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Patients with type 2 diabetes have a greater chance of developing cardiovascular and renal disease a observation-based study

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***Abstract*---**Background: Despite years of study on risk methods, cardiovascular disease and kidney disease remain the top causes of death and morbidity in patients with Type-II diabetes. Methods: One hundred persons of both sexes participated in the study which took place from January to December of 2021 at the Mardan Medical Complex in Mardan, Pakistan. Participants' ages varied from 21 to 86 in this study A Observation-based research. All of the people there had type 2 diabetes. Participants provided a wealth of demographic information, including their ages, sexes, heights, weights, heart rates, blood sugar levels, amounts of saturated fat and sugar in their diets, whether or not they smoked, how often they exercised, what they ate, and if they suffered from any preexisting conditions. The rate of cardio-renal disease was calculated for everyone surveyed. Myocardial infarction, cardiac arrest, stroke, chronic kidney disease, all-cause mortality, and cardiovascular disease mortality were analysed.

Results: This study included 59 men and 41 females. The participants had a mean age of 57.128.557.129.01 and a mean BMI of 31.016.513.126.51. Overall, people's mean systolic and diastolic blood pressures were 128.48.01 and 80.515.31 mmHg. Of the individuals, 49 were chronic slackers when it came to physical activity, whereas 31 were regular smokers. Low blood pressure, obesity, and high cholesterol were the most prevalent co-morbidities. Significantly more people with diabetes also had CVD, such as the 65 (65%) who had CVD in their kidneys, the 56 (86%), who had heart problems, the 52 (80%) who had CVD in their hearts, the 40 (61.5% of people who had an ischemic stroke), the 41 (63% of people who had a myocardial infarction, and the 21 (32%) who had died. Conclusion: Results showed that type 2 diabetics had a higher risk of cardiovascular disease, which in turn raises the likelihood of renal failure, heart failure, myocardial infarction, and ischemic stroke. The mortality rate was particularly high among type 2 diabetics who also suffered from cardiovascular and renal complications.

***Keywords*---**T2DM, CVD, CKD, Deaths.

Introduction

Thousands of studies into risk-reduction measures have not prevented cardiovascular disease and kidney disease from being the primary causes of death and morbidity in patients with type II diabetes [1]. Ischemic stroke and myocardial infarction (MI) may get all the press, but other forms of CVD, such cardiac issues and circulatory illnesses, have an equally major effect on this population [2,3]. A combination of factors, including the ageing of the population, increases in obesity, and bad eating habits among both children and adults, have contributed to the current epidemic of diabetes.

The World Health Organization (WHO) estimates that 17,79 million people die each year from cardiovascular diseases (CVD), or around 48k people every day [4]. Comparatively, the number of fatalities attributed to coronavirus between January 22, 2020, and March 24, 2020, was 17.5k, or about 273 deaths per day, which was much lower than the number of deaths related to CVDs. No one knows the state of CVD in its body because of a lack of diagnostic facilities, despite the fact that it is a pandemic and may be transmitted from person to person.

As a result of urbanisation and economic development, diabetes is on the rise in developing countries. More people with diabetes are living longer because to better diagnosis and treatment of type 2 diabetes. Myocardial infarction, stroke, peripheral vascular disease, diabetic retinopathy, and amputations are all examples of the devastating effects of type 2 diabetes on the body (MI). People who seem to have a lower risk of mortality and morbidity for a short time period really have an increased risk throughout the rest of their life [5]. Because they account for both the risk of the underlying illness and competing risks (e.g., morbidity from several other illnesses) until old age, estimates of illness lifetime risk allow for a more complete evaluation of the overall consumption of a specific diagnosis

in the normal community, both now and in the future. Both the lifetime risks of developing cardiovascular renal disease [5, 6] and developing cardiovascular kidney disease [7] have been calculated. Additionally, the risk of cardiovascular renal disease throughout a lifetime was substantially reduced for those with fewer risk factors. Understanding the epidemiology of CVD, CVD and CVD co-occurrence, and their relative contributions to the overall disease burden may improve our ability to diagnose and treat Type 2 diabetes as it develops, as well as to identify and prevent potential complications. Here, we look for indicators of cardiovascular disease and other risk factors for sudden mortality in people with type 2 diabetes.

Material and Methods

Our study, an observational one conducted at the Mardan Medical Complex in Mardan, Pakistan, included a hundred patients. Participants provided a wealth of demographic information, including their ages, sexes, heights, weights, heart rates, blood sugar levels, amounts of saturated fat and sugar in their diets, whether or not they smoked, how often they exercised, what they ate, and if they suffered from any preexisting conditions. Type I diabetics under the age of 21 did not provide consent for this study.

Participants in our research ranged in age from 21 to 89 and all had no previous diagnosis of Type-II Diabetes. Possible risk factors for cardiovascular renal illness included angina pectoris, previous myocardial infarction, heart failure, and ischemic stroke. Those without any kind of cardiovascular renal disease were used as a comparison group, and those with just cardiovascular renal disease multimorbidity were also taken into account. The study's individuals have been separated into 6 groups based on their cardiovascular renal disease history: 1) cardiovascular renal disease-free, 2) heart disease, 3) kidney disease, 4) MI, 5) ischemic stroke, and 6) peripheral vascular disease. A significant percentage of renal cardiovascular events are predicted (MARCE). We defined significant cardiovascular events as myocardial infarction, MARCE refers to the overall rate of deaths and admissions due to cardiovascular disease, which increases the risk of cardiac failure, kidney problems, ischemic stroke, MI, and peripheral vascular disease (PVD). Every MARCE element has a unique set of severe complications. To undertake evaluation, we classified major CV complications as myocardial infarction, ischemic stroke, and cardiovascular death (MACE).

