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Research Article

Comprehensive Epidemiology and Risk Factors of Chronic Complications in Diagnosed Patients of Type 2 Diabetes Mellitus: A Retrospective Observational Analysis at Allied Hospital 1 and 2 Faisalabad, Pakistan

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Abstract

Introduction: *Diabetes mellitus is an escalating public health crisis affecting millions worldwide, including a significant number of individuals in Pakistan. It is a chronic, non-curable condition characterized by high blood sugar levels. If not managed properly, diabetes can lead to severe and often fatal health complications. Recognizing the pressing need to address diabetes-related issues in Pakistan, our research aimed to investigate the incidence and risk factors of complications associated with type 2 diabetes among hospitalized patients in Faisalabad.*

Main Problem to Solve: *Complications from diabetes can have devastating effects on patients' health, leading to reduced quality of life and increased healthcare costs. In Pakistan, data on the prevalence and management of these complications is limited. Therefore, the primary problem our study sought to solve was to quantify the burden of chronic complications from diabetes in Faisalabad and identify risk factors associated with these complications.*

Aim of the Study: *The aim of this study was to evaluate the frequency of hospitalizations due to microvascular (e.g., nephropathy, retinopathy) and macrovascular complications (e.g., cardiovascular diseases) of type 2 diabetes at tertiary care hospitals in Faisalabad. Additionally, we sought to identify the risk factors that contribute to these complications.*

Methodology: *A retrospective observational study was conducted at Allied Hospitals 1 and 2 in Faisalabad over a six-week period in 2023. Ethical approval was obtained from the Medical Ethics Review Board. We analyzed medical charts of patients diagnosed with chronic complications of diabetes. We initially estimated a sample size of 326 patients but expanded it to 549 to achieve a better representation of the population. The data collected included patient demographics, duration of diabetes, complications, and management strategies. Statistical analyses were performed using SPSS software to explore the associations between variables.*

Results: *Our findings revealed that in 2023, 2,112 patients were hospitalized with chronic diabetic complications, with our study focusing on 549 of these cases. The most common complications identified were:*

- *Nephropathy: Present in 305 patients (55.6%)*
- *Ischemic Heart Disease (IHD): 147 patients (26.8%)*
- *Cerebrovascular Accident (CVA): 134 patients (24.4%)*
- *Limb Ischemia: 123 patients (22.4%)*

The patient population had a median age of 56 years, with a very similar male-to-female ratio. Notably, a high prevalence of hypertension (76%) was identified among patients. Moreover, 71 patients succumbed to complications during their hospital stay. We observed strong correlations between complications and risk factors such as duration of diabetes and poor management practices. In particular, the study indicated that longer durations of diabetes significantly increased the risk for nephropathy and IHD.

Conclusion: *This research highlights the urgent need for focused interventions targeting diabetes management and early detection of complications in Faisalabad. The high incidence of nephropathy, cardiovascular diseases, and other complications*

underscores a significant public health concern. By identifying the risk factors associated with these complications, our study aims to inform healthcare providers and policymakers, enabling the development of targeted strategies to improve diabetes care in the region.

Continued efforts should be made to educate patients about managing their condition and mitigating risks. Awareness campaigns focusing on lifestyle modifications, regular health check-ups, and adherence to treatment regimens are essential to improving outcomes for individuals with diabetes. Ultimately, our findings contribute to the understanding of diabetes complications in Pakistan and can serve as a foundational basis for further research and policy development for better diabetes management in the country.

Keywords: Statistical Epidemiology, Endocrinology & Metabolism, Diabetes Mellitus Type 2, Chronic Complications, Epidemiological Study, Cross Sectional, Nephropathy

1. Introduction

Diabetes mellitus is a growing global public health crisis. Over 537 million adults aged 20 to 79 have been impacted globally, predominantly in China, India, and Pakistan [1]. It is a chronic endocrine non-curable illness that can be managed and controlled in well-compliant patients. The mortality and morbidity rates are high in uncontrolled diabetes especially when chronic complications ensue [2]. Its prevalence and fatality rates are increasing drastically year after year.

WHO records on Type 2 diabetes mellitus caused about 3.7 million deaths around the world in 2012 and 4.2 million in 2019 [3]. In short, diabetes will be this century's defining illness. The role and response of the public and health community to diabetes during the next two centuries will define the graph of population health and life expectancy for the next eighty years [4].

