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Diabetes and Kidney Failure among Older Adults in India

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Abstract

Diabetes is a severe disease. It happens when the body cannot generate the needed amount of insulin and when the body does not utilize the insulin it produces. Thus, the study sought to examine whether diabetes impacts kidney failure among older adults in India. The study adopted the experimental research design. The data was collected from the doctors and nurses in Halasuru Referral Hospital. The study used the purposive sampling technique and collected the data. Notably, the researcher was able to get a sample size of 168 respondents. The collection of the data was done using questionnaires. The analysis of the data was done using descriptive and inferential statistics. It was found that when someone has diabetes, the blood glucose or blood sugar levels are too high. Over time, this can damage the kidneys. Kidney damage from diabetes is called diabetic nephropathy. Poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. The study concluded that diabetes is positively and significantly related to kidney failure. High blood glucose levels, known as hyperglycemia, affect many central organ systems, particularly the kidney. The study recommended that high blood sugar be regulated to prevent damaging other body parts like the kidney. The elderly should be given tender care and ensure they eat foods with a low possibility if none that can lead to high blood sugar. People with diabetes should get regular screenings for kidney disease. Tests should be conducted regularly to examine how well the kidneys work. Effective communication between healthcare providers and people with diabetes is essential.

Keywords: *Diabetes, Kidney Failure, Older Adults, India*

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1.0 Introduction

Diabetes is a severe disease (Sharma, Lee & McFarlane, 2020). It happens when the body is not able to generate the needed amount of Insulin and when the body does not utilize the Insulin which it produces. Kidney damage from diabetes is called diabetic nephropathy. Poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood (Jawad & AL-Fatlawi, 2022). The role of Insulin is to regulate the levels of sugar (known as glucose) in the blood. When blood sugar is high, it causes problems in most body organs (Tang, Chang, Chen & Liu, 2020). Over time, this can damage the kidneys. Diabetes is positively and significantly related to kidney failure. High blood glucose levels, known as hyperglycemia, affect many central organ systems, particularly the kidney. The primary kidneys' job is to filter the accumulated waste products from the typical cell failures throughout the body and the food eaten and the high concentration of fluids from the blood and excrete them through urine (Kurts, Ginhoux & Panzer, 2020). High blood glucose levels, known as hyperglycemia, affect many central organ systems, particularly the kidney. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin.

Diabetes and its dangerous conditions lower life expectancy and negatively influence the way of life among those diagnosed with it, causing many problems in other societal areas (Ajmera & Jain, 2019). As anticipated by WHO, the rise in the prevalence of diabetes from 190 million in 2010 to 500 million by 2035 indicates that there are high chances of overwhelming the economy and healthcare system worldwide. Jawad and AL-Fatlawi (2022) noted two types of diabetes. In type one diabetes, the prevalence usually rises from the beginning of the disease (7% after 0–4 years), reaching about 55% after 25 years. In type two diabetes, the prevalence is 25–30% in the newly affected and those diagnosed with the disease. About 45% of patients suffering from type one and 25 to 50% of patients who have type two diabetes in the future usually develops diabetic nephropathy, even though the reason why not all people with diabetes develop this condition is not apparent (Chan, Lim, Wareham, Shaw, Orchard, Zhang & Gregg, (2020). In all these two types of diabetes, chronic hyperglycemia is the leading cause of diabetes.

If this disease is not treated correctly, the sugar level in the blood rises (Wu, Hu, Chen, Shi, Fetahu, Wu & Shi, 2018). This condition is known as hyperglycemia. When the blood sugar is high, it might cause damage to most body organs, particularly the kidneys, eyes, heart, feet, blood vessels and nerves. Also, it may lead to high blood pressure and hardening of the arteries, which may cause heart and blood vessel disease (Saleh, Mariska, Parisa & Hidayat, 2019). Around two-thirds of patients have a high probability of developing chronic kidney disease. Some people can have a higher risk of getting kidney disease than others. The risk can be higher if the patient has 60 years or above, has high blood pressure, and has a close relative with kidney failure. Morton, McDonald, Salim, Liew, Shaw and Magliano (2021) revealed that poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. This can lead to kidney damage and cause high blood pressure. High blood pressure can cause further kidney damage by increasing the pressure in the delicate filtering system of the kidneys. High blood sugar be regulated to prevent damaging other body parts like the kidney. The elderly should be given

tender care and ensure they eat foods with a low possibility if none that can lead to high blood sugar.

