Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Anticipatory Monitoring of Chronic Kidney Disease Awareness, Prevalence, and Risk Factors among Diabetes & Hypertensive Patients: A Hospital-Based Cross-Sectional Study

Blessy Biju[1], Adlin D'cruz[1], Sneha Jiby[1], Melvin Devassy[1], Rosmin Jacob[2]

[1]Pharm D, St James College of Pharmaceutical Sciences, Chalakudy, Kerala.

[2]Assistant Professor, Department of Pharmacy Practice, St James College of Pharmaceutical Sciences, Chalakudy, Kerala.

[1,2]St James College of Pharmaceutical Sciences (NAAC Accredited), St James Hospital Trust Pharmaceutical Research Centre (DSIR Recognized) Chalakudy, Kerala.

(Received: 16 January 2025 Revised: 20 February 2025 Accepted: 31 March 2025)

KEYWORDS

chronic kidney disease; diabetes; hypertension; knowledge; attitude; prevalence; risk factors

ABSTRACT:

Introduction: Chronic Kidney Disease (CKD), a growing global health concern linked primarily to diabetes and hypertension, often progresses silently, highlighting the need for early detection and awareness to prevent complications.

Objectives: The aim of this study is to assess patient awareness, prevalence, and risk factors of chronic kidney disease among diabetes mellitus and hypertensive patients.

Methods: A six-month cross-sectional study (Nov 2023–Apr 2024) was conducted among 192 diabetic and hypertensive patients at a tertiary hospital. Adults ≥18 years on regular follow-up were included, excluding those with CKD, short follow-up, pregnancy, critical illness, or incomplete records. Data were collected using a questionnaire on CKD knowledge (11 items) and attitude (6 items). Awareness was defined as having both average knowledge and a positive attitude. CKD was classified using eGFR (CKD-EPI) and albuminuria per KDIGO guidelines. Descriptive statistics and logistic regression were used, with $p < 0.05$ as significant.

Results: Among the 192 patients with both diabetes mellitus and hypertension. The mean age was 65 years, 36.5% showed average CKD knowledge, and 67.7% had a negative attitude towards early detection, with a 40.6% CKD prevalence overall. Significant CKD predictors included age, duration of diabetes and hypertension, knowledge level, attitude, uncontrolled blood pressure, and medication use, with ACEI use being protective and longer DM and hypertension durations increasing CKD odds.

Conclusions: Our study highlights the critical importance of early detection and proactive management of Chronic Kidney Disease (CKD) among individuals with hypertension and diabetes mellitus. The significant association between these conditions and CKD underscores the need for regular monitoring and comprehensive patient education to mitigate disease progression and reduce associated morbidity and mortality.

1. Introduction

Chronic Kidney Disease (CKD) is a gradual loss of kidney function over months or years, often leading to tissue damage and scarring. It is diagnosed when signs of kidney damage—such as albuminuria, urine sediment abnormalities, electrolyte and structural abnormalities, or a GFR below 60 ml/min/1.73 m²—persist for over three months.[1] As it progresses, the kidneys struggle to filter waste and maintain vital functions.[2] CKD often manifests initially with normal or slightly decreased glomerular filtration rate (GFR) and albuminuria, but it can advance to end-stage renal disease (ESRD) or kidney failure. ESRD is irreversible and fatal without treatment, typically through dialysis or kidney transplant.[3]

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Chronic Kidney Disease (CKD) is a major global health concern, impacting over 800 million people—about 10% of the world's population.[4] In India, the prevalence is higher at 17.2%, with 6% of cases in stage 3 or more severe stages. The growing rates of diabetes and hypertension are key contributors to the rise in CKD cases.[5] The global increase in death and disease burden is closely associated with the growing number of Chronic Kidney Disease (CKD) cases, particularly among people with conditions like diabetes, high blood pressure, and other health issues. CKD hampers the kidneys' ability to eliminate waste from the bloodstream and maintain vital body functions.[6]

Diabetes mellitus (DM) is a leading risk factor for Chronic Kidney Disease, with diabetic nephropathy affecting around 40% of individuals with diabetes. Hypertension also plays a significant role, showing a bidirectional relationship with CKD. Approximately 28% of CKD patients have hypertension as a contributing factor, linked to both systolic and diastolic blood pressure levels.[6] As per 2016 data, the prevalence of Chronic Kidney Disease (CKD) in India among the general population was 16.8%. Globally, the prevalence stands at around 14.3%, with nearly 90% of individuals in the early stages of the disease. In developed nations, although only 0.03% of the population reaches End Stage Renal Disease (ESRD), it accounts for 2–3% of annual healthcare expenses. In developing countries, factors like low socioeconomic status, infections, limited education, and lack of access to renal replacement therapies contribute significantly to the rising CKD burden.[7] Currently, over 1.4 million people with End Stage Renal Disease (ESRD) require renal replacement therapy, such as dialysis or kidney transplantation. These treatment options are often costly and are growing in demand at an estimated annual rate of 8%.[8]

Early detection and management of Chronic Kidney Disease (CKD) are vital to prevent serious complications; however, many cases remain undiagnosed due to limited awareness. Enhancing public knowledge, promoting early screening, and improving access to treatment are key strategies to tackle this issue and improve outcomes. The present study aimed to assess patient awareness, prevalence, and risk factors of CKD among individuals with diabetes mellitus and hypertension.

