

Original Article

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Cross-sectional study to evaluate coexisting diseases of diabetes mellitus

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Abstract:

Introduction: Diabetes mellitus (DM) patients are very common in outpatient department (OPD) practice. There are two major types of DM, Insulin dependent DM (Type-1) & Non-insulin dependent DM (Type-2). There are few co-morbidities which may coexist with DM. Common coexisting conditions are Hypertension (HTN), Dyslipidemia, Anxiety and Neuropathy, it's a microvascular complication of diabetes.

Methodology: This was cross-sectional observational (Descriptive) study to evaluate the common coexisting diseases with two different types of DM. Study place was a private hospital OPD of Sylhet. Sample size was 425. Study period was 1 year.

Result: Out of total 425 patients IDDM patients were 113 in number and NIDDM patients were 312 in number. The ratio was 1:2.76. HTN, Dyslipidemia, Anxiety and Neuropathy were accompanied with 34.5%, 49.5%, 32%, 59% IDDM patients and 75%, 46%, 37%, 63% NIDDM patients respectively. The percentage of HTN in NIDDM was significantly ($p < 0.0001$) higher than IDDM.

Conclusion: The common coexisting or co-morbid conditions with DM are HTN, Dyslipidemia, Anxiety and Neuropathy. Hypertension was significantly higher in the NIDDM group.

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Introduction:

There are two major types of diabetes mellitus (DM), they are insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM). IDDM is also called Type-1 and NIDDM is called Type-2 diabetes mellitus. T1DM is usually resulting of autoimmune destruction of pancreatic β -cells, leading to absolute insulin deficiency.

T1DM is usually resulting of autoimmune destruction of pancreatic β -cells, leading to absolute insulin deficiency. T1DM accounts for nearly 5–10% of all diabetes mellitus cases worldwide¹. In contrast, T2DM, which represents the majority of cases, results from insulin resistance coupled with relative insulin insufficiency. Both forms predispose individuals to acute and chronic complications, although T2DM often features a higher prevalence of comorbidities due to the metabolic milieu, older age at onset, and longer asymptomatic duration before diagnosis.

Hypertension, dyslipidemia, peripheral neuropathy, and anxiety are among the most prevalent and clinically significant comorbidities in people with DM. Approximately 75% of adults with T2DM are estimated to have hypertension², sharing common risk factors such as obesity, sedentary lifestyle, and vascular dysfunction. The coexistence of high blood pressure exacerbates vascular damage and

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significantly increases cardiovascular morbidity and mortality in this population³.

Abnormal lipid metabolism is another frequent finding in DM. Dyslipidemia, characterized by elevated triglycerides, elevated low-density lipoprotein cholesterol (LDL-C), and reduced high-density lipoprotein cholesterol (HDL-C), is strongly linked to both poor glycemic control and accelerated atherosclerosis. Moreover, hypertension and dyslipidemia have been identified as independent risk factors for diabetic peripheral neuropathy (DPN)⁴⁻⁵. Patients with T2DM who exhibit elevated blood pressure, high triglycerides, low HDL-C, or high LDL-C are at significantly increased risk of developing neuropathy over time.

Diabetic peripheral neuropathy is the most frequent neurological complication of DM, affecting up to 50–66% of individuals during their lifetime⁶. Prevalence varies depending on diagnostic criteria and population studied; in some developing countries, rates exceed 50%⁷. Early detection and management—including glycemic optimization, foot care, and risk factor control—are essential to prevent severe consequences such as ulceration, limb loss, and infection⁶⁻⁷.

Finally, anxiety disorders are common but under-recognized in DM. Generalized anxiety disorder (GAD) affects roughly 14% of diabetic patients, while elevated anxiety symptoms may be present in up to 40%, impairing adherence to self-care routines⁸. Among those with painful diabetic neuropathy, anxiety prevalence ranges widely from 7.8% to 60% depending on population and diagnostic tools⁹. Anxiety not only adds to the psychological burden but also contributes to poorer glycemic control and increased healthcare use.

The aim of the study was to find out the coexisting diseases of both types of diabetes mellitus.

Methodology:

This was a cross sectional observational (Descriptive) study to find out the coexisting diseases of insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes

mellitus (NIDDM). Study place was the out patient department (OPD) of a diabetes mellitus specialist of Sylhet. Sample size was 425. Study period was 1 year. All the patients diagnosed as diabetes mellitus (DM) was included. Non-diabetic patients were excluded. Written permission was obtained from the director of the hospital. Informed consent was taken from all the participants. After enrollment age, sex, type of DM, presence or absence of coexisting diseases like hypertension (HTN), dyslipidemia, anxiety and neuropathy was documented of data collection sheet. OGTT, HbA1c, RBS with typical symptom's- used for diabetes confirmation. HOMA for resistance for Type 2 DM and S. insulin, C-Peptide, insulin antibody is used for exclusion of Type 1 diabetes. NCS used for identification of Diabetic Neuropathy and DSM-5 used for the leveling of Anxiety. At the end of the study data were transferred in to an Excel data sheet. Chi-square test was done for the categorical data. P-value less than 0.05 were considered as significant.

Results:

Total number of patients was 425. IDDM patients were 113 in number and NIDDM patients were 312 in number. The ratio was 1: 2.76.