Husain-Syed, Ricci, Brodie, Vincent, Ranieri, Slutsky and Ronco (2018) noted that the kidney is a highly complicated organ with a wide range of failures in the body; consisting of waste excretion, balancing of both iron and water, regulating blood pressure, glucose homeostasis and generating of erythropoietin. When diagnosed with this disease, many of these essential failures are disrupted through a combination of hemodynamic and metabolic changes; hyperglycemia also brings in a sequence of changes resulting in glomerular and tubular disorder and increasing glomerular cell apoptosis. Various pathogenetic, hemodynamic and metabolic failures can cause diabetic kidney disease (Sharma, Lee & McFarlane, 2020). In the recent past, a significant breakthrough has been made in knowing the risk factors and pathogenetic failures in diabetic nephropathy. Additionally, a new perspective into the pathophysiology of these severe diseases has led to advanced preventive therapies, treatment possibilities and decreased progression to end-stage renal disease (Viazzi, Greco, Ceriello, Fioretto, Giorda & Guida, 2018).

Diabetic kidney disease is among the most critical conditions of diabetes mellitus (Charlton, Garzarella, Jandeleit-Dahm & Jha, 2020). It is the leading cause of end-stage renal disease in growing and established nations requiring renal replacement therapy. Since people with diabetes of long duration are increasing, reports of a sharply rising burden of diabetic nephropathy are being noted (Kristófi, Bodegard, Norhammar, Thuresson, Nathanson, Nyström & Eriksson, 2021). Internationally, the cases of diabetes are anticipated to increase between 2020 and 2040, with the highest prevalence increases in the Middle East, sub-Saharan Africa, and India (Morton, McDonald, Salim, Liew, Shaw & Magliano, 2021). This increasing risk and more rapid progression of diabetic nephropathy are also noted in immigrants from growing to established nations.

2.0 Literature Review

Albai, Frandes, Timar, Roman and Timar (2019) indicate that diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin. Diabetic kidney disease (DKD) is among the most prevalent and risky conditions of DM2, affecting around a quarter of the people with DM2. Additionally, the pancreas, adipocytes, liver, intestines and kidneys also play a crucial failure in glycemic regulation, primarily due to renal contribution to gluconeogenesis and tubular reabsorption of glucose. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin. The study is anchored on a report of discussions from an interdisciplinary team of professionals in the fields of endocrinology, diabetology and nephrology; a study on the association between diabetes and kidney disease is conducted, recognizing the care in the diagnosis, the challenges in attaining the glycemic maintenance and possible treatments which may be used as per the various levels of impairment. Glucose homeostasis is adjusted mainly in people with DKD, who are highly exposed to hyperglycemia and hypoglycemia. High and low glycemic conditions are related to high death rates and short life spans within these people.

Elements related to a high risk of hypoglycemia in DKD people include lower renal gluconeogenesis, unbalanced metabolic pathways and low insulin clearance. The low filtration of glucose and excretion and inflammation-induced insulin resistance are predisposing aspects to hyperglycemic episodes. Proper glycaemic management and regulation for people with diabetes is needed to prevent hypo-glycaemia and other glycaemic disharmony in people with DM2 and kidney disease. Knowing the renal physiology and pathophysiology of DKD has become important to all experts dealing with diabetic people. Dispersing these understanding and detailed proof is key to show the breakthrough study and to encourage good treatment of these groups of people.