Diabetes was originally regarded as a disease of the wealthy and primarily prominent in western areas [5]. Meanwhile, with rapid urbanization, changes in nutrition, and a more sedentary lifestyle, it has spread to Asian countries too [6]. Its prevalence in Pakistan is far higher than anticipated, in part to overall health habits, sedentary professions, increased use of technology, and decreased physical activity levels [7]. Also, Pakistan's healthcare system is facing many challenges, including limited finances, insufficient healthcare infrastructure, and uneven allocations of medical facilities [8]. This might have an impact on diabetes early identification, treatment, and management, particularly in impoverished and rural regions. Poor treatment and a delayed diagnosis of diabetes might stem from a lack of information and teaching about the illness and its risk factors [9].

Ultimately, diabetes has a significant health impact, with macrovascular (when the arteries suffer damage), and microvascular complications (when the small blood vessels are compromised) [10]. The former causes a number of cardiovascular diseases such as peripheral artery disease (PAD), myocardial infarction (MI), angina, and stroke, whereas the latter affects the kidney (nephropathy), the neurological system (neuropathy), and the eye (retinopathy). Loss of eyesight, diabetic ulcers, end-stage renal disease, limb amputations, disability, a worse quality of life, much higher healthcare costs, and even mortality can be caused by these vascular involvements. Depending on a number of variables, such as the period of the disease, the presence of other risk factors and comorbidities, as well as environmental and genetic effects, the majority of T2DM patients are susceptible to developing concomitant diabetic problems at the time of diagnosis. These chronic complications place a greater strain on patients' physical, emotional, and financial wellness especially in Pakistan.

The dramatic effect of the diabetes chronic complications become evident when one takes notice of the morbidity, mortality, and expense of medical care [11]. Diabetes was estimated to affect 171 million people globally in 2000; that number rose to 382 million in 2013, and by 2035, it is expected to reach 592 million people. This amounts to 8%–10% of the world's population, meaning that the cost of treating diabetes will cost at least $548 billion [12]. And the estimated cost of managing diabetes nationwide in Pakistan is 1.67%. (or USD 24.42 billion) of the GDP [13]. These findings have important significance in the context of Pakistan due to its occurrence in the diabetes hot zone.

As strict efforts are required to combat this important health issue, lack of nationwide data from Pakistan on many aspects of type 2 diabetes, particularly on burden of diabetic complications is the main challenge [14]. The primary purpose of this research was to evaluate how many hospitalizations has been happened due to microvascular and macrovascular complications of type 2 diabetes at tertiary care hospitals, Faisalabad. Also, to rule out the frequency of chronic diabetic complications and risk variables (HTN, compliance, gender, duration of diabetes, etc.) that are linked to their development.

2. Method

This study was conducted at two major government sector hospitals i.e.: Allied Hospital 1 and 2, Faisalabad, Pakistan, using a retrospective observational analysis. After taking ethical permission from the ERC Board of FMU, Faisalabad, under ERC No.48.ERC/FMU/2023- 24/429, data was collected in the time period of two months June-July, 2024. Data was collected from medical charts of patients admitted with chronic complications of diabetes in surgery, medical, and nephrology wards last year-2023. After reviewing the charts, the estimated load of diabetic patients in Allied Hospital 1 was 1500 patients and in Allied hospital 2 was 700 patients. The sample size of 549 patients was estimated using a standard WHO calculator based on patient burden keeping confidence interval of 95%. STROBE guidelines

for cross sectional observational studies were used and checklist is submitted separately.

For medical charts, Record rooms were accessed with signed permits from MS of hospitals. All protocols were ensured. Then charts of 549 patients randomly evaluated based on inclusion criteria. In a separate room, a team of 4 members recorded information from these charts onto an Excel sheet. Direct Consent from patients cannot be taken as study is retrospective type.

The inclusion criterion defines a patient with an age greater than 18 years, diagnosed with diabetes (Hb A1c > 6.1 mg/dl), and admitted with a presenting complaint of diabetic complications in the respective wards of Allied hospital 1 and 2 from 1st January 2023 to 31st December 2023.

Confidentiality was ensured as no names, phone numbers or personal information were collected. The study recognized a wide range of variables, including demographic characteristics such as age, gender, geographical distribution, hospital stay, hypertension status, duration of diabetes, management of diabetes, compliance, clinical and pathological diagnoses related to diabetes and its complications, and mortality due to admitted complaint.

