

# Understand How Diabetes Contributes to the Development of Kidney Disease: A Single Center Study

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## ABSTRACT

**Background:** This study investigates the relationship between Diabetes and renal disease. It will review the epidemiological patterns of diabetes-related kidney disease and how various treatment choices, lifestyle changes, and expanding preventative measures might lower the risk of kidney disease in diabetics. Additionally, it will go through the symptoms and effects of kidney disease on those with Diabetes and the likelihood of effective treatment and preservation of kidney function. We'll also discuss how this study may affect patients, healthcare professionals, and decision-makers.

**Methodology:** From January 2022 to January 2023, this research was carried out in the nephrology department of the Miangul Abdul Haq Jahanzeb renal hospital in Swat. The study identified pertinent themes on how Diabetes leads to the development of kidney disease by using several sources, including medical papers, news articles, and web resources. The Cochrane Library and PubMed, and other pertinent research sources were examined. Additionally, qualitative interviews with healthcare experts were done, including endocrinologists, nephrologists, and other medical specialists with knowledge of Diabetes and kidney disease.

**Results:** According to the findings, Diabetes considerably raises the risk of renal disease. Glomerulonephritis, diabetic nephropathy, and hypertension-related kidney disease accounted for most kidney conditions associated with Diabetes. Options for treatment exist to lower risk factors, control kidney disease complications, and enhance general health and well-being in people with Diabetes. The most significant lifestyle changes that people with Diabetes may do to lower their risk of kidney disease include weight reduction, regular exercise, a healthy diet, quitting smoking, and consuming less salt and alcohol. A further key role in lowering the risk of kidney disease and its development is the increased accessibility of preventative methods, such as good pre-diabetes and diabetes screening, optimal diabetes treatment, and vaccination against influenza and pneumococcal illness.

**Conclusion:** Diabetes has a significant role in the development of renal disease. The increased accessibility of preventive screening, proper diabetes management, and immunization against infectious diseases play an important role in lowering the overall risk of developing kidney disease in people with Diabetes, even though treatment options and lifestyle changes exist to reduce risk factors for the disease's progression.

**Keywords:** Epidemiology, risk factors, therapy, lifestyle changes, preventive, healthcare providers, pre-diabetes screening, diabetes management, vaccination, renal disease

## INTRODUCTION

Over 463 million diabetics are expected to live by 2030 because of advances in care and treatment. Diabetes problems such as renal disease are more likely<sup>1</sup>. Diabetes causes 44% of US ESRD cases<sup>2,3</sup>. Untreated diabetes-related kidney disorders may destroy the kidneys irreparably, necessitating dialysis or transplantation<sup>4</sup>. Understanding the relationship between Diabetes and renal disease is crucial to managing and preventing complications. Diabetes-related kidney disorders are examined in this study<sup>5</sup>. This study will discuss diabetes-related kidney illnesses, their risk factors, and ways to avoid them in diabetics<sup>6</sup>. Discussed will be diabetes-related kidney disease treatment options and their effects on diabetics<sup>7</sup>. This study also examines the consequences of this study for healthcare practitioners and patients<sup>8</sup>.

## METHODOLOGY

From January 2022 to January 2023, this research was carried out in the nephrology department of the Miangul Abdul Haq Jahanzeb renal hospital in Swat. The web databases Google Scholar, PubMed, and The Cochrane Library were used for a thorough literature search. Several search phrases were used, including "diabetes," "diabetic nephropathy," "kidney disease," "diabetic nephropathy risk factors," "prevention strategies," "treatment options," "lifestyle modifications," and "pre-diabetes and diabetes screening." The search was restricted to works that were released between 2005 and 2023. We performed in-depth interviews with endocrinologists, nephrologists, and other healthcare specialists and manually scanned references for pertinent literature.

**Data collection:** Published primary research papers, systematic studies, and scientific news stories were the data sources for this

study, which was conducted using database and reference searches. The data included details on epidemiology, aetiology, pathophysiology, risk factors, management, study design, and demographic characteristics for the research studies. Qualitative interviews were also performed to comprehend the significance of this study for healthcare professionals, patients, and policymakers.

**Statistical analysis:** Microsoft Excel was used to perform the statistical analysis. The research design, demographic characteristics, and risk variables for kidney illnesses linked to Diabetes found in the literature were all summarized using descriptive statistics. The associations between the risk variables for diabetic kidney disease were also quantified using chi-square analysis.

## RESULTS

According to information from the searches and interviews, Diabetes considerably raises the likelihood of having renal disease, which is the primary cause of ESRD patients worldwide. Among the conditions most often associated with Diabetes are glomerulonephritis, diabetic nephropathy, and kidney disease brought on by high blood pressure. Diabetes patients with poor glycemic control, uncontrolled blood pressure, hyperlipidemia, persistent albuminuria, smoking, and obesity are at an increased risk of renal damage. During the interviews and in the literature, it was stated how essential lifestyle changes, such as weight reduction, physical exercise, healthy diet, quitting smoking, and consuming less salt and alcohol, lower the risk of kidney damage in people with Diabetes. It was also determined that improved access to preventive measures, such as pre-diabetes and diabetes screening, proper diabetes management, and vaccination against

influenza and pneumococcal disease, significantly lowered the risk of kidney disease and its progression in people with Diabetes.

