

Risk Factors for Chronic Kidney Disease among Patients in Selected Dialysis Centers of Kerala: A Descriptive Study with Nursing Implications

Ms. Athira R

Senior Nursing Officer, Surgical Hdu, Aiiims Bhubaneswar

Abstract

Background: Chronic Kidney Disease (CKD) is a significant global health burden, with rising prevalence in regions like Kerala. Nurses are at the forefront of identifying high-risk individuals and implementing preventive education.

Objectives: The study aimed to assess the clinical and lifestyle risk factors of CKD among patients in selected dialysis centers in Kozhikode and Malappuram, identify associations with socio-personal variables, and develop a self-instructional module for risk reduction.

Methods: A descriptive cross-sectional design was adopted. Using a non-probability consecutive sampling technique, 190 participants were recruited from four major hospitals in Northern Kerala. Data were collected through structured interview schedules and medical record reviews. Chi-square tests were used to determine statistical associations.

Results: Major clinical risk factors identified included Diabetes Mellitus (54.2%) and Hypertension (50.5%), with a family history of CKD present in 21.1% of cases. Significant modifiable lifestyle factors were prevalent: smoking (47.45%), frequent fast-food consumption (60%), and daily soft drink intake (31.6%). Notably, 50% of participants reported high use of over-the-counter (OTC) medications. Statistical analysis revealed significant associations ($p < 0.05$) between Diabetes Mellitus and age, religion, and marital status, as well as between OTC drug use and occupation.

Conclusion: The high prevalence of modifiable risks—particularly dietary habits and OTC drug use—highlights a critical need for nurse-led community screening and targeted educational interventions. The developed self-instructional module provides a practical tool for primary prevention and early risk factor management.

Keywords: Chronic Kidney Disease, Risk Factors, Nursing Education, Dialysis, Lifestyle Diseases, Kerala.

Introduction:

Chronic Kidney Disease (CKD) has emerged as a premier global health crisis, affecting approximately 10% of the population worldwide [1]. While often overshadowed by malignancies, CKD is frequently more fatal and carries an astronomical economic burden, particularly in developing nations where access to renal replacement therapy is limited [1,2]. In India, the burden is acute; approximately 150–200 per million population reach End-Stage Renal Disease (ESRD) annually, yet 90% of these individuals never consult a nephrologist [2,3]. Instead, many present only when kidney function has already diminished by

half, necessitating life-long dialysis or transplantation—options that remain financially out of reach for the vast majority [3].

The epidemiological transition in India has seen non-communicable diseases (NCDs) replace communicable diseases as the leading cause of premature death. Kerala, despite its high social development indicators, is witnessing an alarming rise in CKD cases, estimated at over 42,000 new diagnoses annually [4]. This "kidney epidemic" in Kerala is driven by rising affluence, sedentary lifestyles, and a high prevalence of diabetes (7.1% nationally, but significantly higher in urban Kerala) [4,5]. Furthermore, the indiscriminate use of over-the-counter (OTC) analgesics and alternative medicines has been identified as a critical, yet modifiable, regional risk factor [6].

Nursing professionals play a pivotal role in shifting the paradigm from tertiary treatment to primary prevention. As primary educators, nurses are uniquely positioned to identify high-risk individuals—those with hypertension, diabetes, or specific lifestyle risks—and implement interventions to slow disease progression. However, effective prevention requires a precise understanding of the local risk profile. While global risk factors are well-documented, there is a need for localized data in specific regions like Kozhikode and Malappuram to tailor nursing interventions effectively.

Guided by Imogene King's Theory of Goal Attainment, which emphasizes the dynamic interaction between nurse and patient to achieve health goals, this study sought to assess the specific clinical and lifestyle risk factors among patients undergoing hemodialysis. The ultimate purpose was to utilize these findings to develop a self-instructional module, empowering the public with the knowledge necessary to mitigate CKD risks and improve long-term health outcomes.

MATERIALS AND METHODS

Study Design and Setting

A descriptive, non-experimental cross-sectional study was adopted to identify the clinical and lifestyle risk factors of Chronic Kidney Disease (CKD). The study was carried out across four dialysis centers in Northern Kerala: Thanal Dialysis Centre (Vadakara), Dialysis Centre Co-operative Hospital (Vadakara), Moulana Dialysis Centre (Malappuram), and Alshifa Dialysis Centre (Malappuram).