Before data analysis, efforts were made to address potential sources of bias, including selection bias as random sampling was utilized and confounding variables were ruled out by assuring the duration of diabetes was greater than the time period of first diabetic complication to ensure the accuracy and reliability of the findings. Then, using SPSS version 25, results were generated and cross-checked. The descriptive statistics were used to describe patient characteristics and inferential statistical methods such as regression analysis applied to assess associations between the variables in detail. Missing data was addressed appropriately by rejecting the charts containing the missing data. The investigators had access to the hospital databases, and data cleaning methods were used to ensure data quality and integrity. No data linkage across multiple databases was performed to maintain patient confidentiality, and adherence to ethical standards was ensured at each step.

This study's methodology was designed to provide a comprehensive epidemiology of diabetes complications at a tertiary care hospital Allied 1 and 2. The extracted information is significant in understanding diabetic patient load, prevalence of complications, compliance rates, managing strategies, co-morbidities, death rates, and ultimately the economic burden on the country due to uncontrolled sugar levels. This result will be helpful in analyzing hospital management of diabetes-related issues in Faisalabad and making healthcare policy and practice accordingly. By identifying trends and patterns in diabetes complications, healthcare providers can develop targeted interventions to improve patient outcomes and reduce the burden of diabetes on the healthcare system.

3. Results

According to admission record of year 2023, annual load of patients with chronic diabetic complications was 2112 (68.18% at Allied-1; 31.81% at Allied-2). Among them, data of 549 patients was collected including: 101(18.4%) from Surgery wards, 272(49.5%) from Medicine wards and 176(32.1%) from Nephrology wards.

Male-to-female ratio is around 1:1. The patients' ages ranged from 21 to 90 years old, with a median age of 56.52 years ± 12.085. They were classified into four categories: 36 (6.6%) Young adults aged 20-39 years, 260 (47.4%) Adults aged 40-59 years, 171 (31.1%) Older adult aged 60-69 years, and 82(14.9%) Elderly above 70 years. Majority 443(80.7%) were residents of urban areas while rest 106(19.3%) were referred from rural areas. And 71(12.9%) patients died primarily due to diabetic complications during hospital stay. Out of which 52(73.24%) deaths were in medicine ward, 10(14.08%) patients died in surgery ward and 9(12.68%) patients died in Nephrology ward. The average length of hospital stay was 3.34 days, reflecting the burden of diabetes on hospital resources. Hypertension status was also recorded to determine its association with diabetic complications; 417 (76%) patients were positive for HTN. 402 out of 549 charts have mentioned duration of diabetes (M=7.5 years, SD= 7.8) which is important risk factor of chronic complications, as evident from Figure 1.

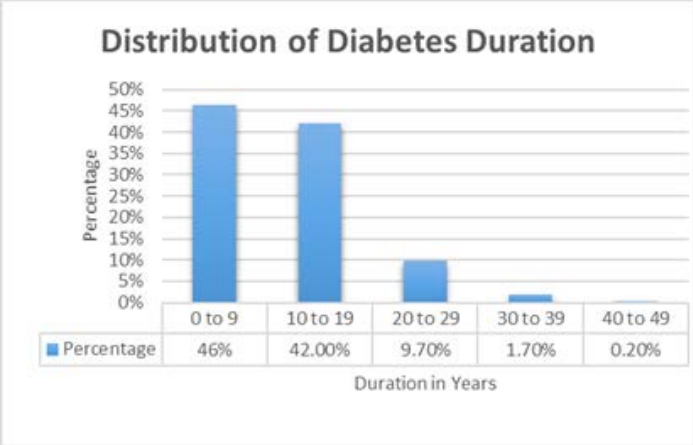

Figure 1: Duration of Diabetes (Percentage)

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Majority 314 (57.2%) showed non- adherence in managing diabetes, 149 (27.1%) were on insulin, 73 (13.3%) were taking oral hypoglycemics and 13 (2.4%) patients were taking both. The primary objective of this study is to comprehend the epidemiology of chronic diabetic complications in Faisalabad. The frequencies and percentages presented are based on counting each complication separately for each patient, regardless of whether they have multiple complications, as represented in Figure 2.