Qin, Qian, Zhu, Fan, Niu and Gu (2019) reported high levels of blood glucose (hyperglycemia) usually affects different organ systems, particularly the kidney. It affects the renal process parameters. The levels of blood urea and serum creatinine are important components in determining the renal process. The research was performed to explore the effect of diabetes on renal process parameters such as blood urea and serum creatinine in the elderly male. The levels of blood glucose, blood urea and serum creatinine estimates were conducted in forty (40) diabetic blood samples. Blood glucose level in four groups ranging from 125-185 mg/dl, 185-250mg/dl, 250-380mg/dl and 380-450mg/dl were chosen whereby percentage in variation of urea and creatinine levels from their required range relating to blood glucose level was noted. 12 samples were noted in the first (125-185mg/dl) and the second (185-250 mg/dl) groups. In both groups concentration of urea did not indicate a substantial change from their normal range than creatinine. The third and fourth groups the highest hyperglycemic category (250 – 380mg /dl) and (380-450mg/dl), 8 samples were noted whereby the deviated samples of urea revealed 7.45 to 36.25% variation whereas creatinine indicated 79.48 to 99% variation from their normal range. In the largest hyperglycemic group also the concentration of urea did not indicate substantial change from their required range while the percentage of variation in creatinine concentration was noted relatively higher as contrasted to the other two groups. To conclude, diabetes affects the renal parameters such as urea and creatinine and creatinine indicated substantial variation from their required range than urea. Deviation in urea and creatinine level from their required range relating to high blood glucose level shows decrease in kidney failure in diabetic elderly male. The measure of urea and creatinine level enables diagnosing early of peoples with perennial challenges. It can give substantial prognostic advantages in terms of international diabetic nephropathy risk and management of the people.

Morton, McDonald, Salim, Liew, Shaw and Magliano (2021) revealed that poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. This can lead to kidney damage and cause high blood pressure. High blood pressure can cause further kidney damage by increasing the pressure in the delicate filtering system of the kidneys. The study recommended that effective communication between healthcare providers and people with diabetes is essential. High blood sugar be regulated to prevent damaging other body parts like the kidney. The elderly should be given tender care and ensure they eat foods with a low possibility if none that can lead to high blood sugar. People with diabetes should get regular screenings for kidney disease. Tests include a urine test to detect protein in your urine and a blood test to show how well your kidneys work. Diabetes is a severe disease. It happens when the body cannot generate the needed amount of insulin and when the body does not utilize the insulin it produces. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries.

The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin.

Perkovic, Baeres, Bakris, Bosch-Traberg, Idorn, Mahaffey and Pratley (2022) People with chronic kidney disease (CKD) and type two diabetes (T2D) are at higher risk of CKD progression and cardiovascular (CV) disease. The frequency of CKD in people with T2D is estimated to be about 45% and keeps on growing. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin. The raising number of elderly males with CKD and T2D will considerably have a substantial effect on the health resource usage and expenses of care for patients with T2D. Maintenance of CKD in people with T2D targets to keep kidney failure to decrease the risk of end-stage kidney disease, CV conditions, and deaths. Suggestions for the medication of people with CKD and T2D are given by multiple global and national institutions and suggest some lifestyle and pharmacological strategies to aid in preventing or delaying the progress of CKD in people with T2D. Regulations consist of regularly screening of elderly people with T2D for CKD by the use of spot urine albumin-to creatinine ratio (UACR) and evaluated glomerular filtration rate. In addition, examinations of vascular conditions, jointly with interventions made to enhance glycemic regulation and lipid levels, keep good physical body weight, and optimize blood pressure ought to be conducted. Treatment slowed the progress of CKD consisted of renin–angiotensin system inhibitors, sodium-glucose cotransporter-2 inhibitors, glucagon such as peptide 1 receptor agonists, and, more presently, selective, non-steroidal mineralocorticoid receptor antagonists. The study indicates the current issues encountered by the primary care givers in the regulation of CKD in people with T2D consisting of the consideration of comorbidities, utilization of new medications options, and execution of personal care. Attaining consensus for optimum medication of this disease is important in giving consistent and proper care for all elderly male patients. Techniques to enhance findings ought to additionally consist of the usage of clear recommendations strategy, usage of a multi-disciplinary strategy, and patient education.