Participants and Sampling

The study population comprised patients with CKD undergoing maintenance hemodialysis. A sample of 190 participants was selected using a non-probability consecutive sampling technique. Inclusion criteria required participants to have been diagnosed with CKD after the age of 20, be willing to participate, and be proficient in Malayalam. Patients who were mentally ill or critically unstable were excluded from the study.

Data Collection Tools

Data were gathered using two primary instruments developed by the researcher:

1. **Structured Interview Schedule (Tool-I):** This instrument consisted of two sections. Section I collected socio-personal data (10 items, including age, education, and occupation). Section II assessed risk factors, including family history, systemic diseases, lifestyle factors, food habits, and medication history.
2. **Clinical Record Review Checklist (Tool-II):** This was used to extract objective clinical data, including age of onset, duration of disease, treatment history, and frequency of dialysis.

Validity and Reliability

Content validity of the tools was established by a panel of 11 experts from the fields of Community Health

Nursing, Nephrology, General Medicine, and Community Medicine. Suggestions regarding relevance and adequacy were incorporated, resulting in 100% agreement on 72% of the items and modifications to the remaining items. The tool was translated into Malayalam and back-translated into English to ensure linguistic validity.

A pre-test (n=4) was conducted at Snehasparsam Dialysis Centre, Kuttyadi, to ensure feasibility. Subsequently, a **pilot study** was conducted among 20 subjects to verify the appropriateness of the tool and the data collection process; results indicated that the tool was unambiguous and the study was feasible.

Data Collection Procedure

Following approval from the Institutional Ethics Committee (IEC) of the Government College of Nursing, Kozhikode, and the Kerala University of Health Sciences, administrative permission was obtained from the respective hospital directors. Data collection took place between January 28 and March 11, 2017.

Before performing in-person interviews, the researcher built rapport with each subject and secured informed consent. The duration of each session was roughly thirty minutes. In order to verify clinical risk factors and history, the investigator examined patient records after the interview.

Data Analysis

The data were analyzed using SPSS. Descriptive statistics (frequency and percentage) were used to summarize socio-personal data and the prevalence of risk factors. Inferential statistics, specifically the **Chi-square test**, were employed to determine the association between risk factors and socio-personal variables, with the significance level set at $p < 0.05$

RESULTS

Socio-personal Characteristics of Participants

A total of 190 patients undergoing hemodialysis were included in the study. The demographic profile revealed that nearly half of the participants (**47.9%**) belonged to the middle-age bracket of 40–60 years. The sample was predominantly male (**70%**), and the majority identified as Muslim (**54.7%**), followed by Hindu (**41.6%**).

Regarding social indicators, most participants were married (**92.1%**) and resided in rural areas (**73.2%**). Educational attainment was largely at the primary level (**63.2%**), with only **7.9%** having completed graduate or post-graduate studies. Economically, **75.3%** of the participants belonged to the Above Poverty Line (APL) category.

In terms of occupational history, **30.5%** were government employees, while a significant portion (**27.4%**) reported having no current employment, likely due to the debilitating nature of the disease. Interestingly, **38.9%** of the participants had a history of working abroad, while the majority (**61.1%**) worked within their native region.

Table 1: Socio-demographic Profile of Study Participants (N=190)

Variable	Frequency (f)	Percentage (%)
Age Group (Years)		
40–60	91	47.9

Variable	Frequency (f)	Percentage (%)
Other ages	99	52.1
Gender		
Male	133	70.0
Female	57	30.0
Education		
Primary or below	130	68.5
Secondary and above	60	31.5
Financial Status		
APL	143	75.3
BPL	47	24.7
Place of Residence		
Rural	139	73.2
Urban	51	26.8

Clinical Profile and Treatment Characteristics

The clinical history of the participants indicated a significant mid-life onset of the disease, with **65.3%** of individuals being diagnosed between the ages of 40 and 60 years. At the time of the study, the majority (**62.1%**) had been living with a CKD diagnosis for a duration of 1 to 5 years.