2. Methods

Study design and setting

A hospital-based cross-sectional study was conducted for 6 months from November 2023 to April 2024, among patients with both diabetes and hypertension in a tertiary care hospital.

Inclusion and exclusion criteria

The study enrolled 192 patients diagnosed with both diabetes and hypertension at a tertiary care hospital, meeting specific inclusion criteria. The inclusion criteria consisted of Adult (age ≥ 18 years) diabetes mellitus and hypertensive patients on regular follow-up and those who signed informed written consent were recruited to the study. Confirmed chronic kidney disease, short follow-up period (< 3 months), incomplete patient chart, pregnant women, and critically ill patients were excluded from the study.

Ethical clearance

The study was approved by the Institutional Ethics Committee (IEC) with Approval No. SJPCEC/P25/PP/2023/006 of the St James' College of Pharmaceutical Sciences, Chalakudy, Kerala, India.

Study procedure

A total of 192 patients were assessed for patient awareness, prevalence, and risk factors for CKD among diabetes mellitus and hypertensive patients. Data collection tool was developed after reviewing different literatures; the tool has three parts: the first part is sociodemographic and disease condition, second part has 11 yes or no questions assessing patients knowledge, and third part has 6 questions assessing attitude. Patient's chart was also reviewed for information like medications, blood pressure, and serum glucose level. The last three months' FBS (fasting blood sugar) and BP (blood pressure) average were used assess glycemic and blood pressure control, respectively. Laboratory values such as serum creatinine level, blood urea nitrogen, urine albumin.

Average knowledge is when at least 6 questions were answered correctly out of 11 knowledge questions, and positive attitude is when patients agreed with at least three of the attitude statements. Patient awareness was assessed using knowledge and attitude; it is considered

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

as patients have awareness about CKD if they have both average knowledge and positive attitude. Glomerular filtration rate (GFR) was estimated using CKD –EPI question[9]; chronic kidney disease was defined using eGFR and presence of albuminuria and classified into five stages according to KDIGO classification system.[10]

Statistical analysis

Descriptive statistics like percentage and mean and standard deviation were used to present sociodemography and clinical characteristics of participants. logistic regression was used to assess the crude association between independent variables and CKD and p-value < 0.05 was considered statistically significant.

3. Results

Sociodemographic characteristics of diabetes mellitus and hypertensive patients

A total of 192 diabetes mellitus and hypertensive patients were included in the study, mostly aged 61-80 years (64%), with a gender distribution of 52% male and 48% female. Most were married (78%) and had secondary education (45%). Income distribution showed 34% earning 10,000-20,000 rupees monthly. Health information sources included family and friends (41%), healthcare providers (39%), and television (20%). The majority lived in rural areas (66%).

Table 1: Sociodemographic characteristics of diabetes mellitus and hypertensive patients

Characteristics	Number (%)
Age (year)	
20-40	2(1)
41-60	42(22)
61-80	123(64)
81-100	25(13)
Sex	
Female	92(48)
Male	100(52)
Marital status	
Married	150(78)
Unmarried	42(22)
Educational status	
No education	13(7)
Elementary	64(33)
Secondary	86(45)
College and above	29(15)
Average monthly income (rupees)	
<5000	42(22)
5000-10000	66(34)
10000-20000	35(18)
>20000	
Source of health information	
Family & friends	79(41)
Television	38(20)
Healthcare provider	75(39)
Residence	
Urban	66(34)
Rural	126(66)

Knowledge, attitude, and clinical characteristics of diabetes mellitus and hypertensive patients

Study participants' mean (±SD) systolic blood pressure and diastolic blood pressure were 145.3± 15.9 mmHg and 84.5± 9.9 mmHg, respectively. Mean ((±SD) fasting blood sugar was 178.6 ± 62.7 mg/dl. Urine albumin was positive in 41%. More than half (51%) of participants had a healthy body weight. Knowledge about CKD was poor in 64% and attitudes were negative in 68%. The duration of diabetes was over 5 years in 52% of patients, and hypertension duration was over 5 years in 60%. The majority (78%) did not use social drugs like tobacco and alcohol. A family history of kidney disease was reported by 40% of participants.