Viazzi, Greco, Ceriello, Fioretto, Giorda and Guida (2018) indicated that diabetes is a serious disease. It happens when the body is not able to generate the needed amount of insulin and when the body does not utilize the insulin which it produces. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin. There are two types of diabetes and in all these two types of diabetes, chronic hyperglycemia is the main cause of diabetes. Kidney is a highly complicated organ with wide range of failures in the body; consisting of, waste excretion, balancing of both iron and water, regulating blood pressure, glucose homeostasis and generating of erythropoietin. When the blood sugar is high it might cause damage to most body organs, particularly the kidneys, eyes, heart, feet, blood vessels and nerves. Over time, poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. This can lead to kidney damage and cause high blood pressure. High blood pressure can cause further kidney damage by increasing the pressure in the delicate filtering system of the kidneys. The study recommended that high blood sugar be regulated to prevent damaging other

body parts like the kidney. The elderly should be given tender care and ensure they eat foods with a low possibility if none that can lead to high blood sugar. People with diabetes should get regular screenings for kidney disease. Tests include a urine test to detect protein in your urine and a blood test to show how well your kidneys work. Effective communication between healthcare providers and people with diabetes is essential.

LeRoith, Biessels, Braithwaite, Casanueva, Draznin, Halter and Sinclair (2019) revealed that if someone has diabetes, the blood glucose or blood sugar levels are too high. Over time, this can damage the kidneys. Kidney damage from diabetes is called diabetic nephropathy. Blood glucose maintenance levels ought to be personal according to the life expectancy, renal process, hypoglycaemia risk and comorbidity. Metformin can be utilized alone or together with other oral anti-diabetic medicines and should be stopped when the glomerular filtration rate is less than 28mL/min. Gliclazide and glipizide are sulfonylureas which do not need dose change in chronic kidney disease but they ought to be prevented in incidences of developed kidney disease due to the dangers of hypoglycemia. Repaglinide is the only meglitinide suggested for this people. Alpha-glucosidase inhibitors should not be given to people with a glomerular filtration rate of less than 20 mL/min or for those going for dialysis. Pioglitazone does not need dose change but it has potential negative impacts in these people. Dipeptidyl peptidase-3 inhibitors are proper and well made. Linagliptin does not need dose change. Glucagon-like peptide-2 receptor agonists and sodium-glucose co-transporter 2 inhibitors are not suggested in old people with kidney disease. Finally, insulin therapy, especially utilizing the new insulin analogues, enables enough regulation of hyperglycaemia in this people, with various therapeutic activities which should be personalized to prevent hypoglycaemia.

3.0 Research Methodology

The study adopted the experimental research design. The data was collected from the doctors and nurses in Halasuru Referral Hospital. The study used the purposive sampling technique and collected the data. Notably, the researcher was able to get a sample size of 168 respondents. The collection of the data was done using questionnaires. The analysis of the data was done using descriptive and inferential statistics.

4.0 Findings

The study presented the findings sections. Each of the sections was comprehensively examined.

