

Original Research Article

Prevalence and determinants of hypertension and diabetes mellitus in an urban area of Coimbatore

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ABSTRACT

Background: Owing to change in behavior and lifestyle patterns, diabetes mellitus and hypertension are in increasing trend worldwide. They are associated with various complications resulting in high morbidity. Early detection of these would necessitate the prevention of complications associated with it and improves the quality of life of the people. The objective of the study was to assess the prevalence and determinants of diabetes mellitus and hypertension among urban population in the field practice area of a tertiary care hospital in Coimbatore.

Methods: 299 individuals of both sexes belonging to six wards in the field practice area of a tertiary care hospital in Coimbatore were randomly selected and screened for diabetes mellitus and hypertension. Diagnosis was based on American Diabetic Association and JNC 7 guidelines for diabetes mellitus and hypertension respectively. Data on various factors associated was collected using pretested validated semi structured questionnaire.

Results: Overall prevalence of diabetes mellitus and hypertension was found to be 32.44% and 38.8% respectively with newly diagnosed diabetes mellitus and hypertension of 4.02% and 7.37%. Overall adherence was found to be 80%. Factors such as elderly age, sedentary life style, non-vegetarian diet, obesity are found to be associated with both diabetes mellitus and hypertension.

Conclusions: Almost one in every third person found to be having either diabetes mellitus/hypertension or both with 20% non-adherence to treatment. This high prevalence necessitates the need for adoption of various strategies to combat the risk factors and to promote healthy life style.

Keywords: Adherence, Determinants, Diabetes mellitus, Hypertension, Prevalence

INTRODUCTION

Diabetes mellitus (DM) and hypertension (HT), the most common chronic non-communicable diseases and multifactorial disorders affecting both developed and developing countries are major and growing public health concern.¹ They are the main preventable risk factors for coronary heart disease, stroke, end-stage renal failure, disability and increased health-care costs. Although

diabetes mellitus and hypertension are not among the top leading causes of death, these two diseases draw attention from the public due to their increasing trends and associated complications.² Diabetes mellitus is a chronic disease increasing in explosive pattern in India.³ It continues to increase in numbers and significance, as changing lifestyles lead to reduced physical activity, and increased obesity. Globally, an estimated 382 million people have diabetes, with type 2 diabetes making up

about 90% of the cases. In 2016 diabetes mellitus resulted in 1.6 million deaths per year worldwide, making it the seventh leading cause of death.⁴ India has the second highest number of diabetics in the world next only to China. In this rate, India is poised to become a non-communicable disease capital of the world.

Hypertension causes 7.5 million deaths globally every year which is about 12.8% of total annual deaths. This accounts for 57 million disability adjusted life years (DALYs) or 3.7% of total DALYs.⁵ India is no stranger to this problem and has a prevalence ranging from 17% to 21% in all states which may be a lot more inflated if the entire population is screened. The prevalence of HT is 1.5-2.0 times more in those with diabetes mellitus than in those without diabetes mellitus, whereas almost one-third of the patients with hypertension develop diabetes mellitus later.⁶ The presence of hypertension in diabetic patients substantially increases the risks of coronary heart disease, stroke, nephropathy and retinopathy. When hypertension coexists with diabetes mellitus, the risk of cardio vascular disease is increased by 75%, which further contributes to the overall morbidity and mortality of already high risk population.⁷ Early detection of hypertension and diabetes mellitus reduces the risk of various complications.

The objectives were to estimate the prevalence of hypertension and diabetes mellitus among urban population in the field practice area of a tertiary care hospital in Coimbatore and to find out the associated risk factors for hypertension and diabetes in an urban population.

METHODS

A Community based cross-sectional study was conducted among 299 subjects above 30 years of age selected from 6 wards of the field practice area of a tertiary care hospital in Coimbatore during April to June 2018. Out of the 13 wards, 6 wards were selected for the study using simple random sampling (lottery method). Using population proportion to sample size, the study participants were randomly selected from all 6 wards. The health inspector and medical social workers visited the wards on the previous day of the study and sensitized the public about the screening. The questionnaire consisted of

the socio-demographic data, anthropometry, dietary practices, physical activity, smoking and alcohol history, knowledge, attitude and practice towards diabetes mellitus and hypertension. Aneroid sphygmomanometer was used to measure blood pressure after calibration with a mercury manometer. A standardized glucometer was used to measure random blood sugar. Classification of hypertension and diabetes mellitus was done as per the latest JNC (Joint National Committee) 8 and ADA (American Diabetes Association) guidelines respectively. Waist circumference above 90 cm in males and above 80 cm in females was considered as abdominal obesity as per WHO guidelines.

Inclusion criteria

Those who were known diabetes mellitus and hypertensive on treatment were also included in the study.

Exclusion criteria

Those who were mentally ill and bed ridden patients were excluded from the study.

