerical shop/owner	11 (19.3)	29(50.9)	17(29.8)	57 (16.3)		
	f) professional	2 (15.4)	10(76.9)	1(7.7)	13 (3.7)		
	Total	76 (21.7)	177(50.6)	97(27.7)	350 (100)		
7.	Socio economic status					22.60	.004
	a) Lower middle	43(30.8)	69(50.7)	28(20.5)	140 (40)		
	b) Upper lower	19(16.8)	58(51.3)	36(31.9)	113 (32.3)		
	c) Lower	14(14.4)	50(51.5)	33(34.0)	97 (27.7)		
	Total	76(21.7)	177(50.6)	97(27.7)	350 (100)		
8.	Family type					9.09	.059
	a) Nuclear	54(20.1)	141(52.4)	74(27.5)	269 (76.9)		
	b) Joint family	22(25.3)	36(45.6)	23(29.1)	81 (23.1)		
	Total	76(21.7)	177(50.6)	97(27.7)	350 (100)		

In our study prevalence of Diabetes was found to be increasing with age and this association found to be significant. Prevalence of diabetes in males was found higher as compared to female. (22.8,20.5 respectively). It was also observed that prevalence was higher in married people (23.1) than unmarried (3.8).

Table 1 shows prevalence of diabetes was highest in those individuals who had educated upto the

high school (37.2) followed by illiterate (21.1) than primary school pass out (25). The prevalence was highest in unemployed subjects (26.4) followed by unskilled workers (24.7) than clerk or shop owners (19.3).

It was also observed that prevalence of diabetes was significantly higher in middle class as compared to lower class of socio-economic status. (30.8,16.8 respectively).

Table 2: Association of Diabetes mellitus Status with Servings of Fruits and Vegetables of Study Subjects

Serving	Diabetes (%) N=76	Impaired fasting glucose (%) N= 177	Non-Diabetic (%) N= 97	Total (%)	χ^2 Value	P- value
Vegetables and Fruits serving						
>5	9(13)	16(23.2)	44(63.8)	69(100)	56.028	.00001
<5	67(23.8)	161(57.3)	53(18.9)	281(100)		

In present study significantly higher prevalence of Diabetes (23.8%) was found in those consuming <5 serving of Fruit and vegetables in Diet, similar pattern seen in IFG glucose also (57.3%) (Table 2)

Table 3: Association of Diabetes in study participants according to their family history of Diabetes

Family history of Diabetes	Diabetes N=76(%)	IFG N=177(%)	Normal N=97(%)	Total	χ^2 Value	P-value
Yes	4(30.8)	9(69.2)	0(0)	13	5.181	.075
No	72(21.4)	168(49.9)	97(28.8)	337		
Total	76(21.7)	177(50.5)	97(27.7)	350		

Table 3 shows that prevalence of diabetes mellitus and impaired fasting glucose was higher (30.8%, 69.2% respectively) in those who had family history of diabetes mellitus and this association was not statistically not significant.

Discussion

The present study revealed that 30.8% of diabetics having positive family history of Diabetes. It is aptly said for diabetes that —genetics loads the cannon and obesity fires it. Following this saying the present study also found a higher prevalence of DM of family history of diabetes with risk of diabetes and pre diabetes. This study also reported that maternal history of type II DM to be stronger compared to paternal history of diabetes when both the parents are diabetic the risk increases synergistically, however in the present study no such effect was observed, probably because there were only few subjects with both the parents diabetic. This is in contrast to study by Jali et al at Belgaon which showed high prevalence in both the parents being diabetic was 14.94%. [6].

It is seen that Indians have a genetic phenotype characterized by low body mass index, but higher upper body adiposity, and high body fat percentage as well as high level of insulin resistance. Hence with a high genetic predisposition and high susceptibility to overcome environmental conditions the Indian population faces a high risk for diabetes and its associated complications.

High fat intake, non-vegetarian diet and diet low in fruits and vegetables are established risk factor for the development of type 2 diabetes mellitus. In the present study prevalence of Diabetes Mellitus was higher among those consuming less than five combined servings of fruits and vegetables in a day compared to those taking five or more serving.

Jukka M et al (2005) [7] in their study also found that prudent diet rich in fruits and vegetables was associated with reduced risk of type 2 diabetes mellitus in contrast to conservative pattern rich in meat, whole milk.

Conclusion

Overall prevalence of Diabetes Mellitus was found 21.7%. Prevalence of Diabetes Mellitus males (22.8%) was slightly higher than females (20.5%). This difference is however not statistically significant.

The prevalence of Diabetes Mellitus showed a significant correlation with family income. Prevalence of Diabetes Mellitus was found significantly higher among unemployed / unskilled subjects (26.4% and 24.7% respectively) as compared to professionals (15.1%). Prevalence of Diabetes mellitus was found higher (37.2%) among that literate high school and above as compared to illiterate and those educated below high school (21.1%).

Prevalence of Diabetes Mellitus was found significantly higher among those belonging to lower middle and upper lower SES (30.9% and 16.8% respectively) as compared to those belonging to lower class (14.4%). Prevalence of Diabetes Mellitus was found higher among those having family history (30.8)/parental history (16.7) of Diabetes Mellitus.

But this association was statistically significant. Prevalence of Diabetes Mellitus was higher (23.8%) among those taking less than five combined meals of fruits and vegetables in a day compared to those taking more than five serving in a day (13.0%).

References:

1. WHO. WHO Global status report of NCD 2010. Geneva: World Health Organization 2014. Available from http://apps.who.int/iris/bitstream/handle/10665/148114/9789241564854_eng.pdf;jsessionid=C9B37E75C4AA15F92875C71A9057BFFE?sequence=1
2. Anjana RM, Ali M K, Pradeepa R, Deepa M, Datta M, Unnikrishnan R et al. The need for obtaining accurate nationwide estimates of diabetes prevalence in India – Rationale for a national study on diabetes. Indian J Med Res. 2011;369-380.
3. WHO. Non-communicable Diseases Progress Monitor 2017. Available at <http://www.who.int/nmh/publications/ncd-progress-monitor-2017/en/>
4. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, et al. Prevalence of diabetes and prediabetes (impaired fasting glucose and or impaired glucose tolerance) in urban and rural India : phase I results of the Indian Council of Medical Research – India Diabetes (ICMR-INDIAB) study. Diabetologica. 2011; 54:3022-7.
5. Yacov F, Margalit G, Khaled K, Managing diabetes mellitus: A survey of attitudes and practices among family physician, Journal of Community Medicine. 2015; 1002-7.
6. Jali MV, Kambar S, Jali SM, Gowda S. Familial early onset of type-2 diabetes mellitus and its complications. North Am J Med Sci. 2009; 1(7):377-80.
7. Jukka M, Paul K, Tommi H, Rita J, Marku H, Arop A et al. Diabetes patterns and the incidence of Type 2 Diabetes. Am J Epidemiol 2005; 161: 219-27.