

Prevalence of Diabetes and Hypertension among Adults 20 Yrs and above in Urban Slums of Delhi

Ritesh Bansal¹, Paras Agarwal²

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Abstract

Introduction: According to the International Diabetes Federation, currently 39.5 million people in India have pre diabetes, and of them 7 million will develop diabetes every year. The number of diabetic people in India is expected to increase from 51 million in 2010 to 87 million in 2030.¹ India being the diabetes capital of the world; every 5th diabetic is an Indian in the world. But the real impact of diabetes is through cardiovascular disease and hypertension.²
Objective: The present study was carried out with the objective to study the prevalence of diabetes and hypertension among individuals 20 years and above in Urban slums of Delhi. **Material and Method:** A community based cross sectional study among 740 individuals 20 yrs. and above selected by systematic random sampling method was conducted in Delhi from January to December 2012. Data was collected using predesigned, pretested, semi structured questionnaire after taking written informed consent data was analyzed using SPSS version 17. Chi-square/ Fisher's Exact test were used for qualitative variables to find association and *p*-value <0.05 was considered significant. **Results:** Out of the subjects surveyed 374 (50.5%) were males and rest females. Out of 740 subjects, 102 (27.3%) males and 99 (27.0%) females were in the age group of 20-29 years. Majority of

males, 177 (47.3%) and females, 188 (51.4%) belonged to upper lower socio-economic status according to modified Kuppuswamy classification 2012. Out of 740 study subjects, overall prevalence of diabetes and hypertension was found to be 12.6% and 23.7% respectively.

Keywords: Prevalence; Diabetes; Hypertension; Urban slums; Delhi.

Introduction

Diabetes mellitus (DM) is a chronic disorder characterized by raised blood sugar levels that occur when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces³.

According to recent estimates, approximately 285 million people worldwide (6.6%) in the 20-79 year age group will have diabetes in 2010 and by 2030, 438 million people (7.8%) of the adult population, is expected to have diabetes. The largest increases will take place in the regions dominated by developing economies¹. According to the international diabetes federation, currently 39.5 million people in India have pre diabetes, and of them 7 million will develop diabetes every year. The number of diabetic people in India is expected to increase from 51 million in 2010 to 87 million in 2030.¹

India being the diabetes capital of the world; every 5th diabetic is an Indian in the world. But the real impact of diabetes is through cardiovascular disease and hypertension.² Hypertension is defined as systolic blood pressure greater than or equal to 140 mmHg or diastolic blood pressure greater than or equal to 90 mmHg or currently taking medication

Author's Affiliation: ¹Consultant Diabetologist, Lifespan Diabetes Clinic, 285, AGCR Enclave, New Delhi, Delhi 110092, India. ²Consultant, Max Hospital, Gurugram, Haryana 122001, India.

Corresponding Author: Ritesh Bansal, Consultant Diabetologist, Lifespan Diabetes Clinic, 285, AGCR Enclave, New Delhi, Delhi 110092, India.

E-mail: scorit1986@yahoo.co.in

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to lower high blood pressure^{4,5}. Based on a pooled analysis of available national and regional data, Kearney et al reported the estimated number of adults with hypertension in 2000 to be 972 million worldwide. They further indicated that the estimated number of hypertensives in developing countries out weighed that of developed countries by almost twofold (639 million in developing countries versus 333 million in developed countries). In North India, Misra et al. reported 12% prevalence of hypertension in the slums of Delhi.⁶ Thus, the present study was carried out with the objective to study the prevalence of diabetes and hypertension among individuals 20 years and above in Urban slums of Delhi.

Materials and Methods

Study design and area: This was a community based cross sectional study conducted in the urban area of Delhi which included Basti Vikas Kendra, Delhi Gate Vikram Nagar and 100 Quarters.

Study subjects: Both males and females 20 years and above residing in these areas.

Study period: Study was conducted for a period of 12 months from Jan 2012 to Dec 2012.

Sampling: Sample size was calculated on the basis of results of a previous study where the prevalence of diabetes was found to be 11.6% and that of hypertension to be 20%. A total of 740 subjects from study areas viz. Basti Vikas Kendra, Delhi Gate, Vikram Nagar and 100 Quarters were included in the study. Sample proportionate to population size was selected from each of these areas and houses were selected systematically (Every 3rd house) and from each house all the individuals of 20 year and above were selected.

Study tool: Data was collected by interviewing the study subjects, using a predesigned, pre-tested semi-structured interview schedule containing items on identification data, i.e. age, gender, educational status, area of residence, socio-economic status of the person in the local language.