Table 2: Knowledge, attitude, and clinical characteristics of diabetes mellitus and hypertensive patients

Characteristics	Number %
Systolic pressure	145.3± 15.9
Diastolic pressure	84.5± 9.9
Fasting blood sugar	178.6 ± 62.7
Urine albumin	
Positive	78(41)
Negative	114(59)
BMI category(Kg/m^2)	
Underweight	15(8)
Healthy weight	98(51)
Overweight	62(32)
Obese	17(9)
Social drug users	
Non-users	150(78)
Users	42(22)
Knowledge about CKD	
Average knowledge	70(36)
Poor knowledge	122(64)
Attitude about CKD	
Positive attitude	62(32)
Negative attitude	130(68)

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Duration of DM	
≤5	93(48)
>5	99(52)
Duration of HTN	
≤5	77(40)
>5	115(60)
Family history of kidney disease	
Yes	77(40)
No	115(60)

Knowledge and attitude of DM and hypertensive patients about CKD

Our study assessed the knowledge and attitudes of 192 participants regarding chronic kidney disease (CKD). Approximately 36% of participants demonstrated average knowledge, while the remaining 64% had poor knowledge about CKD. Regarding attitudes, only 32% of participants had a positive outlook on the early detection and prevention of CKD. (Table 2) Knowledge about CKD varied significantly: 66.1% of respondents knew that one healthy kidney can support a normal life, 84.9% were aware that kidneys produce urine, and 62.0% understood that kidneys clean the blood. However, only 22.4% knew that kidneys help maintain blood pressure and sugar levels, and just 34.4% recognized that kidneys contribute to bone health. While 75.5% identified CKD as a condition where kidneys fail to remove waste from the blood, only 60.9% knew it could be asymptomatic until advanced stages. Risk factor awareness was lower, with only 21.9% associating high blood pressure and 20.3% associating heart problems with CKD. Additionally, 78.6% understood that CKD could progress to kidney failure, and 58.9% recognized that untreated kidney failure is fatal.

Attitudes towards CKD and its management revealed mixed sentiments. Only 36.5% agreed that kidney function tests are necessary even without CKD symptoms, and 33.3% felt that kidney screening tests were affordable. Despite this, 68.2% acknowledged the high risk of death associated with CKD, and 55.7% indicated they would seek medical help if they had signs of kidney disease. Additionally, 47.9% believed in the possibility of preventing CKD, and 62.0% stressed the importance of early detection to slow disease progression.

Table 3: Knowledge and attitude of DM and hypertensive patients about CKD

Knowledge questions	**Response, number (%)**	
	Yes	**No**
A person can lead a normal life with one healthy kidney?	127(66.1)	65(33.9)
Do kidneys make urine?	163(84.9)	29(15.1)
Do kidneys clean the blood?	119(62.0)	73(38.0)
Do kidneys help in maintaining blood pressure & sugar level normal?	43(22.4)	149(77.6)
Do kidneys help to keep the bones healthy?	66(34.4)	126(65.6)
CKD is reduced ability of the kidneys to avoid waste from the blood?	145(75.5)	.47(24.5)
Chronic kidney disease may not have any symptom until advanced?	117(60.9)	75(39.1)
Is obesity a risk factor for CKD?	73(38.0)	119(62.0)
High blood pressure is a risk factor for CKD?	42(21.9)	150(78.1)
Is water retention (excess water in the body) a sign or symptom for CKD?	34(17.7)	158(82.3)
Is diabetes a risk factor for CKD?	79(41.1)	113(58.9)
Heart problems such as heart failure or heart attack are risk factors for CKD?	39(20.3)	153(79.7)
Chronic kidney disease progresses to kidney failure?	151(78.6)	41(21.4)
Kidney failure is fatal if not treated by dialysis or kidney transplant?	113(58.9)	79(41.1)

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Kidney failure treatment costs more than kidney function screening?	87(45.3)	105(54.7)
Attitude questions	**Agree**	**Disagree**
Kidney function test is necessary though there is no sign of CKD?	70(36.5)	122(63.5)
It is not too expensive to have a kidney screening test	64(33.3)	128(66.7)
Chronic kidney disease carries high risk of death?	131(68.2)	61(31.8)
I will go to a health facility if I have signs of kidney disease?	107(55.7)	85(44.3)
It is possible to prevent chronic kidney disease?	92(47.9)	100(52.1)
Early detection of CKD is important to slow its progress?	119(62.0)	73(38.0)

Prevalence and stage of chronic kidney disease of diabetes mellitus and hypertensive patients

The overall prevalence of chronic kidney disease was 40.6% with (95% CI, 33.7 %- 47.6 %); of this, 12.5% were in stage G1 with normal or high eGFR, and albuminuria, 20.3% were in stage G2 with mildly decreased eGFR and albuminuria, 5.2% were in stage G3a with mildly to moderately decreased eGFR, and 2.6% were in stage G3b with moderately to severely decreased eGFR. No participants were identified in stages G4 (severely decreased eGFR) or G5 (kidney failure).