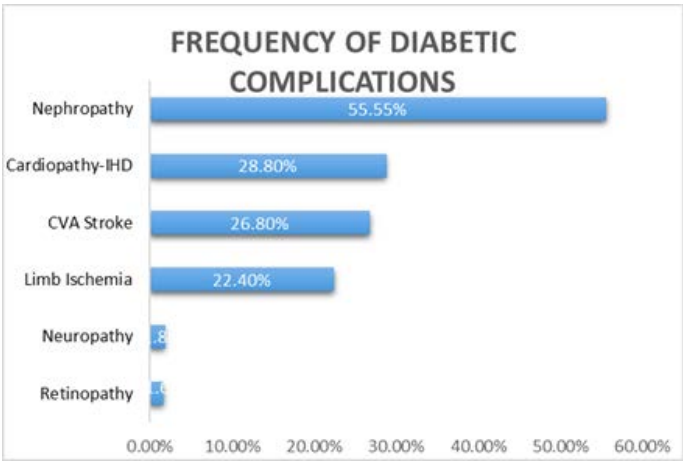

Figure 2: Frequency of Chronic Complication of Diabetes

As a patient had suffered from more than one complication, ward-based distribution helped in tracking active complaint, the primary cause of hospital admission. In nephrology wards, patients were diagnosed with chronic kidney disease (CKD), acute on CKD or end stage renal failure (ESRF). Similarly, in medicine wards, diagnosed complications include: CVA including ischemic and hemorrhagic stroke, ischemic heart disease (IHD) or cardiopathy. In surgery wards, most common presenting complaint was peripheral vascular disease (PAD) including limb ischemia, diabetic foot and carbuncle. Relationship of chronic complications of Diabetes with its associating factors and with other complications is determined by Chi-square and p-value is summarized in Table 1. P-value less than 0.005 is considered significant and their strength of association is determined by applying regression analysis their values are given in Table 2.

Risk factors	Nephropathy	CVA- stroke	Cardiopathy-IHD	Limb ischemia
Gender	0.731	0.226	0.039	0.006
age(years)	0.151	0.017	0.087	0.195
HTN	< 0.001	0.002	0.228	< 0.001
Management	0.003	0.037	0.617	0.005
Duration (years)	< 0.001	0.001	0.067	0.563
Nephropathy	-	< 0.001	0.518	< 0.001
CVA- stroke	< 0.001	-	0.008	< 0.001
Cardiopathy	0.518	0.008	-	0.829
Limb ischemia	< 0.001	< 0.001	0.829	-
Retinopathy	0.042	0.086	0.756	0.428
Neuropathy	0.004	0.284	0.625	0.854

Table 1: Demographic Details of Patients

	PARAMETERS		Adjusted OR	95% CI	p value
	HTN	yes	1.279	0.660 - 2.478	<0.001
	Management	insulin	1.098	0.588 - 2.052	0.415
NEPHROPATHY	both		0.948	0.153 - 5.877	0.660
	Duration	0-9	reference	reference	reference
		10-19	2.059	1.344 - 3.153	0.032
		20-29	6.395	2.558 - 15.990	<0.001
		30-39	1.550	0.338 - 7.120	0.975

STROKE	HTN	yes	2.339	0.928- 5.894	0.002
	Management	insulin	0.659	0.302 - 1.438	0.036
	oral	hypoglycemics	1.751	0.642 - 4.775	0.070
	both		0.801	0.070 - 9.222	0.156
CARDIOPATHY IHD	Gender	male	reference	reference	reference
		female	1.544	1.050 - 2.269	0.039
LIMB ISCHEMIA	Gender	male	reference	reference	reference
		female	0.431	0.215 - 0.866	0.006
	HTN	yes	2.339	0.928- 5.894	<0.001
	Management	insulin	1.567	0.302 - 1.438	0.128
		oral hypoglycemics	1.672	0.639- 4.379	0.009
	both		0.769	0.098- 6.028	0.464

Table 2: Adjusted odds ratio showing strength of association between parameter and complication of diabetes.