Study methodology: The study was carried out by conducting house to house survey. The individuals selected were approached, interviewed and tested for both diabetes and hypertension. For each study subject a new questionnaire was filled. Before conducting the study, the purpose of the study was

explained to each person in the local language and a written and informed consent was taken.

Blood pressure of the person to detect hypertension was measured by digital sphygmomanometer after 5 minutes of complete physical rest. Fasting blood sugar of the person was tested by using Accu-check glucometer. If the Fasting blood sugar was found to be high (>110 mg/dl), then the person was tested for diabetes using conventional methods. Blood sugar of the subject was tested using enzymatic method (Glucose oxidase-peroxidase). The subjects found to suffer from diabetes or hypertension or both were provided treatment either by giving appropriate counseling and drugs at the health care facility or in the tertiary care hospital through referral.

Statistical analysis: The collected data was then analyzed and statistically evaluated using SPSS-PE-17 version.

The blood pressure values were classified according to the JNC VII criteria⁴ as follows

Table 1: JNC VII classification for hypertension

Category	Systolic BP (mmHg)	And	Diastolic BP (mmHg)
Normal	<120	And	<80
Pre-hypertension	120-139	Or	80-89
Stage 1 hypertension	140-159	Or	90-99
Stage 2 hypertension	≥160	Or	≥100

The fasting blood glucose was classified as follows:

Table 2: WHO⁷ classification for diabetes

Category	Fasting blood sugar (mg %)
Normal	<110
Impaired fasting glucose (IFG)	≥110 but <126
Diabetes mellitus (DM)	≥126

Ethical considerations: Informed written consent was taken from all study subjects. No pressure coercion was exerted on subjects for participation in the study. Confidentiality and privacy was ensured and maintained at all stages (females were examined only in presence of other female attendant). People who were found positive were adequately treated and referred the subjects were free to leave the study at any time and no questions were asked. They were not debarred from getting any medical services similar to the participants.

Results

Out of the subjects examined, 374 (50.5%) were males and rest females. Out of 740 subjects, 102 (27.3%) males and 99 (27.0%) females were in the age group of 20-29 years. Illiterate subjects comprised of 89 (23.8%) males and 130 (35.5%) females. Among the rest, 88 (23.5%) males and 79 (21.6%) females had studied up to middle school. Only 24 (6.4%) males and 13 (3.6%) females had post graduate/professional degree. It was found that 94 (25.1%) males and 271 (74.0%) females were unemployed. Majority of unemployed females 221 (60.4%) were housewives. Out of 374 males, 89 (23.8%) and 85 (22.7%) were semi-skilled and skilled workers respectively. Majority of males, 177 (47.3%) and females, 188 (51.4%) belonged to upper lower socio economic status according to modified Kuppuswamy classification 2012 (Table 3).

Table 3: Socio-demographic profile of study subjects

Characteristics	Total (N = 740)	
	Males (N = 374)	Females (N = 366)
Age (years)		
20-29	102 (27.3)	99 (27.0)
30-39	69 (18.4)	82 (22.4)
40-49	81 (21.7)	65 (17.8)
50-59	63 (16.8)	57 (15.6)
60 and above	59 (15.8)	63 (17.2)
Educational status*		
Illiterate	89 (23.8)	130 (35.5)
Primary/just literate	50 (13.4)	47 (12.8)
Middle school	88 (23.5)	79 (21.6)
High school	77 (20.6)	59 (16.1)
Intermediate/diploma	1 (0.3)	2 (0.5)
Graduate	45 (12.0)	36 (9.8)
Post graduate/professional	24 (6.4)	13 (3.6)
Occupation*		
Unemployed [#]	94 (25.1)	271 (74.0)
Unskilled	37 (9.9)	27 (7.4)
Semi-skilled	89 (23.8)	18 (4.9)
Skilled	85 (22.7)	17 (4.6)
Clerical/shop owner/Farmer	21 (5.6)	4 (1.1)
Semi-professional	11 (2.9)	4 (1.1)
Professional	37 (9.9)	25 (6.8)
Income group*		
≤1520	7 (1.9)	23 (6.3)
1521-4555	38 (10.2)	51 (13.9)
4556-7593	67 (17.9)	73 (19.9)
7594-11361	101 (27.0)	76 (20.8)

Characteristics	Total (N = 740)	
	Males (N = 374)	Females (N = 366)
Age (years)		
11362-15187	45 (12.0)	30 (8.2)
15188-30374	79 (21.1)	89 (24.3)
≥30375	37 (9.9)	24 (6.6)
Socio economic class*		
Upper	32 (8.6)	18 (4.9)
Upper middle	67 (17.9)	35 (9.6)
Lower middle	89 (23.8)	91 (24.9)
Upper lower	177 (47.3)	188 (51.4)
Lower	9 (2.4)	34 (9.3)

Figures in parenthesis are percentages. *According to Modified Kuppuswamy classification 2012. [#]Unemployed includes housewives.