Institutional ethical clearance and informed consent were obtained. Data analyzed using SPSS version 23.0. Chi square test was used to find association between various factors and p value less than 0.05 was considered significant.

RESULTS

Out of the 299 subjects included in the study, 131 were males (44%) and 168 were females (56%). The prevalence of diabetes mellitus was 32.44% and prevalence of hypertension was 38.8%. The prevalence of diabetes mellitus and hypertension was more in elderly age group (Table 1).

Among the 97 diabetics and 116 hypertensive identified in the study, 12.3% diabetics and 17.24% hypertensive were newly detected cases along with a significant number of prediabetics (5.3%) and prehypertensives (18%). About 49% of the known diabetics did not have optimal glycemic control and 68.3% of them were found to have uncontrolled high blood pressure at the time of study (Figures 1 and 2).

Table 1: Association of study population according to their age group and disease status.

Age group (in years)	Overall frequency (%)	Diabetics N (%)	P value	Hypertensive N (%)	P value
<20	4	0	0.008	0	0.004
21-40	46	3 (6.5)		5 (10.8)	
41-60	147	40 (27.2)		52 (35.4)	
61-80	90	46 (51.1)		51(56.7)	
>80	12	8 (66.6)		8 (66.6)	
Total	299	97(32.4)		116 (38.8)	

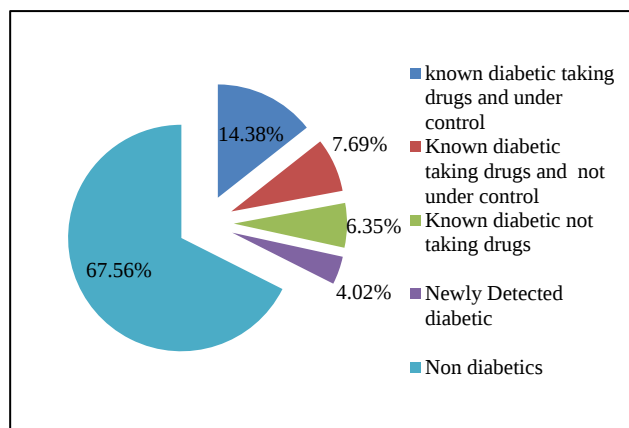


Figure 1: Distribution of study population according to their current readings of random sugar levels and disease status.

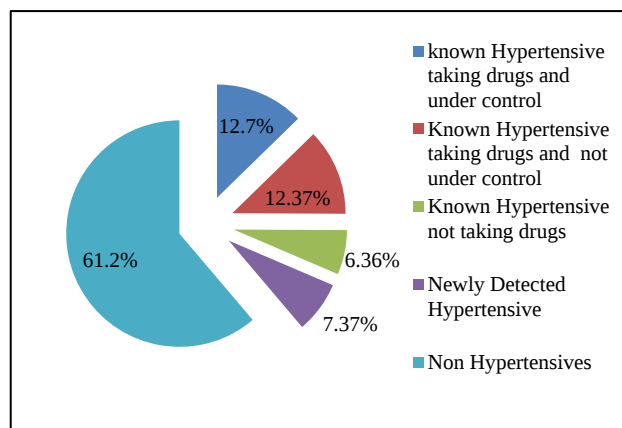


Figure 2: Distribution of study population according to their current blood pressure readings and disease status.

Table 2: Classification of study subjects according to prevalence of various risk factors of diabetes mellitus and hypertension.

Risk factor	Overall prevalence (n=299) N (%)	Diabetes mellitus (n=97) N (%)	Hypertension (n=116) N (%)
Sedentary life style	180 (60.2)	67 (68.1)	79 (68.1)
Physical Activity	105 (35.12)	25 (25.77)	30 (25.6)
Alcohol consumption >thrice a week	94 (31.43)	45 (46.4)	56 (48.28)
Smoking	68 (22.74)	26 (26.8)	39 (33.62)
BMI >25	87 (29.09)	36 (37.11)	39 (33.62)
Abdominal obesity	148 (49.45)	81 (83.5)	95 (81.9)

Table 3: Association of hypertension and diabetes mellitus with various risk factors.