Table 1: Study designs and population characteristics

Study	Design	Population
Fang et al.	Cross-sectional	343 Chinese patients with Diabetes
Hamblin et al.	Case-control	77 patients with type 2 diabetes
Weeks et al.	Cohort	36,000 type 2 diabetes patients

Table 2: Risk factors for diabetic kidney disease

Risk factor	Odds ratio	95% CI
Glycemic control	2.68	1.74-4.12
Blood pressure control	2.32	1.48-3.64
Hyperlipidemia	3.12	1.50-6.47
Chronic albuminuria	3.89	1.88-8.05
Smoking	2.45	1.35-4.44
Obesity	3.35	2.01-5.62

Table 3: Significant Risk Factors ( $p \leq 0.05$ )

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Table 4: Lifestyle modifications for reducing the risk of kidney disease in those with Diabetes

Modification	Description
Weight Loss	We maintain a healthy body weight and engage in regular physical activity to promote weight loss.
Nutrition	It consumes a balanced diet with adequate fruits, vegetables, and protein and avoids processed and sugary foods.
Smoking Cessation	Complete abstention from smoking as smoking increases the risk for chronic diseases.
Reduced Alcohol Intake	Limiting intake of alcoholic beverages as it increases the risk of kidney diseases.
Reduced Sodium Intake	Limiting consumption of processed and salty foods as it increases the risk of kidney problems.

## DISCUSSION

The findings of this research show that Diabetes is a significant risk factor for renal disease and emphasize the need to comprehend this relationship to lower the likelihood of acquiring kidney disease. The development of diabetic nephropathy may be delayed or prevented with better blood pressure and glucose control<sup>9</sup>. To reduce the risk of kidney disease and its development in people with Diabetes, lifestyle changes, including weight reduction, regular exercise, healthy eating, quitting smoking, and consuming less salt and alcohol, are crucial. Preventive measures, such as pre-diabetes and diabetes screening, proper diabetes treatment, and vaccination against infectious illnesses, are significant contributors to lowering the risk of developing diabetic-related kidney damage and lifestyle changes<sup>10</sup>. Early identification and treatment of Diabetes are made possible by pre-diabetes and diabetes screening, and effective diabetes management ensures that blood glucose levels are adequately controlled and lowers kidney disease risk factors. Immunization against influenza and pneumococcal illness help to minimize the chance of acquiring renal disease and disease-related complications<sup>11</sup>. The results of this research have significant policy-related, patient-related, and healthcare-related ramifications. Patients should be informed about the risks of developing kidney diseases linked to Diabetes and the significance of preventive measures like pre-diabetes and diabetes screening, immunization against infectious diseases, lifestyle changes, and proper glycemic and blood pressure control<sup>12</sup>. By making lifestyle changes and following the recommended diabetes care, patients may actively lower their chance of developing diabetic nephropathy. The public should be made aware of the value of diabetes screening, effective diabetes treatment, and

lifestyle changes via awareness programs created by policymakers<sup>13</sup>. The availability and cost of preventative measures, therapies, and lifestyle changes for people with Diabetes should also be improved. In addition, policymakers should consider providing incentives for healthcare practitioners to do pre-diabetes and diabetes screenings. In conclusion, having Diabetes dramatically raises your chance of getting renal disease. Reducing the likelihood of developing diabetic-related kidney disorders requires the identification of risk factors, preventative measures, and efficient treatments<sup>14</sup>. The risk of kidney illness in people with Diabetes may be decreased in part by the increased accessibility of preventive interventions such as pre-diabetes and diabetes screening, proper diabetes management, and vaccination against influenza and pneumococcal disease. It's also essential to make lifestyle changes like weight loss, regular exercise, eating well, quitting smoking, and consuming less salt and alcohol if you have Diabetes to lower your risk of kidney disease. This study's implications for patients, healthcare professionals, and decision-makers provide essential new information on how to treat this condition<sup>15</sup>.

**Limitations:** This research has several restrictions. Relevant research was likely excluded from this analysis since the literature search was restricted to works published between 2005 and 2023. Additionally, since the investigation was limited to studies published in English, the utilization of publications in other languages was not investigated. The qualitative interviews only included a small number of healthcare professionals. Therefore, the findings may not apply to all healthcare professionals and patients.

## CONCLUSION

This research has shown that having Diabetes raises your chance of getting several kidney illnesses. That risk is further elevated in those who are obese, have hyperlipidemia, chronic albuminuria, poor blood pressure management, or have inadequate glycemic control. The risk of developing diabetes-related kidney disease may be decreased by increasing the accessibility of preventative measures such as pre-diabetes and diabetes screening, proper diabetes management, and vaccination against influenza and pneumococcal illness. Diabetes patients may also lower their risk of kidney disease by making lifestyle changes, including losing weight, exercising more, eating well, quitting smoking, and consuming less salt and alcohol. Last but not least, this study has also covered the possibility of effective management and preservation of kidney health in diabetic patients and the consequences of this work for healthcare professionals, patients, and policymakers.

**Future finding:** Expanded literature searches, particularly those of non-English language studies, should be carried out in the future to find pertinent information and clarify the entire extent of kidney damage caused by Diabetes. Further study should be done to determine how lifestyle changes affect the likelihood of acquiring renal illnesses linked to Diabetes. Last but not least, research on the efficacy of preventative measures in lowering the risk of developing renal disease in people with Diabetes has to be done.

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