Overall prevalence of Diabetes and Hypertension was found to be 12.6% and 23.7% respectively (Table 4). The prevalence of Diabetes was observed to be 12.6% in males and 12.6% in females and difference was not statistically significant ($\chi^2 = 0.18$, p -value 0.91). The prevalence of newly diagnosed cases in stage 1 hypertension and stage 2 hypertension in males was found to be 23(6.2%) and 18 (4.8%) respectively. Similarly, prevalence of newly diagnosed cases in Stage 1 hypertension and stage 2 hypertension in females was found to be 31 (8.5%) and 16 (4.4%) respectively and the difference was statistically significant between males and females ($\chi^2=7.73$, p -value 0.05).

Table 4: Prevalence of diabetes and hypertension among the study subjects

Classification of diabetes	Males (N = 374) n (%)	Females (N = 366) n (%)	Total (N = 740) n (%)	χ^2 value, d.f, p-value
Normal	317 (84.8)	312 (85.2)	629 (85.0)	0.18,
IFG*	10 (2.6)	8 (2.2)	18 (2.4)	2,
Diabetics	47 (12.6)	46 (12.6)	93 (12.6)	0.91
Stages of hypertension				
Normal	167 (44.6)	191 (52.2)	358 (48.4)	7.73,
Pre-hypertensive	121 (32.4)	86 (23.5)	207 (27.9)	3,
HTN [#] (Stage 1)	23 (6.2)	31 (8.5)	54 (7.3)	0.05
HTN (Stage 2)	18 (4.8)	16 (4.4)	34 (4.6)	
Known hypertensive	45 (12.0)	42 (11.4)	87 (11.8)	

*IFG Impaired fasting glucose [#]HTN Hypertension

Discussion

Prevalence of Diabetes

The prevalence of Diabetes in the present study was

found to be 12.6% in both males and females, which was observed to be higher than that in the previous studies conducted in the urban population by Ahuja⁸ in 1979 (2.3%), by Ramachandran⁹ in major cities (Mumbai, Kolkata, Hyderabad, Bengaluru and Chennai) in 2001 (12.1%) conducted among aged 20 years or above, by Mohan¹⁰ conducted in different geographical locations (North, South, East, West/Central) in India in 2008 (7.3%) for which a total of 44,523 individuals (age: 15–64 years) inclusive of 15,239 from urban, 15,760 from peri-urban/slum and 13,524 from rural areas were recruited and by Misra¹¹ in urban slum of Delhi (Colony of Gautam Nagar situated in South Delhi) in 2001 (10.3%) among adults 18 years and above excluding pregnant females, disabled subjects, drug abusers and acutely ill subjects. The increasing prevalence of diabetes could be attributed to increasing longevity, urbanization and lifestyle changes.

The prevalence of diabetes in the present study was observed to be lower than that in the previous studies conducted in the urban population by Prabhakarn et al.¹² in Delhi in 2005 (15.0%), by Raman et al.¹³ in Thriuvananthapuram in 1999 (16.3%) and by Ramachandran et al.¹⁴ in Tamil Nadu in 2008 (18.6%). This difference in prevalence of diabetes could be attributed to varying geographical locations, varying age and population compositions among different studies.

Prevalence of hypertension

The prevalence of hypertension in the present study was observed to be 23.0% in males and 24.3% in females with a combined prevalence of 23.7%, which was observed to be higher than that in the previous studies conducted in the urban population by Wasir HS¹⁵ in age group of 20–60 years in Delhi in 1984 (3.2%), by Sharma BK¹⁶ in age group of 20–75 years in Ludhiana in 1985 (14.1%), by Gupta R¹⁷ in age group of 20–80 years in Jaipur in 1995 (10.9%), by Chadha SL¹⁸ in age group of 25–69 years in Delhi in 1998 (11.6%). Again, the increasing prevalence of hypertension could be attributed to increasing longevity, urbanization and lifestyle changes.

The prevalence of hypertension in the present study was observed to be lower than in the previous studies conducted in the urban population by Singh¹⁹ in age group of 20–65 years in Uttar Pradesh in 1997 (32.8%), by Singh²⁰ in age group of 25–64 years in Uttar Pradesh in 1997 (25.9%) and by Gupta R¹⁷ in age group of 20–80 years in Jaipur in 1995 (30.1%). Similarly, this difference in prevalence of hypertension could be attributed to varying geographical locations, varying age and population

compositions among different studies.

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