Table 4: Prevalence and stage of chronic kidney disease of diabetes mellitus and hypertensive patients

Stage of CKD	Description	eGFR (ml/min/1.73m^2)	Number (%)
G1	Normal or high with albuminuria	≥90	24(12.5)
G2	Mildly decreased with albuminuria	60-89	39(20.3)
G3a	Mildly to moderately decreased	45-59	10(5.2)
G3b	Moderately to severely decreased	30-44	5(2.6)
G4	Severely decreased	15-29	0
G5	Kidney failure	<15	0
Total			78(40.6)

Independent variables associated with CKD among diabetes mellitus and hypertensive patients

In the crude analysis utilizing bivariate logistic regression, several factors exhibited significant associations with chronic kidney disease (CKD). These included age greater than 55 years, long duration of diabetes mellitus and hypertension, elevated fasting blood sugar levels, uncontrolled blood pressure, poor CKD knowledge, and negative attitude. Independent predictors for CKD were identified using multivariate logistic regression in this, Age greater than 55 years, prolonged duration of diabetes mellitus and hypertension, uncontrolled blood pressure (>140/90 mmHg), poor knowledge of CKD were identified as independent predictors of chronic kidney disease. According to our findings, patients with uncontrolled blood pressure were 2.44 (AOR 2.44, 95% CI 1.29-4.63) times at risk for chronic kidney disease than those with controlled blood pressure. patients having poor knowledge exhibiting a higher likelihood of CKD development (AOR: 3.49, 95% CI 1.54-7.86).

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Table 5: Independent variables associated with CKD among diabetes mellitus and hypertensive patients

Variable	CKD present vs CKD absent			
	Univariate		Multivariate[a]	
	COR (95% CI)	p-Value	AOR (95% CI)	p-Value
Age (≤ 55 vs >55)	0.32 (0.08-0.63)	0.024*	2.34 (1.53-3.40)	0.041*
Sex (female vs male)	0.75 (0.42-1.33)	0.321	1.24 (0.62-2.48)	0.549
Marital status (married vs unmarried)	0.61 (0.31-1.22)	0.162	1.70 (0.81-3.55)	0.162
Family history of kidney disease (yes vs no)	1.12 (0.62-2.02)	0.701	0.85 (0.45-1.61)	0.615
Place of residence (rural vs urban)	0.81 (0.44-1.49)	0.499	1.28 (0.68-2.42)	0.444
Knowledge level (average vs poor)	0.54 (0.29-1.00)	0.049*	3.49 (1.54-7.86)	0.003**
Attitude level (negative vs positive)	0.40 (0.32-0.49)	<0.001***	2.04 (0.86-3.39)	0.124
ACEIs/ARB (nonuser vs user)	1.34 (0.74-2.42)	0.337	1.67 (1.36-2.26)	0.0462
Social drug users (nonuser vs user)	0.79 (0.39-1.57)	0.491	1.04 (0.46-2.39)	0.919
Duration of DM (≤ 5 years vs >5 years)	0.42 (0.08-0.98)	0.004**	2.09 (1.52-3.29)	0.032*
Duration of HTN (≤ 5 years vs >5 years)	0.42 (0.09-0.88)	0.005**	2.95 (1.45-3.44)	0.037*
FBS (≤ 150 mg/dl vs >150 mg/dl)	0.55 (0.12-0.94)	0.035*	1.45 (1.09-1.85)	0.214
BP control(controlled vs uncontrolled)	0.44 (0.24-0.81)	0.008**	2.44(1.29-4.63)	0.006**

[a] Adjusted for old age, sex, family history of CKD, residence, knowledge level, attitude level, ACEIS/ARB users, social drug users, duration of DM & HTN, FBS, BP control; OR, odds ratio; CI, confidence interval.

*significant at 0.05 level , **significant at 0.01 level, ***significant at 0.001 level

Drug utilisation evaluation of antidiabetic drugs

Among monotherapy users, Metformin and Insulin were equally prescribed (22 each), followed by Glimepiride (11), Vildagliptin (3). Dual therapy was the most common, with Metformin + Glimepiride being the predominant combination (47), followed by Dapagliflozin + Insulin (18). Triple therapy regimens were also frequent, with Metformin + Glimepiride + Sitagliptin being the most used (12). Quadruple therapy was less common, observed in only 6 cases, with varied drug combinations. Metformin and Glimepiride were the most consistently used agents across all therapy types.

