

Observational Study to Evaluate Prevalence of Comorbidities in Indian Type 2 Diabetes Patients and Its Association with Glycemic Control at a Tertiary Care Teaching Hospital at Patna

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ABSTRACT

Objective: Comorbid chronic disease which is most frequent among type 2 diabetes patients who were having poor glycemic control which also leads to increase cost of the therapy and disease burden in future. The aim of the study was to evaluate the prevalence of comorbidities among in Indian type 2 diabetes patients and its association with glycemic control at a tertiary care teaching hospital at Patna.

Method: This is an observational study performed at a single center outpatient diabetes clinic at Patna Medical College and Hospital, Patna, Bihar. Patients' data was collected between June 2018 to December 2019. A total 872 patients were initially considered for trial and analysis where done to examine the association between number and type of comorbidities (cardiovascular disease (CVD), cerebrovascular disease, dyslipidemia, hypertension, diabetic foot and amputation, nephropathy, and retinopathy) and HbA1c used to measure poor glycemic control.

Results: Mean age of the patients was 54±18 years with 7.6±2.4 years as mean duration of diabetes. 59% patients were female with >80cm waist circumference which was >90cm for male. 67.8% patients were had HbA1c>6.5% and fails to achieve glycemic control. 94% patients were having at least one comorbidity and 86.8% had at least two. Most common was hypertension (76.5%). Dyslipidemia (71.3%), overweight/obesity (68.6%), cardiovascular disease (CVD) (41%) and cerebrovascular disease (21%) are the comorbidity associated with which was followed by nephropathy (10.9%), retinopathy

(9.2%) and diabetic foot and amputation (1.5%). Older age groups tended to increase comorbidity burden and compare to women higher in men. Diabetes duration along with glucose lowering oral therapy and insulin usage were found to be significantly related to all co-morbidities.

Conclusion: Multiple comorbidities were present in majority of type 2 diabetes patients. In terms of decreasing mortality and morbidity, comorbidities should be one of the major focus of clinicians rather than only focusing on anti-diabetic treatment. In patients with type 2 diabetes achievement of good glycemic control does not appear to be limit by comorbidity.

Keywords: Comorbidities; Prevalence; Type 2 diabetes.

INTRODUCTION

A leading public health issue become increasing prevalence of chronic health problems and type 2 diabetes is one of them [1]. Comorbid chronic disease which is most frequent among type 2 diabetes patients who were having poor glycemic control which also leads to increase cost of the therapy and disease burden in future. The high prevalence of co-existing chronic medical conditions or “co morbidities” apart from being a chronic debilitating disease makes diabetes management an arduous task for the patient and for health care providers. There are so many investigator who were confirmed in various study due at different part of the

world have proved that at least one comorbid condition is associated with diabetes and even on an average of 40% of them were having two or multiple comorbidity [2-5]. Yet the treatment strategies and perspective of the healthcare providers are more oriented on management of diabetes alone.

There is increasing interest in the impact of comorbid conditions on health care outcomes as health care costs, and mortality became higher since the presence of chronic health conditions such as diabetes, hypertension, coronary artery disease, and renal or pulmonary insufficiency is predictive of medical resource [6,7]. Macro and micro vascular complication's prevalence among type 2 diabetes was earlier studied by Ramachandra et al [8]. There were several studies which has evaluated prevalence of dyslipidemia and hypertension among type 2 diabetics with focus on metabolic syndrome [9-15]. Till present there are very a smaller number of data which tells whether the presence of chronic comorbidity has a similar impact on poor glycemic control.

The aim of the study was to evaluate the prevalence of comorbidities among in Indian type 2 diabetes patients and its association with glycemic control at a tertiary care teaching hospital at Patna.

METHOD

This is an observational study performed at a single center outpatient diabetes clinic at Patna Medical College and Hospital, Patna, Bihar. Patients' data was collected between June 2018 to may 2019. A total 672 patients were initially considered for trial and analysis where done to examine the association between number and type of comorbidities (cardiovascular disease (CVD), cerebrovascular disease, dyslipidemia, hypertension, diabetic foot and amputation, nephropathy, and retinopathy) and HbA1c used to measure poor glycemic control.

Patients who were maintaining their personal medical record for at least 1 year were eligible to be included in the study. Patients with emergency health conditions and too ill to participate were excluded from the study. Study purposes were explained to all patients and prior to the interview written informed consent was obtained. Every patient was allotted with a unique code to avoid any kind of duplication.

A cross sectional interview survey was conducted in all participants to evaluate the comorbidity presence. All interviews were conducted by the author itself with an average time of 20-30 minutes during OPD clinic timing. With the help of predesigned questionnaire demographical details and data regarding existence of co morbidity were elicited. STATA were used to do the statistical analysis.

RESULT

Mean age of the patients were 54 ± 18 years with 7.6 ± 2.4 years as mean duration of diabetes. 59% patients were female with $>80\text{cm}$ waist circumference which was $>90\text{cm}$ for male. 69.8% patients were had HbA1c $>6.5\%$ and fails to achieve glycemic control with a mean of $8.2 \pm 1.2\%$. This was illustrated in table 1.