Results

This study included 59 men and 41 females. On average, each person was 57 years old, or 57.128557.129.01, and their body mass index was 31.016 or 131.01 or 6.51 kilogrammes per square metre. Systolic blood pressure was 128.48.01 mm Hg, and diastolic blood pressure was 80.55.31 mm Hg, on average, throughout the whole sample. Of the individuals, 49 were chronic slackers when it came to physical activity, whereas 31 were regular smokers. (Table 1)

Table 1: provides visual representations of the individuals' clinical and demographic information

Definition of Individual Variables	Results	Percentage
Average age (years)	57.12±9.01	
Average BMI (kg / m^2)	31.01±6.51	
Gender		
Male	59	59
Female	41	41
Average SBP (mmHg)	128.4±8.01	
Average DBP (mmHg)	80.5±5.31	
Cause		
Smoking	31	31
Lack of Exercise	49	49
Overweight	20	20

Hypotension, obesity, and high cholesterol were the three most prevalent illnesses. (Fig 1)
As of 2013, 65 people with T2DM and CVRD were recorded. (Fig 2)
Ischemic stroke affected 40 (61.5%) of the 65 patients with cardiovascular renal illness, and myocardial infarction affected 41 (63%). Heart failure affected 56 (86%), and cardiovascular renal disease affected 41 (63%).
Among those affected with CKD, 52 (80%) have died.

Table 2 : Heart and kidney disease are linked to other illnesses and mortality

Theory	Results (n=65)	Percent
Myocardial Infarction		
Positive	41	63
Negative	24	37
Heart Failure		
Positive	56	86
Negative	9	14
Ischemia Stroke		
Positive	40	61.5
Negative	25	38.5
Cardiovascular Kidney Disease		
Positive	52	80
Negative	13	20
Deaths		
Positive	21	32
Negative	44	68

Discussion

Patients with type 2 diabetes should focus on preventing both macro- and micro-vascular complications [8]. To reduce the risk of contracting a severe coronavirus disease in 2019 and the predicted global effect of illness, an increasing number of

individuals continue to advocate for the treatment of non-communicable diseases and diverse multi-morbidity both before and after the epidemic. After assessing the short-term risk of a practise, a period of 10 years is often used in both medical and community health initiatives. Short-term results may exaggerate the total disease burden since the majority of persons with T2D and history of CVRD suffer more MARCE. Individuals and healthcare institutions might both benefit financially from more efficient use of secondary prevention [9]. Individuals with type II diabetes have a higher chance of developing cardiovascular and renal problems (which is currently predicted to have a decreased risk [10,11]). Teachers, doctors, and policymakers need to be aware of this.

One hundred type 2 diabetes patients, aged 21 to 89, were reported in this study. Sixty-nine percent of our study participants were male and forty-one percent were female. Patients had a mean age of 57.128.557.129.01 and a mean body mass index of 31.016.51 kg/m2. Patient averages for systolic blood pressure were 128.48.01 and diastolic blood pressure was 80.55.31 mmHg. The results we obtained were consistent with those of other studies [12,13]. Ninety-four (94%) of the patients lacked regular exercise, whereas 31% of the cases were heavy smokers [14]. Hypotension, obesity, and high cholesterol were the three most common co-morbidities. Sixty-five percent of individuals with T2DM also had cardiovascular renal illness. Rates of myocardial infarction (MI) were 63%, heart failure (HF) was 86%, and ischemic stroke (IS) was 40% among 65 patients diagnosed with cardiovascular renal illness.

(61.5%), CKD due to cardiovascular disease (52) (80%), and 21 fatalities (32%). Uncontrolled diabetes increases the risk of renal disease, heart failure, and cardiovascular disease by 50% in patients with type II diabetes. Although comorbidities have been the primary focus of research and treatment for type II diabetes mellitus, less attention has been paid to how co-morbidity gradually arises over time [15], whenever the benefits of fundamental treatment are significantly greater for healthcare systems and medical institutions. Many studies and discussions in medicine on comorbidities have concentrated on a broad range of ailments and diseases rather than narrower categories. Various studies have focused on cardiovascular disease (CVD). Information on a particular illness, like CVRD, is more likely to be uncovered by conventional statistical methods (like regression analysis) and cutting-edge analytics (like clustering). [16].

Although randomised controlled trials have failed to show a significant relationship between strict type 2 diabetes and cardiovascular renal disease outcomes like renal failure [17], there is no doubt that recent advances in therapies have had an important impact on the population of patients with type II diabetes. While diabetes drugs have been found to reduce blood sugar levels, their safety profiles and mechanisms of action for cardiovascular health may be more important. When compared to metformin or newer hypoglycemic medicines, the use of sulfonylureas and thiazolidinediones is linked with a higher risk of developing heart failure (HF) [18]. Major cardiovascular renal disease problems seem to be more common in those who have a family history of CVRD. Patients may reduce their risk of developing type II diabetes (T2D) by being educated about the disease and its complications, by receiving multidisciplinary treatment, by

engaging in even the most fundamental preventative measures, and by making better use of already-approved medications [19].

Conclusion

Cardiovascular disease (CVD), including myocardial infarction (MI), sudden cardiac death (SCD), ischemic strokes (IA), and renal failure (RF), seems to represent a lifelong risk in persons with Type- II diabetes, as was demonstrated in our research. Patients with type 2 diabetes mellitus (T2dm) and cardiovascular renal disease (CVRD) had an alarmingly high mortality rate.

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