Table 6: Drug utilisation evaluation of antidiabetic drugs

Anti- diabetic drugs	Number
Monotherapy	
Metformin	22
Insulin	22
Glimepiride	11
Vildagliptin	3
Others	4
Dual therapy	
Metformin+ glimepiride	47
Dapaglifloxin + insulin	18
Glimepiride+ dapagliflozin	6
Metformin+ sitagliptin	3
Others	11
Triple therapy	
Metformin+ glimepiride+ sitagliptin	12
Metformin+ glimepiride+ insulin	10
Metformin+ glimepiride+ vildagliptin	8
Others	12
Quadruple therapy	
Metformin+ glimepiride+ dapagliflozin+ vildagliptin	2

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Metformin+ dapagliflozin+ sitagliptin+ glibenclamide	1
Metformin+ glimepiride+ vildagliptin+ voglibose	1
Metformin+ glimepiride+ vildagliptin+ insulin	2

Drug utilisation evaluation of antihypertensive drugs

Among the antihypertensive drug prescriptions, monotherapy was observed in 85 patients, with Telmisartan being the most commonly prescribed (24), followed by Furosemide (21) and Amlodipine (15). Dual therapy was used in 67 patients, most frequently with the combination of Telmisartan + Cilnidipine (22), and other combinations like Telmisartan + Ramipril (12) and Ramipril + Metoprolol (11) were also noted. Triple therapy was prescribed in 36 cases, with Telmisartan-based combinations being predominant. Quadruple therapy was less frequent (4 patients), involving complex regimens. Telmisartan remained the most consistently used agent across all therapy types.

Table 7: Drug utilisation evaluation of antihypertensive drugs

Anti- hypertensive drugs	Number
Monotherapy	
Telmisartan	24
Furosemide	21
Amlodipine	15
Losartan	9
Others	16
Dual therapy	
Telmisartan+clinidipine	22
Telmisartan+Ramipril	12
Ramipril+metoprolol	11
Others	22
Triple therapy	
Telmisartan+furosemide+diltiazem	12
Telmisartan+metoprolol+clinidipine	10
Telmisartan+metoprolol+ramipril	7
Others	7
Quadruple therapy	
Telmisartan+furosemide+bisoprolol+clinidipine	2
Furosemide+olmesartan+metoprolol+nifedipine	2

4. Discussion

Chronic kidney disease (CKD) often shows no symptoms in the early Its progression can be controlled through lifestyle changes, affordable medications, and public health strategies. Key contributing factors, such as obesity, high blood pressure, and diabetes, should be targeted to reduce the risk.[11] The current study aimed to assess the level of awareness, prevalence, and risk factors of CKD in diabetic and hypertensive patients.

Overall awareness of chronic kidney disease (CKD) among participants was relatively low. Only 36% demonstrated average knowledge, closely aligning with findings from Ethiopia (36.5%)[7], but higher than those reported in Nigeria (27%)[12]. However, this was still below the 50% of participants in Jordan who scored above 80% in CKD-related knowledge.[13] A study from the Aseer region showed even higher awareness, with 75.1% of respondents having good overall knowledge.[14] Understanding that CKD can be asymptomatic in its early stages varied across regions. In our study, 60.9% were aware of this, which was higher than the 29.8% in Ethiopia[7] but lower than the 71.8% reported in Aseer[13]. Awareness of key risk factors was comparatively low—only 21.9% and 41.1% of participants identified hypertension and diabetes mellitus as causes of CKD. These figures were below those reported in Ethiopia (38.5% and 44.2%)[7], Aseer (77.4% and 81.4%)[13], Cameroon (38.5% and 44.2%)[15] and Nigeria (38.3% and 43.6%)[12], though higher than in Iran, where only 12.7% and 14.4% identified uncontrolled diabetes and hypertension as major risk factors[16]. Furthermore, 78.6% of participants recognized that CKD can lead to kidney failure, and 58.9% understood that untreated kidney failure can be fatal.

Concerning patient attitudes, we found a generally negative attitude (68%) toward CKD and its effects and prevention. Attitudes towards CKD management showed that 68.2% recognized the high risk of death, 62.0% stressed the importance of early detection, but only 36.5% agreed kidney function tests are necessary without symptoms, and 33.3% felt screening was affordable. In contrast a study conducted in the Aseer region, like ours, found a generally positive attitude toward CKD prevention and management.[14] Another Saudi study also reported positive attitudes and good knowledge among educated participants, recommending greater efforts to improve healthcare awareness.[17]

The overall prevalence of chronic kidney disease was 40.6% in our study population. The prevalence rate was less compared to studies conducted in cameroon[15] which

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

reported a prevalence rate of 60% and more than compared to ethiopia (26%)[7], U.K (27.5%)[18], gondar (20.8%)[19], spain (31.22%)[20]. Prevalence of chronic kidney disease among Palestinian type 2 diabetic patients in North West Bank was reported to be 23.6%[21], in northern Thailand the prevalence of CKD was 24.4% among diabetes patients[22], in china it was 31% among diabetes polulation[23]. Kenya reported a 45.4% prevalence rate of chronic kidney disease among the hypertensive patients.[24] In Tigray among the hypertensive patients the prevalence of chronic kidney disease was found to be (22.1%)[25]. Another study in northwest Ethiopia reported a prevalence of 17.6% among hypertensive patients[26].