3.1. Nephropathy

Nephropathy, the most prevalent complication, was present in 305 out of 549 patients. Frequency and percentages of all variables i.e.: Gender, Age, Address, HTN, Management of Diabetes, Concomitant Complication are displayed in Table-1. Chi-square test was applied to assess the association of parameters with nephropathy (p-value< 0.05 significant). Results showed HTN (p<0.001), Management of diabetes (p=0.003), Duration of Diabetes (p< 0.001), CVA-stroke (p< 0.001), Limb ischemia (p< 0.001), Retinopathy (p=0.042) and Neuropathy (p= 0.004) had significant association with Nephropathy, presented in Table-2. The strength of association was determined using regression analysis plotted in Table-3. Duration of diabetes of 20-29 years was found to be a potential risk factor for nephropathy (adjusted OR= 6.395, 95% CI= 2.558 - 15.990, p- value <0.001)

3.2. Cardiopathy-IHD

It is second most common complication of diabetes. Frequency and percentage distribution of all variables w.r.t IHD is summarized in Table-1. Using Chi-square test, Gender (p = 0.039), and CVA- stroke (p= 0.008) found to have significant association with Cardiopathy- IHD, presented in Table-2. Logistic regression was applied on these variables to explore the strength of association, presented in Table 3. Female gender was found to be a significant risk factor for Cardiopathy- IHD (adjusted OR= 1.544, 95% CI= 1.050 - 2.269, p- value = 0.039).

3.3. Cerebrovascular Accident (CVA)

Third most common complication is CVA. Their demographics, risk factors and comorbidities in terms of frequency and percentage is shown in Table 3.

Parameters		Nephropathy N (%)	CVA/Stroke N (%)	Cardiopathy-IHD N (%)	Limb ischemia N (%)
Total 549 patients	Frequency	305 (55.55%)	134(24.41%)	147 (26.78%)	123 (22.40%)
Gender	Male	157 (51.48%)	62(42.26%)	64(43.53%)	76(61.7%)
	Female	148 (48.52%)	72(53.73%)	83(56.46%)	47(38.21%)
Age (years)	20-39	22 (7.21%)	3(2.23%)	6(4.08%)	12(9.75%)
	40-59	153(50.16%)	58(43.28%)	64(43.53%)	63(51.21%)
	60-69	93(30.49%)	45(33.58%)	47(31.97%)	32(26.01%)
	more than 70	37 (12.13%)	28(20.89%)	30(20.40%)	16(13.0%)
Address	urban	241(78.87%)	107(79.85%)	123(83.67%)	97(78.86%)
	rural	64 (20.98%)	27(20.14%)	24(16.32%)	26(21.13%)
HTN	no	53 (17.38%)	19(14.17%)	30(20.40%)	66(53.65%)
	yes	252 (82.61%)	115(85.82%)	117(79.59%)	57(46.34%)
Management	nothing	184 (60.33%)	82(61.19%)	80(54.42%)	54(43.90%)
Of Diabetes	insulin	87 (28.52%)	27(20.14%)	39(26.53%)	40(32.52%)
	oral hypoglycemics	26 (8.52%)	24(17.91%)	24(16.32%)	25(20.32%)
	both	8 (2.62%)	1(0.74%)	4(2.72%)	4(3.25%)
Concomitant	nephropathy	-	21(15.67%)	85(57.82%)	18(14.63%)
Complication	stroke	21(6.88%)	-	24(16.32%)	1(0.81%)
	cardiopathy	85(27.86%)	24(17.91%)	-	32(26.01%)

	Limb ischemia	18(5.90%)	1(0.74%)	32(21.76%)	-
	retinopathy	8(2.62%)	0	2(1.36%)	3(2.43%)
	neuropathy	10(3.27%)	1(0.74%)	2(1.36%)	2(1.62%)

Table 3: Demographic Details of Patients

Results showed Age (p= 0.017), HTN (p=0.002), Management of diabetes (p= 0.037), Duration of Diabetes (p= 0.001), Nephropathy (p< 0.001), Cardiopathy (p= 0.008) and Limb ischemia (p< 0.001) had significant association with CVA, using Chi square, mentioned in Table 2. Logistic regression was applied to explore the strength of association. Table-3 shows adjusted odds ratio with upper and lower limit of 95% confidence interval and p-value.

3.4. Limb Ischemia

123/549 presented in surgical floors with Limb ischemia, their demographics and other variables are summarized in Table-1. The association with hypertension and other diabetic complications is shown in Table-2. Gender (p = 0.006), HTN (p < 0.001), Management of diabetes (p = 0.005), Nephropathy (p< 0.001) and CVA- stroke (p< 0.001) had significant association with Limb ischemia, using Chi square test.

This implies that male gender, hypertension and ill management of diabetes increases the chances of Limb ischemia. Patients with Limb ischemia had significant load of hospital stay, higher risk of CVA- stroke, and nephropathy.