Regarding treatment adherence and dialysis therapy, the study found high levels of regularity; **96.3%** of participants reported consistent adherence to their prescribed treatment regimens. The duration of renal replacement therapy varied, with over half of the sample (**51.6%**) undergoing dialysis for 1 to 3 years. The intensity of treatment was high, as **91.1%** of participants required hemodialysis sessions thrice

weekly, while the remaining **8.9%** received treatment twice weekly.

Table 2: Clinical Characteristics and Treatment Patterns (N=190)

Clinical Variable	Frequency (f)	Percentage (%)
Age at Diagnosis (Years)		
20–40	33	17.4
40–60	124	65.3
> 60	33	17.3
Duration of CKD		
< 1 Year	28	14.7
1–5 Years	118	62.1
> 5 Years	44	23.2
Dialysis Frequency		
Thrice Weekly	173	91.1
Twice Weekly	17	8.9
Duration on Dialysis		
1–3 Years	98	51.6
Other durations	92	48.4

Prevalence of Clinical and Systemic Risk Factors

The study identified a high prevalence of long-standing systemic diseases. **Diabetes Mellitus (54.2%)** and **Hypertension (50.5%)** were the leading comorbidities. Alarming, among those with these conditions, a vast majority had been living with the disease for over 10 years (61.2% of diabetics and 40.6% of hypertensives). Furthermore, treatment non-adherence was high; **76.7% of diabetics** and **58.3%**

of hypertensives reported irregular treatment prior to their CKD diagnosis.

Family history also played a role, with **21.1%** of participants reporting CKD in a first-degree relative (65% in parents). Other identified clinical risks included history of renal calculi (20.0%), heart disease (18.9%), and urinary tract infections (13.2%).

Modifiable Lifestyle and Behavioral Risks

Analysis of lifestyle habits revealed significant areas for nursing intervention. Nearly half of the participants (**47.4%**) were smokers, with **66.6%** of them having smoked for over 20 years. Alcohol consumption was reported by **22.6%**, with a majority (62.8%) consuming it daily. Physical inactivity was also prevalent, as **63.2%** of participants reported no regular exercise.

A critical finding for patient safety was the high rate of self-medication; **50.5% of participants regularly used over-the-counter (OTC) drugs**. Additionally, while Modern medicine was the primary system of medicine for most (66.8%), a significant portion utilized **Ayurveda (23.7%)** or Natural treatments (8.9%), which may involve substances with nephrotoxic potential.

Dietary Patterns and Nutritional Risks

Dietary habits among the dialysis population showed a high intake of processed and high-sodium foods. **Nearly 60% (59.5%) of participants consumed fast food more than three times a week**, and **31.6% reported daily consumption of soft drinks**. While vegetable intake was high (93.2% daily), fruit consumption was low, with only 20.5% eating fresh fruit daily. Notably, **9.5% used extra salt with every meal**, and 100% of participants used coconut oil as their primary cooking medium.

Table 3: Prevalence of Modifiable Lifestyle and Dietary Risk Factors (N=190)

Risk Factor Category	Specific Variable	Frequency (f)	Percentage (%)
Medication/Treatment	Irregular DM Treatment	79	76.7*
	Irregular HTN Treatment	56	58.3*
	OTC Drug Use	96	50.5
Lifestyle Habits	No Regular Exercise	120	63.2
	Smoking (>20 years)	60	31.6
	Daily Alcohol Use	27	14.2
Dietary Risks	Fast Food (>3x/week)	113	59.5
	Daily Soft Drink Use	60	31.6

Risk Factor Category	Specific Variable	Frequency (f)	Percentage (%)
	Extra Salt with Every Meal	18	9.5

*Percentage calculated based on the sub-group with the condition.

Association between Risk Factors and Socio-personal Variables

The study utilized Chi-square analysis to determine the relationship between identified risk factors and the socio-personal characteristics of the participants. The findings revealed that several clinical and lifestyle risks were significantly influenced by demographic profiles (Table 4).