In our drug utilization evaluation, Metformin emerged as the most commonly prescribed antidiabetic monotherapy, either alone or in combination, owing to its role in improving insulin resistance. This finding aligns with previous studies conducted by Das et al.[27] and Orlando and colleagues[28]. Similarly, Telmisartan was identified as the most preferred antihypertensive monotherapy in our study, consistent with findings by Khan M.Y. et al.[29], where its use as monotherapy or as an add-on therapy effectively reduced blood pressure levels. Metformin + Glimepiride was the most commonly used dual therapy, consistent with studies by Mendal S. et al.[30] and Ramachandran et al.[31]. This combination is widely prescribed for effective glycemic control by addressing both insulin resistance and secretion defects.[32] Among the antihypertensives, the combination of Telmisartan + Cilnidipine was most commonly prescribed. A prospective study reported that both telmisartan and cilnidipine effectively reduce systolic and diastolic blood pressure smoothly, without affecting heart rate.[33]

The regression analysis found age greater than 55, long duration of DM and HTN, elevated fasting blood sugar levels, uncontrolled blood pressure, poor CKD knowledge, and negative attitude as independent predictors of CKD among diabetes and hypertensive patients. Aging significantly increases the risk of CKD. Studies from the KEEP program highlight its prevalence in older adults, often accompanied by other medical conditions and abnormal biochemical markers. Enhancing physician awareness could improve diagnosis rates.[34] A cross-sectional study conducted in northern Thailand found that individuals older than 75 years had a CKD prevalence of 61.3%, highlighting age as a significant risk factor.[35]

The duration of DM and HTN correlates with CKD development. A prospective cohort study demonstrated that individuals with both baseline hypertension and incident diabetes had a higher risk of developing CKD compared to those with only one of these conditions.[36] Persistent hyperglycemia is directly linked to kidney damage. A study from northern Thailand reported that individuals with hemoglobin A1c levels ≥8% had a CKD prevalence of 38.6%, underscoring the importance of glycemic control in preventing CKD.[35] In current study fasting blood sugar of >150mg/dl was independently associated with CKD this is in line with the study of Kumela *et al*. similarlu uncontrolled hypertension was also a significant predictor of CKD. This is similar to the finding of Kumela et al. and Akpor O et al, where the long duration of hypertension and uncontrolled blood pressure (BP>140/90 mmHg) were independent predictors of CKD.

5. Conclusion

Chronic Kidney Disease (CKD) poses a serious and growing global health challenge, often remaining undiagnosed until it reaches an advanced stage when treatment becomes more intensive and costly. Proactive screening of at-risk individuals allows for timely clinical actions, minimizes exposure to harmful agents, and helps slow disease progression. Early identification also uncovers cardiovascular risks and enables more effective planning for potential kidney replacement therapies. Our study highlights the critical importance of early detection and proactive management of Chronic Kidney Disease (CKD) among individuals with hypertension and diabetes mellitus. The significant association between these conditions and CKD underscores the need for regular monitoring and comprehensive patient education to mitigate disease progression and reduce associated morbidity and mortality. To combat the widespread lack of awareness, we are offering educational leaflets for patients and a practical early intervention guide for healthcare providers. Pharmacists are also essential in reducing CKD risk among diabetic and hypertensive patients by offering tailored counseling, optimizing medications, and encouraging healthier lifestyles.

Refrences

1. G. Eknoyan, N. Lameire, K. Eckardt, B. Kasiske, D. Wheeler, A. Levin et al., “KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease,” Kidney International Supplements, vol. 3, no. 1, pp. 5–14, 2013.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