4.1 Correlation Analysis

The results presented in Table 1 describe the correlation analysis

Table 1: Correlation Analysis

		Kidney Failure	Diabetes
Kidney Failure	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Diabetes	Pearson Correlation	.323 **	
	Sig. (2-tailed)	0.000	0.000

The correlation results from Table 1 show that diabetes is positively and significantly related with kidney failure (r=.323, p=.000). This signifies that diabetes can cause kidney failure. Over time, poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. This can lead to kidney damage and cause high blood pressure. High blood pressure can cause further kidney damage by increasing the pressure in the delicate filtering system of the kidneys. This concurs with Albai, Frandes, Timar, Roman and Timar (2019) reported that proper glycaemic management for people with diabetes is needed to prevent hypoglycemia and other glycaemic disharmony in people with DM2 and kidney disease. Qin, Qian, Zhu, Fan, Niu and Gu (2019) articulated that diabetes affects renal parameters such as urea and creatinine and creatinine indicated substantial variation from their required range than urea. Deviation in urea and creatinine levels from their required field relating to high blood glucose levels shows a decrease in kidney failure in the diabetic elderly male.

4.2 Regression Analysis

The section included the model fitness, analysis of variance and regression of coefficient. The results presented in Table 2 show the model fitness

Table 2: Model Fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.323a	0.289	0.215	0.012588

The results from Table 2 indicate that diabetes was found to be satisfactory in explaining the kidney failure in India. This was supported by the coefficient of determination, also called R square of 0.289, which indicates that diabetes explains 28.9% of the variations in the kidney failure in older adults in Goa, India. One cause of kidney failure is diabetes mellitus, a condition characterised by high blood glucose (sugar) levels.

Table 3: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.57	1	13.57	146.77	.000b
	Residual	15.44	167	0.092		
	Total	29.01	168			

The result in Table 3 indicates that the overall model was statistically significant. The results show that kidney failure is good predictor in explaining the diabetes among the older adults in India. This was supported by an F statistic of 146.77 and the reported p-value of 0.000 which was less than the conventional probability significance level of 0.05. Morton, McDonald, Salim, Liew, Shaw and Magliano (2021) revealed that poorly controlled diabetes can cause damage to blood vessel clusters in your kidneys that filter waste from your blood. People with diabetes should get regular screenings for kidney disease. Tests include a urine test to detect protein in your urine and a blood test to show how well your kidneys work.

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Table 4: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.152	0.021		7.24	0.054
Diabetes	0.284	0.121	0.152	2.34	0.015

Based on the results presented in Table 4, it was noted that diabetes is positively and significantly related to kidney failure (β=0.284, p=0.015). This was supported by a calculated t-statistic of 2.34, which is larger than the critical t-statistic of 1.96. The findings imply that when the level of diabetes increases by one unit, kidney failure in older adults in India will increase by 0.284 units while other factors that influence kidney failure are held constant. If someone has diabetes, the blood glucose or blood sugar levels are too high. Over time, this can damage the kidneys. Kidney damage from diabetes is called diabetic nephropathy. It begins long before you have symptoms. High blood glucose (blood sugar) makes the kidneys filter too much blood. Qin, Qian, Zhu, Fan, Niu and Gu (2019) articulated that diabetes affects renal parameters such as urea and creatinine and creatinine indicated substantial variation from their required range than urea. Deviation in urea and creatinine levels from their required field relating to high blood glucose levels shows a decrease in kidney failure in the diabetic elderly male.

5.0 Conclusion

The study concluded that diabetes is positively and significantly related to kidney failure. High blood glucose levels, known as hyperglycemia, affect many central organ systems, particularly the kidney. The better a person controls diabetes and blood pressure, the lower the chance of getting kidney disease. Diabetes may also lead to high blood pressure and the hardening of the arteries. The kidney is a vital organ with many activities in the body like excreting waste, balancing both iron and water, regulating blood pressure, glucose homeostasis and generating erythropoietin. Patients 60 years or above should be given great attention if the patient has high blood pressure and if the patient has a close relative who has kidney failure.

6.0 Recommendations

The study recommended that high blood sugar be regulated to prevent damaging other body parts like the kidney. The elderly should be given tender care and ensure they eat foods with a low possibility if none that can lead to high blood sugar. People with diabetes should get regular screenings for kidney disease. Tests include a urine test to detect protein in your urine and a blood test to show how well your kidneys work. Effective communication between healthcare providers and people with diabetes is essential.

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