Results of Logistic regression on these variables are summarized in Table 3. Female has half the risk of Limb ischemia as compared to males (adjusted OR= 0.431, 95% CI= 0.215 - 0.866, p- value = 0.006).

3.5. Retinopathy and Neuropathy

Retinopathy and neuropathy, with very low frequency, were present as co-morbid complications in patients admitted in Medicine, Surgery and Nephrology wards. Management of diabetes (p = 0.055), Nephropathy (p = 0.042) and Neuropathy (p< 0.001) had significant association with Retinopathy. While Age (p = 0.056) and Nephropathy (p = 0.004) had significant association with Neuropathy. This implies that patients with nephropathy had high chances of co morbid conditions including retinopathy and neuropathy in uncontrolled diabetes.

4. Discussion

Allied Hospital 1 and 2 are two leading government hospitals associated with Faisalabad Medical University in Faisalabad, Pakistan. In a single year (2023), patient admission due to chronic diabetic complications in both hospitals was more than 2000, as per the record register. Such massive case numbers reflect poor diabetic prevention and prophylactic measures in this city. In Pakistan, mostly diabetes type 2 is diagnosed after admission to a tertiary care hospital due to the development of a life- threatening chronic complication. Based on a sample of 549 patients, 305 (55.6%) patients had developed nephropathy in their life span, 147 (28.8%) patients were having ischemic heart disease (IHD), 134 (26.8%) had stroke, 123 (22.4%) patients had limb ischemia, 10 (1.8%) patients were having neuropathy, and 9 (1.6%) patients were suffering from retinopathy. Nephropathy has the highest frequency among all complications, similar to a study by Anjali D. Deshpande [15]. Type 2 diabetes reduces life expectancy, but there are opportunities to translate early prevention strategies into long-term survival benefits through better risk factor modification [16]. Many of these patients were still dying as a result of fatal complications caused by poor noncompliance. Diabetes type 2 caused nearly 1.5 million deaths worldwide in 2019 [17]. In this study, 71 patients (12.9%) died of diabetic complications.

4.1. Nephropathy

Duration of diabetes is important in the development of nephropathy, as evident by Inassi J et al. [18]. This study showed the incidence of diabetic nephropathy is six times high during 20-29 years of diabetes duration. In contrast to an Ethiopian study where the duration of diabetes >10 years is protective for diabetic nephropathy [19]. It is prevalent in the 40–59 age group. The underlying mechanism of diabetic nephropathy is unclear. Several risk variables are implicated, some of which may be modified and others not. One of the main modifiable risk factors for the development of diabetic nephropathy is diabetes management. Oral hypoglycemic role is proved effective over insulin therapy, in consistent with a study by Triozzi JL et al. [20]. However, blood pressure with diabetes increases the developmental risk of diabetic nephropathy. This study explored 82% of patients with hypertension with nephropathy, with other studies showing as high as 70% [21,22]. Patients with nephropathy had high chances of developing comorbid conditions, including retinopathy and neuropathy in uncontrolled diabetes, in corresponding to a study by Kalarni et al., in which these three complications clearly share the same pathophysiology and chance of occurrence in concurrence [23].

4.2. Cardiopathy-IHD

In individuals with type 2 diabetes, Cardiopathy (IHD) and stroke account for up to 73.24% of all fatalities; this is comparable to a research that found heart disease and stroke are the leading complication of mortality for two-thirds of diabetics [15].

Duration of diabetes type 2 is significant in defining the occurrence of cardiac complications. A Chinese population-based cohort study found that patients with early-onset diabetes (<60 years) are more likely to develop cardiac complications than those with late-onset diabetes (≥60 years). Consistent with this study, cardiopathy is highest among the age group of 40–60 years with early diabetes onset. Paola Ballotari in his Italian study extracted that females are more prone to diabetes- related cardiopathies as in this study [24].

4.3. Stroke

Stroke with IHD is the most frequent cause of mortality among diabetics. Hypertension, a recognised risk factor for stroke, is found in more than 85% of patients. Furthermore, the United Kingdom Prospective Diabetes Study (UKPDS) found that males with T2DM had a 1.63 times higher stroke incidence than female patients [25]. In contrast, this study discovered that male gender protects against stroke in diabetes type 2. This finding was backed by several other studies, including the Renfrew/Paisley Study in Scotland and a meta-analysis of 64 cohorts [26,27]. Diabetes type 2 increases the risk of ischaemic stroke in all age groups, but is especially prevalent in African individuals under 55 years old. According to data from the Greater Cincinnati/Northern Kentucky stroke study, diabetes type 2 increases the risk of ischaemic stroke in all age groups, but especially in African Americans under 55 and Whites under 65 [28]. Our study found a high risk in Pakistanis under 60 years old, in parallel to above study.