2. Whaley-Connell, J. R. Sowers, P. A. McCullough et al., “DiaPbetes mellitus and CKD awareness: the kidney early evaluation program (KEEP) and national health and nutrition examination survey (NHANES),” American Journal of Kidney Diseases, vol. 53, Supplement 4, pp. S11–S21, 2009.
3. National Kidney Foundation Inc., “About chronic kidney disease,” 2013, https://www.kidney.org/atoz/content/about-chronic-kidney-disease#ckd.
4. Kovesdy, C.P. Epidemiology of chronic kidney disease: An update 2022. Kidney Int. Suppl. 2022, 12, 7–11.
5. Singh, A.K.; Farag, Y.M.; Mittal, B.V.; Subramanian, K.K.; Reddy, S.R.K.; Acharya, V.N.; Almeida, A.F.; Channakeshavamurthy, A.; Ballal, H.S.; Gaccione, P.; et al. Epidemiology and risk factors of chronic kidney disease in India—Results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. BMC Nephrol. 2013, 14, 114.
6. Akpor O, Adeoye A, Ibitoba F, Akpor O. Prevalence of Chronic Kidney Disease Among Diabetes and Hypertensive Patients in a Teaching Hospital in Ekiti State, Southwest Nigeria . Open Public Health J, 2022; 15: e187494452212201. http://dx.doi.org/10.2174/18749445-v15-e221220-2022-99
7. Kumela Goro K, Desalegn Wolide A, Kerga Dibaba F, Gashe Fufa F, Wakjira Garedow A, Edilu Tufa B, Mulisa Bobasa E. Patient Awareness, Prevalence, and Risk Factors of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Patients at Jimma University Medical Center, Ethiopia. Biomed Res Int. 2019 May 12;2019:2383508. doi: 10.1155/2019/2383508.
8. Soni KK, Kalyanasundaram M, Singh S, et al. Prevalence of chronic kidney disease among severely gas-exposed survivors in Bhopal, India. Natl Med J India. 2023;36(1):5-10. doi:10.252549/NMJI_569_20
9. Levey A. S., Stevens L. A., Schmid C. H., et al. A new equation to estimate glomerular filtration rate. Annals of Internal Medicine. 2009;150(9):604–612. doi: 10.7326/0003-4819-150-9-200905050-00006.
10. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int. 2024;105(4S): S117–S314.
11. Levin A, Okpechi IG, Caskey FJ, Yang CW, Tonelli M, Jha V. Perspectives on early detection of chronic kidney disease: the facts, the questions, and a proposed framework for 2023 and beyond. Kidney Int. 2023;103(6):1004-1008. doi:10.1016/j.kint.2023.03.009
12. Awareness, knowledge and perception of chronic kidney disease in a rural community of South-West Nigeria. Oluyombo R, Ayodele OE, Akinwusi PO, Okunola OO, Gbadegesin BA, Soje MO, Akinsola A. Niger J Clin Pract. 2016;19:161–169.
13. Knowledge, attitudes, and practices towards prevention and early detection of chronic kidney disease. Khalil A, Abdalrahim M. Int Nurs Rev. 2014;61:237–245.
14. Al-Qahtani M, Tawhari I, Alhmare AM, et al. The Awareness, Prevalence, and Risk Factors of Chronic Kidney Disease Among Diabetes Mellitus and Hypertensive Patients in the Aseer Region, Saudi Arabia. Cureus. 2024;16(2):e53366. Published 2024 Feb 1. doi:10.7759/cureus.53366
15. Patience Ndapkwi, Nformi & Menkem, Elisabeth & Ngounou, Eleonore & Sama, Woquan & Djakissam, Watching & Nembo, Erastus & Seukep, Armel Jackson & Taksinkou, Francis & Teuwafeu, Denis & Boyom, Fabrice. (2023). Prevalence, Risk Factors, and Awareness of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Individuals at the Buea Regional Hospital, Cameroon. Journal of Biosciences and Medicines. 11. 260-277. 10.4236/jbm.2023.114019.
16. P. Roomizadeh, D. Taheri, A. Abedini et al., “Limited knowledge of chronic kidney disease and its main risk factors among Iranian community: an appeal for promoting national public health education programs,” International Journal of Health Policy and Management, vol. 2, no. 4, pp. 161–166, 2014.
17. Knowledge and perceptions toward chronic kidney disease prevention and control in Saudi Arabia. AlSogair AA, Alharbi AA, Alharbi SH, Alateeq FA, Aloriney AM, Ahmed HG. https://ijpras.com/article/knowledge-and-perceptions-toward-chronic-kidney-disease-

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

prevention-and-control-in-saudi-arabia Int J Pharm Res Allied Sci. 2019;8:77–83.