Table 1: Patient Characteristics

Characteristic	Patients at presentation (N= 872)
Age (Years)	54 ± 11
Gender, Female (%)	59%
Duration of Diabetes (Years)	7.6 ± 2.4
BMI (Kg/m ²)	33.3 ± 0.7
HbA1c (%)	7.8 ± 1.8

94% patients were having at least one comorbidity and 86.8% had at least two. Most common was hypertension (76.5%). Dyslipidemia (71.3%), overweight/obesity (68.6%), cardiovascular disease (CVD) (41%) and cerebrovascular disease (21%) are the comorbidity associated with which was followed by nephropathy (10.9%), retinopathy (9.2%) and diabetic foot and amputation (1.5%) (Figure 1)

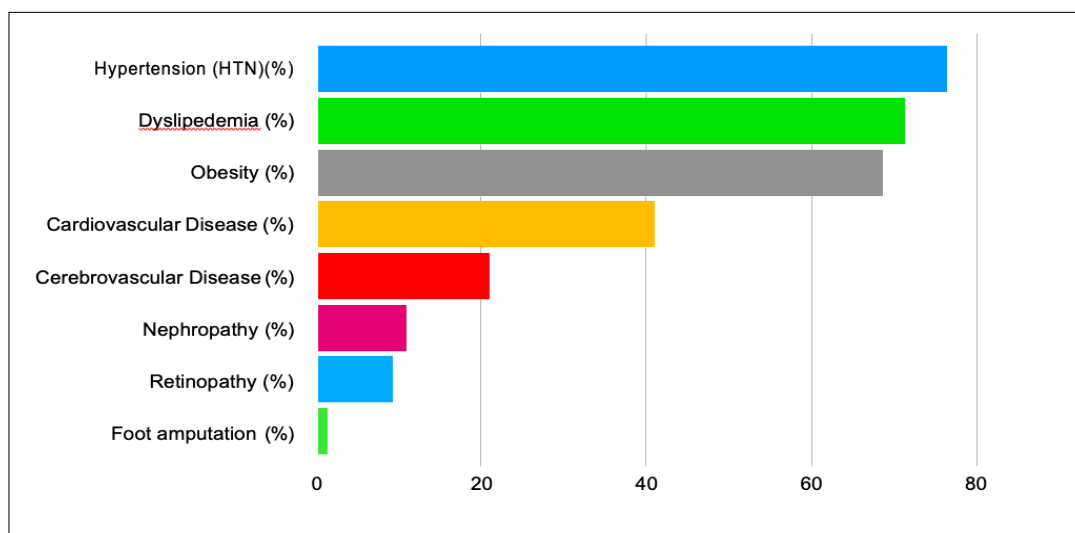


Figure 1: Chronic Comorbidity

Table 2: Prevalence and pattern of co morbidity among type 2 diabetics

Parameters	Total (N=872)	Co morbidity (N= 820)	No Co morbidity (N=52)	P Value
Age Group Years				
18-30	61 (7%)	56 (6.8%)	5 (9.6%)	<0.001
30-60	621 (71.3%)	589 (71.8%)	32 (5.43%)	<0.001
≥ 60	190 (21.7%)	175 (21.35%)	15 (34.6%)	<0.001
Socio economic status				
Above poverty line	558 (64%)	525 (64%)	33 (63.5%)	<0.001
Below poverty line	314 (36%)	295 (36%)	19 (36.5%)	<0.001
Duration of Diabetes				
≤ 6 Years	321 (36.8%)	316(38.5%)	5 (6%)	0.459
≥ 6 Years	551 (63.2%)	504 (64.6%)	47 (90.4%)	0.310
Glycemic Level				
Controlled≤6.5%	263 (30.2%)	245 (29.9%)	18 (34.6%)	<0.001
Poorly Controlled≥6.5%	609 (69.8%)	575 (70.1%)	34 (65.4%)	<0.001
Type of therapy				
Oral Therapy	855 (98%)	817 (99.6%)	38 (73%)	0.143
Insulin Therapy	305 (35%)	305 (37.2%)	0 (0%)	0.171

Older age groups tended to increase comorbidity burden and compare to women higher in men. Diabetes duration along with glucose lowering oral therapy and insulin usage were found to be significantly related to all co- morbidities. (Table 2)

DISCUSSION

In this trial it was observed by the investigator that vast majority of type 2 diabetes patients (94%) were having at least one comorbidity and 86.8% had at least two. In patients with diagnosed type 2 diabetes the prevalence of co morbidity was similar to or higher than those of previous studies [16-18]. Like so many previous investigation this study also reveals a strong positive association with increasing age and also found the highest rate of co morbidity in the elderly [19-20]. As the other study

done at different part of the world also in line with these findings of comorbidity as it has been seen that most common was hypertension (76.5%). Dyslipidemia (71.3%), overweight/ obesity (68.6%), cardiovascular disease (CVD) (41%) and cerebrovascular disease (21%) are the comorbidity associated with which was followed by nephropathy (10.9%), retinopathy (9.2%) and diabetic foot and amputation (1.5%) [21-24].

It had observed from the study that 30 to 60 years comorbidity was maximum, but in older patients its existence was high. This represent that age older age groups tended to increase comorbidity burden. Like this observation, Strong positive association with increasing age with co morbidity also reported by few authors earlier [19,20].

In this study combination of hypertension and hyperlipidemia were evaluated with the most frequent pairs of co-prevalent disorders followed by the combinations of both hypertension and hyperlipidemia with obesity. These findings also in line with many previous trials done earlier at different part of the world [25-27].

Obesity, cardiovascular disease and chronic kidney disease followed by retinopathy were other doublets of frequent co prevalent comorbidities in this study. It had also observed that extreme co morbid condition like foot infection which even get worsen with extremity like leg amputation.

There were several limitations which this study has. Certain comorbidities only were included in this observational study therefore a snapshot of diabetes-related comorbidities reflects in results. A misclassification cannot be excluded as the data was prepared through personal interview with the patients. A large number of subjects managed under real world conditions, population-based design, and single handed data in a single center was the strengths of this study.

CONCLUSION

Multiple comorbidities were present in majority of type 2 diabetes patients. In terms of decreasing mortality and morbidity, co-morbidities should be one of the major focus of clinicians rather than only focusing on anti-diabetic treatment. In patients with type 2 diabetes achievement of good glycemic control does not appear to be limit by comorbidity.

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