Clinical Risk Associations:

Diabetes Mellitus (DM) showed a highly significant association with **age** ($p=0.001$), **religion** ($p=0.03$), and **marital status** ($p=0.00$), suggesting that these factors may play a role in the prevalence or management of the condition. Similarly, family history was significantly linked to **age** ($p=0.02$) and **education** ($p=0.02$). Interestingly, Hypertension (HTN) and extra salt intake showed no significant association with any socio-personal variables ($p > 0.05$), indicating a uniform distribution across the study population.

Lifestyle and Behavioral Associations:

Modifiable habits were strongly associated with gender and occupation. **Smoking** demonstrated a very strong association with **gender** ($p=0.00$), **occupation** ($p=0.00$), and **place of work** ($p=0.00$). The use of **over-the-counter (OTC) drugs** was significantly associated with **marital status** ($p=0.05$), **occupation** ($p=0.02$), and **place of work** ($p=0.02$). Furthermore, the consumption of **fast food** was significantly tied to **gender**, **occupation**, **financial status**, and **place of living** ($p < 0.05$).

Table 4: Significant Associations between Risk Factors and Socio-personal Variables (N=190)

Risk Factor	Significant Variables	χ^2	df	p-value
Family History	Marital Status	20.38	1	< 0.001***
Diabetes (DM)	Age	13.74	2	0.001**
	Marital Status	13.67	1	0.001**
Smoking	Gender	73.28	1	< 0.001***
	Occupation	69.37	4	< 0.001***
OTC Drug Use	Occupation	11.40	4	0.02*
	Place of Work	9.96	1	0.02*

Risk Factor	Significant Variables	χ^2	df	p-value
Fast Food	Gender	54.53	1	< 0.001***
	Financial Status	14.07	1	0.001**
Soft Drinks	Gender	10.99	3	0.012*

*Significant at 0.05; **Significant at 0.01; ***Significant at 0.001

DISCUSSION

Demographic and Clinical Context

The demographic profile of the participants in this study, with a predominant middle-age onset (47.9% aged 40–60 years) and male majority (70%), aligns with existing Indian literature [2,7]. The high representation of rural participants (73.2%) and those with primary-level education (63.2%) suggests that CKD in Kerala is not merely an "urban lifestyle disease" but is deeply entrenched in rural communities where health literacy and access to specialized renal care may be limited.

The "Silent" Epidemic: Hypertension and Diabetes

The prevalence of Hypertension (50.5%) and Diabetes (54.2%) as primary comorbidities in this study is consistent with regional trends, such as the Trivandrum City survey which reported hypertension at 47% [4]. However, the most critical nursing finding was not the presence of these diseases, but the **treatment irregularity** (76.7% for diabetics and 58.3% for hypertensives).

This suggests a failure in the "cascade of care." Despite having long-standing conditions (over 10 years in most cases), these patients did not maintain stable control, likely accelerating their progression to End-Stage Renal Disease (ESRD). For renal nurses, this underscores the need for "Adherence Counseling" as a primary intervention in outpatient settings.

Modifiable Lifestyle Factors and the "OTC" Risk

A standout finding in this study is the **50.5% prevalence of Over-the-Counter (OTC) drug use**, which mirrors findings in Kurnool (46.41%) [7]. In the Indian context, self-medication with non-steroidal anti-inflammatory drugs (NSAIDs) is often a result of easy pharmacy access and a desire to avoid hospital consultation fees [6]. Nurses must recognize that half of their patients may be inadvertently damaging their kidneys through self-medication for minor ailments.

Furthermore, the dietary findings—60% consuming fast food and 31.6% consuming soft drinks regularly—reflect a significant "nutritional transition" in Kerala. Even in rural areas, processed foods are replacing traditional diets, contributing to the obesity-hypertension-CKD triad.

NURSING IMPLICATIONS & RECOMMENDATIONS

NURSING IMPLICATIONS

The findings of this study provide a critical framework for nursing interventions across four key domains: practice, education, administration, and research.

1. Nursing Practice

- **Preventative Screening:** Nurses in primary and secondary care settings must move beyond routine

care to targeted screening. Given the study's finding that over 50% of patients had long-standing DM and HTN with high rates of treatment irregularity, nurses should implement "Adherence Clinics" to ensure chronic conditions do not progress to ESRD.