18. New J. P., Middleton R. J., Klebe B., et al. Assessing the prevalence, monitoring and management of chronic kidney disease in patients with diabetes compared with those without diabetes in general practice. Diabetic Medicine. 2007;24(4):364–369. doi: 10.1111/j.1464-5491.2007.02075.x.
19. Damtie S., Biadgo B., Baynes H. W., et al. Chronic kidney disease and associated risk factors assessment among diabetes mellitus patients attending at university of Gondar Hospital, Northwest Ethiopia. Ethiopian Journal of Science. 2018;28(6):p. 691. doi: 10.4314/ejhs.v28i6.3.
20. Alemán-Vega G., Gómez Cabañas I., Reques Sastre L., Rosado Martín J., Polentinos-Castro E., Rodríguez Barrientos R. Prevalence and risk of progression of chronic kidney disease in diabetics and hypertensive patients followed by primary care physicians. Nefrología (English Edition) 2017;37(3):343–345. doi: 10.1016/j.nefroe.2017.05.010.
21. Nazzal, Z., Hamdan, Z., Masri, D. et al. Prevalence and risk factors of chronic kidney disease among Palestinian type 2 diabetic patients: a cross-sectional study. BMC Nephrol 21, 484 (2020). https://doi.org/10.1186/s12882-020-02138-4
22. Jitraknatee, J., Ruengorn, C. & Nochaiwong, S. Prevalence and Risk Factors of Chronic Kidney Disease among Type 2 Diabetes Patients: A Cross-Sectional Study in Primary Care Practice. Sci Rep 10, 6205 (2020). https://doi.org/10.1038/s41598-020-63443-4
23. Shi L, Xue Y, Yu X, Wang Y, Hong T, Li X, Ma J, Zhu D, Mu Y Prevalence and Risk Factors of Chronic Kidney Disease in Patients With Type 2 Diabetes in China: Cross-Sectional Study JMIR Public Health Surveill 2024;10:e54429
24. Ali, A. M., Kimani, H. M., & Ogweno, G. O. (2024). Prevalence of chronic kidney disease among the hypertensive patients in Wajir county, Kenya. International Journal Of Community Medicine And Public Health, 11(7), 2587–2591. https://doi.org/10.18203/2394-6040.ijcmph20241810
25. Bahrey D, Gebremedhn G, Mariye T, et al. Prevalence and associated factors of chronic kidney disease among adult hypertensive patients in Tigray teaching hospitals: a cross-sectional study. BMC Res Notes. 2019;12(1):562. Published 2019 Sep 9. doi:10.1186/s13104-019-4610-8
26. Hunegnaw A, Mekonnen HS, Techane MA, Agegnehu CD. Prevalence and Associated Factors of Chronic Kidney Disease among Adult Hypertensive Patients at Northwest Amhara Referral Hospitals, Northwest Ethiopia, 2020. Int J Hypertens. 2021;2021:5515832. Published 2021 Aug 26. doi:10.1155/2021/5515832
27. Das P, Prasad Das B, Prasad Rauniar G, Kumar Roy R, Kumar Sharma S: Drug utilization pattern and effectiveness analysis in diabetes mellitus at a tertiary care centre in Eastern Nepal. J Physiol Pharmacol. 2011, 55:272-80.
28. .Moreno Juste A, Menditto E, Orlando V, et al.: Treatment patterns of diabetes in Italy: a population-based study. Front Pharmacol. 2019, 10:870. 10.3389/fphar.2019.00870
29. Khan MY, Pandit S, Abdulkutty J, Navasundi G, Hazra PK, Phadke U, Mane A, Mehta S, Shah S. Effectiveness of Telmisartan on Blood Pressure Control in Hypertensive Patients in India: A Real-World Retrospective Study from Electronic Medical Records. Cardiol Ther. 2021 Jun;10(1):255-269. doi: 10.1007/s40119-021-00217-7.
30. Mandal, S., Maiti, T., Das, A. K., Das, A., Mandal, A., Sarkar, B. S., & Mandal, S. (2017). Drug utilization study in patients with type 2 diabetes mellitus attending diabetes clinic of a tertiary care hospital in rural Bengal. International Journal of Basic & Clinical Pharmacology, 5(4), 1647–1654. https://doi.org/10.18203/2319-2003.ijbcp20162487
31. Ramachandran S, Swethanjali D, Bindu H. M, Sripada R, Srinivas E. D, Chakravarthy M, Dhanaraju M. D. Drug Utilization Evaluation on Antidiabetic, Thyroid and Antithyroid Drugs. Biomed Pharmacol J 2020;13(4).
32. Sahay RK, Mittal V, Gopal GR, et al. Glimepiride and Metformin Combinations in Diabetes Comorbidities and Complications: Real-World Evidence. Cureus. 2020;12(9):e10700. Published 2020 Sep 28. doi:10.7759/cureus.10700
33. Kaur, Balbir & Jyoti, Naresh & Kaur, Gurleen & Arora, Lalit. (2024). Comparative Efficacy and Safety of Cilnidipine and Telmisartan in

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(2), 1532-1542 | ISSN:2251-6727

Hypertension: An 8 Week, Prospective Study. International Journal of Pharmaceutical and Clinical Research. 16. 115-119.

34. Stevens LA, Li S, Wang C, et al. Prevalence of CKD and comorbid illness in elderly patients in the United States: results from the Kidney Early Evaluation Program (KEEP). Am J Kidney Dis. 2010;55(3 Suppl 2):S23-S33. doi:10.1053/j.ajkd.2009.09.035
35. Jitraknatee J, Ruengorn C, Nochaiwong S. Prevalence and Risk Factors of Chronic Kidney Disease among Type 2 Diabetes Patients: A Cross-Sectional Study in Primary Care Practice. Sci Rep. 2020;10(1):6205. Published 2020 Apr 10. doi:10.1038/s41598-020-63443-4
36. Wang M, Li J, Li Y, et al. The effects of hypertension and diabetes on new-onset chronic kidney disease: A prospective cohort study. J Clin Hypertens (Greenwich). 2020;22(1):39-46. doi:10.1111/jch.13768