	Variable	Hypertensive (n=116) N (%)	Non-hypertensive (n=183) N (%)	P value	Diabetics (n=97) N (%)	Non diabetics (n=202) N (%)	P value
Gender	Male	67 (57.75)	64 (34.9)	0.0000	36 (37.11)	95 (47.02)	0.10
	Female	49 (42.25)	119 (65.1)		61 (62.89)	107 (52.98)	
Age (in years)	<50	35 (30.18)	87 (47.54)	0.0029	27 (27.83)	95 (47.02)	0.001
	>50	81 (69.82)	96 (52.46)		70 (72.17)	107 (52.98)	
Diet	Non-veg	92 (79.31)	123 (67.21)	0.023	78 (80.41)	137 (67.82)	0.002
	Veg	24 (20.68)	60 (32.79)		19 (19.59)	65 (32.18)	
Occupation	Sedentary	79 (68.1)	101 (55.2)	0.026	67 (69.07)	113 (55.94)	0.03
	Non sedentary	37 (31.9)	82 (44.8)		30 (30.93)	89 (44.06)	
Regular exercise	Yes	30 (25.86)	75 (41)	0.007	25 (25.77)	80 (39.6)	0.019
	No	86 (74.14)	108 (59)		72 (74.23)	122 (60.4)	
Smoking	Yes	39 (33.62)	29 (15.85)	<0.001	26 (26.8)	42 (20.8)	0.245
	No	77 (66.38)	154 (84.15)		71 (73.2)	160 (79.2)	
Alcohol >thrice a week	Yes	56 (48.28)	38 (20.77)	0.00	45 (46.4)	49 (24.26)	<0.001
	No	60 (51.72)	145 (79.23)		52 (53.6)	153 (75.74)	
Abdominal obesity	Present	95 (81.9)	53 (28.9)	0.00	81 (83.5)	67 (33.17)	<0.001
	Absent	21 (18.1)	130 (71.1)		16 (16.5)	135 (66.83)	
BMI	>25	39 (33.62)	48 (26.23)	0.170	36 (37.11)	51 (25.25)	0.034
	<25	77 (66.38)	135 (73.77)		61 (62.89)	151 (74.75)	

Table 2 shows nearly 70% of the patients lead a sedentary lifestyle and did not practice any kind of physical activity. Only 25% of subjects complied with the recommended physical activity of more than 30 minutes/day. A remarkably high prevalence of abdominal obesity (49.45%) was observed in the study.

Significant association was found between prevalence of diabetes mellitus and various risk factors including age, diet, sedentary life style, lack of physical activity, alcoholism, abdominal obesity and body mass index. Increasing age, sedentary lifestyle and poor treatment compliance were found to be significantly ($p < 0.05$) associated with high blood pressure and blood sugar levels (Table 3).

DISCUSSION

The prevalence of diabetes and hypertension in the study population was high among the 5th and 6th decades of life. Also in spite of very few subjects survive above 80 years, the proportion of hypertension and diabetes is alarmingly high (nearly 2/3rd) among them. This clearly indicates most of the people who develop NCD's succumb to premature death.

In a study conducted in urban Varanasi by Singh et al, the prevalence of hypertension was 32.9% and pre hypertension was 41.7%. The prevalence of hypertension was nearly consistent with our study but the prevalence of pre hypertension was high when compared to present study. They found that risk factors like elderly age, overweight and obesity, tobacco and alcohol consumption were associated with hypertension which was consistent with our study but tobacco and alcohol consumption was not associated with hypertension in present study.⁸ In present study we found that patients with uncontrolled hypertension were 68.3% which was nearly similar to this study (64.9%). The prevalence estimated in the current study was much higher than that estimated by Nellore (22.3%) and Bihar (37.95%).^{9,10} Kokiwar et al in his study found that the overall prevalence of hypertension and pre hypertension was 19.04% and 18.8% respectively.¹¹ The prevalence of hypertension was high when compared with this study. Similar to present study the proportion of hypertensive was high in elderly age group and in patients with sedentary activity and increased BMI. The study also stated that there was no significant association between alcohol intake and hypertension which was similar to current study.¹¹

Around 20% of the known hypertensive reported to be non-adherent to hypertensive medications. This was similar to the study done by Katapadi et al where 24% non-adherence was reported among hypertensive patients.¹²

The prevalence of diabetes mellitus was found to be 32.44% in present study. Almost one in every third person was found to be diabetic in present study. Study

by Bharathi et al reported newly diagnosed diabetes mellitus of 8.4%.¹³ Similar results was reported in current study. The prevalence of diabetes was 14.6% in a study conducted by Kapil et al which had lower prevalence than present study.¹⁴ In the study by Bharati et al showed that proportion of diabetes mellitus was higher in persons aged ≥ 50 years and was reported to be associated with sedentary occupation, non-vegetarian diet, obesity, non-alcoholic and non-smokers.¹⁴ Consistent result was observed in this study also.

Around 19.5% of the known diabetic reported to be non-adherent to anti diabetic medications. This was similar to the study done by Santhanakrishnan et al where 24% non-adherence was reported among diabetic patients.¹⁵

CONCLUSION

The study reported high prevalence of diabetes mellitus and hypertension among urban population with high prevalence among elderly population. Both diabetes mellitus and hypertension was associated with behavioural and biological risk factors. 20% non-adherence was reported for both anti diabetic and anti-hypertensive medications.

Recommendations

Periodic health education and awareness activities regarding biological and behavioral factors such as importance of physical activity, avoidance of smoking and alcohol should be provided. Awareness on knowledge about early signs and symptoms and risk factors needs to be imparted to the study population and the subsequent positive attitudes and practices adopted by the community should be reassessed by periodic studies carried out in the same population in future.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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