4.4. Limb Ischaemia

Males outnumbered females on the surgical floor for amputation in this study. Consistent with a meta- analysis indicating about one-half increased amputation risk in men than women with diabetic foot [29]. Muhammad Imran Hassan Khan in his study at a tertiary care hospital mentioned the prevalence of diabetic foot ulcers to be 57.3% in the age group 45-65; consistently, it was 51% in the age range of 40 to 59 years in this study. Sophia Rossboth, in her systemic review, concluded a positive association of HTN with diabetic foot [30,31]. This study found HTN as a potential risk factor with a 2x chance of limb ischemia. There was no role for insulin, while oral drugs have a positive association, consistent with a clinical study by Rakesh Sharma where insulin is a risk factor in limb ischaemia development [32].

The global rise in Diabetes Mellitus needs greater knowledge of hyperglycaemic conditions and their prevalent consequences, including stroke, hypertension, nephropathy, amputation, neuropathy, cardiovascular disease, and retinopathy. A balanced diet, physical activity, and healthy lifestyle are essential for long life. Fitness and nutritional measures are crucial to the treatment of type 2 diabetes patients, with the goal of improving glycaemic control and preventing micro and macrovascular problems. These measures should be simplified and attractive to patients, with weight-loss objectives within reasonable limits. Dietary fat intake should be set at high levels to maintain the diet's palatability. Physical training should be seen as a leisure activity rather than a constraint. Management plans should be multifactorial and avoid contradictory measures [33]. Therefore, in order to enhance the health and lifestyle of diabetic patients, this study was designed to examine the burden of complications with hospitalizations in city Faisalabad.

Our findings revealed that patients with poor glycaemic control, long-period diabetes, hypertension, and obesity were more likely to develop diabetic microvascular and macrovascular problems. In order to start the right therapy as soon as possible, we advise screening high-risk populations and stress the significance of early diabetes diagnosis and chronic complication identification.

5. Limitation

The use of retrospective observational design restricts the distinction and relations between management of diabetes, prevalence of complications, and the outcomes that could be investigated. It depends on existing medical records and therefore, it can be biased by the mere reliance on record-keeping strategies. The study makes mention towards the issues of incomplete such as the lack of BMI measurements or reporting of the patient's lifestyle factors like smoking, alcohol consumption, family history and the lack of copies of laboratory reports in patients' records which limits the full range assessment of health risks. Even though the study attempts to rectify this (through controlling some of the confounding like age, duration of diabetes and presence of hypertension), other factors like sociodemographic departments or availability to medical assistance may surely add to the background of the study but are not comprehend within the study aim. The mortality statistics have been included in the data, as well as the diabetes-related complications, however the causes of death and unrevealed incidents of acute decompensation provoking the termination of the patient's life have not been examined in conjunction with diabetes complications. As this was a cross-sectional observational study, no attention was given to the outcome or what happens to these complications over a period of time. The relatively high proportion of diabetic complications in the current sample may not be the case in individuals from other countries or some who have different lifestyle and diet. Acknowledging these limitations can enhance transparency in our research, inform future studies, and encourage improvements in data collection and analysis methodologies.

6. Conclusion

Our study sample reflects critical characteristics of the overall diabetes patient group hospitalised throughout the year. This study on the complications by chronic diabetes mellitus type II in diabetic patient of Faisalabad has revealed the prevalence of comorbidities in this order: Nephropathy conditions > cardiovascular conditions > Cerebrovascular> limb ischemic conditions > neuropathy conditions > Ocular conditions. The substantial linkages discovered in our studies add credibility to the argument that these findings may be applicable to all patients admitted with diabetic problems in our settings. Further research targeting larger population would be great for reaching more definitive conclusions. Each diabetic patient should be informed and well educated about the risk factors that may lead to development of the complications. The risk factors should be minimized in order to reduce the complications. Gender based awareness should also be promoted for vulnerable group to specific complications.

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