- **Pharmacovigilance Education:** With 50.5% of participants reporting frequent over-the-counter (OTC) drug use, clinical nurses must prioritize education regarding nephrotoxicity. Patient history-taking should specifically include self-medication habits to identify at-risk individuals early.
- **Lifestyle Coaching:** Nurses should utilize the study's findings on dietary risks (e.g., 60% fast-food consumption) to provide culturally specific nutritional counseling, focusing on salt reduction and the dangers of processed foods in the local context.

2. Nursing Education

- **Curriculum Integration:** Nursing curricula should place greater emphasis on the "Primary Prevention" of renal disease. Educators can use these findings to develop case studies that teach students to identify "pre-renal" risk profiles.
- **Skill Development:** Training should focus on developing advanced communication skills for nurses to effectively deliver health education to populations with primary-level education, utilizing the Self-Instructional Module developed in this study.

3. Nursing Administration

- **Protocol Development:** Nurse administrators should advocate for standardized, age-and-gender-specific protocols in outpatient departments.
- **In-Service Training:** Specialized training programs should be organized for staff nurses on the early identification of CKD markers and the management of patients with multiple comorbidities.
- **Collaborative Care:** Administrators should facilitate partnerships between nephrology units and community health social support systems to bridge the gap in rural care access identified in this study.

4. Nursing Research

- **Standardization of Tools:** The researcher-developed tool, found feasible in this study, can be further validated and standardized for wider use in regional renal research.
- **Evidence-Based Reference:** This study serves as a baseline for future longitudinal studies investigating the causal relationship between specific local habits (e.g., Ayurvedic medicine use or high coconut oil intake) and renal decline.

LIMITATIONS

While this study provides valuable regional data, certain limitations must be acknowledged. The use of a **non-probability consecutive sampling technique** and a relatively small sample size (N=190) from specific centers in Kerala may limit the generalizability of the findings to the broader national population. Additionally, the reliance on self-reported data for lifestyle habits may introduce social desirability bias.

RECOMMENDATIONS

1. **Large-Scale Longitudinal Studies:** Future research should involve larger, multi-center cohorts to generalize findings across different geographic and ethnic populations in India.
2. **Community-Based Prevalence Surveys:** A shift from hospital-based to community-based screening is recommended to identify "silent" CKD cases in the early stages (Stages 1 and 2).
3. **Interventional Assessments:** Further studies are needed to evaluate the effectiveness of the **Self-Instructional Module** on improving patient knowledge, treatment adherence, and long-term quality

of life.

4. **Policy Advocacy:** Findings regarding high OTC use should be used to advocate for stricter regulations on nephrotoxic drug sales at the community level.

CONCLUSION

This study confirms that while clinical factors like Diabetes and Hypertension are the primary drivers of CKD in Northern Kerala, they are exacerbated by high rates of treatment irregularity and modifiable lifestyle risks, such as OTC drug use, fast food and soft drinks consumption. The transition from a "treating" role to a "preventative" role for nurses is essential. Through targeted education—exemplified by the self-instructional module—nurses can play a decisive role in reducing the regional burden of chronic kidney disease.

REFERENCES

1. World Health Organization. Global facts about kidney disease. Geneva: WHO; 2010.
2. Rajapurkar MM, John GT, Kirpalani AL, Abraham G, Agarwal SK, Almeida AF, et al. [What do we know about chronic kidney disease in India: first report of the Indian CKD registry](#). BMC Nephrol. 2012;13:10.
3. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, et al. Chronic kidney disease: global dimension and perspectives. Lancet. 2013;382(9888):260-72.
4. Vimala A. Indiscriminate use of analgesics and alternative medicines in CKD. Kozhikode Medical College Report; 2015.
5. Agarwal SK, Dash SC, Irshad M, Raju S, Singh R, Pandey RM. Prevalence of chronic renal failure in adults in Delhi, India. Nephrol Dial Transplant. 2005;20(8):1638-42.
6. Kher V. [End-stage renal disease in developing countries](#). Kidney Int. 2002;62(1):350-62.
7. Sreejith N, et al. [Epidemiology and risk factors of chronic kidney disease in India](#). Indian J Nephrol. 2011;21(4):220-4.