Table-1: According to sex distribution (N= 425)

	Male	%	Female	%	p-value
IDDM	40	35.4	73	64.6	0.148
NIDDM	142	45.5	170	54.5	

Table-1 shows the distribution according to the sex distribution of IDDM (n=113) and NIDDM (n=312) patients. In both the groups female were predominant.

Table-2: According to age frequency

	IDDM	%	NIDDM	%
20 and below	3	2.65	3	0.96
21 – 30	18	15.93	26	8.33
31 - 40	14	12.39	65	20.83
41 - 50	22	19.47	89	28.53
51 – 60	28	24.78	88	28.21
61 – 70	19	16.81	29	9.29
Above 70	09	7.96	12	3.85
	113		312	

Table-2 demonstrates distribution of patients according to age frequency. Age group 51 to 60 year had highest frequency in IDDM group and age group 41 to 50 year was highest in number in the NIDDM group.

Table-3: According to presence of hypertension (HTN)

	HTN	%	Absent	%
IDDM	39	34.51	74	65.49
NIDDM	234	75	78	25

According table-3, hypertension was present in nearly two-third of the NIDDM patients.

Table-4: According to presence of dyslipidemia

	Dyslipidemia	%	Absent	%
IDDM	56	49.5	57	50.5
NIDDM	144	46	168	54

According to table-4, dyslipidemia was present in nearly half of the IDDM group and less than half in the NIDDM group.

Table-5: According to presence of anxiety

	Anxiety	%	Absent	%
IDDM	36	32	77	68
NIDDM	115	37	197	63

Table-5 shows that anxiety was present nearly one-third in both the IDDM & NIDDM group.

Table-6: According to presence of neuropathy

	Neuropathy	%	Absent	%
IDDM	67	59	46	41
NIDDM	196	63	116	37

Table-6 states that more than half of both the group patients suffered from neuropathy.

Table-7: According to the comparison of coexisting diseases in IDDM & NIDDM

	IDDM (%)	NIDDM (%)	p-value	p-value
HTN	34.5	75	< 0.00001	.016
Dyslipidemia	49.5	46	.571	
Anxiety	32	37	.457	
Neuropathy	59	63	.561	

Table-7 illustrates that hypertension was significantly higher in the NIDDM group. Anxiety and neuropathy were also higher in the NIDDM group though dyslipidemia was higher in the IDDM group.

Discussion:

In an Iranian cohort of adults with type 2 diabetes (NIDDM) from the Fasa Cohort Study (n=1,233 with T2DM), 47.0% had coexisting hypertension; the study also quantified related demographic and lifestyle correlates.¹⁰ A hospital-based study in Kabul, Afghanistan reported that 70.5% of people with type 2 diabetes had hypertension, highlighting a heavy cardio metabolic co-morbidity burden in routine care.¹¹ In this study 75% of the type -2 DM patients had hypertension.

In a large cross-sectional study of Chinese adults with type 2 diabetes, the prevalence of dyslipidemia was 87.7%, and the same cohort documented diabetic peripheral neuropathy (DPN) and other complications, underscoring the high rate of atherogenic lipids in NIDDM.¹² An Ethiopian outpatient study of adults with type 2 diabetes (n=354) found dyslipidemia in 61.3% (95% CI 56.2–66.7) of patients; over half of those affected had combined lipid abnormalities, emphasizing the need for routine lipid screening and management in DM care.¹³ This study showed 46% of the type-2 DM patients had dyslipidemia.

The multinational INTERPRET-DD study (14 countries; n=2,733 with type 2 diabetes) reported an overall DPN prevalence of 26.71% with substantial between-country variation; DPN risk rose with longer diabetes duration, poor blood sugar control, and a history of raised blood pressure and cardiovascular disease.¹⁴ A 2022 systematic review and meta-analysis of 13 observational studies (n≈20,000) estimated that 25.9% of adults with diabetes have anxiety (pooled prevalence), indicating that roughly one in four people with DM experience clinically significant anxiety symptoms.¹⁵ According to this study 32% of IDDM patients and 37% of NIDDM patients suffered from anxiety.

In the United States, approximately 75% of individuals with diabetes also have

hypertension, underlining the extensive overlap of these cardiovascular risk conditions.¹⁶ Global data indicate that 60–80% of people who develop diabetes will eventually develop high blood pressure.¹⁷ In a cross-sectional study of diabetic patients in southern Bangladesh, the prevalence of dyslipidemia was very high—73% among males and 71% among females.¹⁸ A study of type 2 diabetes mellitus (T2DM) patients in Northwest China reported a dyslipidemia prevalence of 87.7%, with treatment coverage at 68% and control rates for LDL-C at 43.1%.¹⁹ Diabetic peripheral neuropathy (DPN) affects 42–51% of adults with type 2 diabetes. For example, in the ACCORD trial, 42% of adult T2DM patients had DPN; similar prevalence (39%) was reported in the Veterans Affairs Diabetes Trial, and up to 51% in the BARI-2D trial.²⁰ According to a study of a tertiary care hospital of Eastern India, the prevalence of anxiety among diabetic patients was 36.2% which revealed nearly 2.5 times higher than in non-diabetics (14.4%).²¹ This study also found that 59% of IDDM patients and 63% of NIDDM patients were accompanied with neuropathy.

After comparing with the international studies a fair similarity was found in the current study.

Conclusion:

There are few diseases coexist with diabetes mellitus. Hypertension, dyslipidemia, anxiety and neuropathy are common coexisting or comorbid conditions with DM. Hypertension were significantly higher in the NIDDM patients.

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