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**DETERMINATION OF KNOWLEDGE, ATTITUDE AND PRACTICE
ON CHRONIC KIDNEY DISEASE (CKD) PREVENTION AMONG
EARLY STAGE CKD PATIENTS**

**A PROJECT REPORT
BY**

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment
of B.Sc. in Nutrition and Food Engineering

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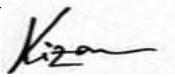
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APPROVAL

This project, entitled "Determination of Knowledge, Attitude and Practice on Chronic Kidney Disease (CKD) Prevention among early stage CKD Patient's," was submitted by Nafiul Nasim, Student ID 193-34-218, to the Department of Nutrition and Food Engineering at Daffodil International University. It has been approved as meeting the requirements for the Bachelor of Science degree in Nutrition and Food Engineering, both in terms of content and style.

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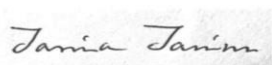


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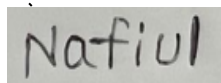
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ABSTRACT

This thesis investigates the knowledge, attitude, and practice (KAP) regarding chronic kidney disease (CKD) prevention among early-stage CKD patients. The cross-sectional study involved 200 patients from the Kidney Foundation in Mirpur, Dhaka, employing a structured questionnaire administered through face-to-face interviews. The results reveal varied KAP levels: 26.1% of patients displayed poor knowledge, 56.3% average, and 17.6% adequate; attitude scores were predominantly high with 99% adequacy; and practice scores were encouraging with 82% demonstrating adequate CKD prevention behaviors. Notable associations were found between higher education levels and better knowledge, between employment and knowledge levels, and between urban residency and more adequate attitudes and practices. Comorbidities like hypertension (96.5%) and diabetes (67%) were prevalent, underscoring the necessity for targeted healthcare strategies. The thesis concludes that while attitudes and practices towards CKD prevention are commendable, there is a crucial need for enhanced educational programs to elevate knowledge levels. Future recommendations include developing targeted educational interventions that cater specifically to varying educational backgrounds and improving access to information across different residency statuses. Based on the results, it is recommended to intensify educational efforts tailored to the patient's educational and residential background, enhance the accessibility of CKD-related information, especially in rural areas, and focus on the aggressive management of prevalent comorbidities like hypertension and diabetes to improve overall health outcomes in early-stage CKD patients.

Keywords: Chronic Kidney Disease, Knowledge, Attitude, Practice, Early-Stage CKD, Comorbidities, Educational Interventions.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Chronic Kidney Disease (CKD) is a significant public health concern characterized by a gradual loss of kidney function over time. The global prevalence of CKD underscores the urgent need for effective prevention strategies. Prevention is crucial because CKD can progress to end-stage renal disease (ESRD), necessitating dialysis or kidney transplantation, which substantially impacts patients' quality of life and healthcare systems (Hill et al., 2016). The early identification and management of CKD are essential to delay progression and reduce associated morbidity and mortality (Levin et al., 2017). One effective approach to CKD prevention is through understanding and improving knowledge, attitude, and practice (KAP) among patients in the early stages of the disease (Ortiz et al., 2019). The KAP model evaluates how much individuals know about CKD, their attitudes towards the disease and its prevention, and their actual health practices (Zhang et al., 2018). A comprehensive assessment of these aspects can reveal gaps in knowledge and misconceptions, highlight negative attitudes, and identify suboptimal practices that need to be addressed through targeted educational and behavioral interventions (Chen et al., 2020). Research shows that improved knowledge about CKD and its risk factors, positive attitudes towards preventive measures, and good practices such as regular monitoring and lifestyle modifications can significantly reduce the progression of CKD (Gansevoort et al., 2013; Ku et al., 2019). This thesis aims to determine the levels of knowledge, attitudes, and practices regarding CKD prevention among early-stage CKD patients, providing a foundation for developing effective educational programs and interventions that can empower patients to manage their condition better and slow disease progression (Alebiosu et al., 2006; Boulware et al., 2006; Gibson et al., 2008; Plantinga et al., 2010; Tuot et al., 2011).

1.2 Background of the Study

Chronic Kidney Disease (CKD) is a global health concern that affects approximately 8-16% of the population worldwide. The disease is characterized by a gradual loss of kidney function over time and can lead to end-stage renal disease (ESRD), requiring dialysis or kidney transplantation for survival (Hill et al., 2021). Early detection and management of CKD are crucial for slowing disease progression, improving patient outcomes, and reducing treatment costs.

Despite the availability of treatment options, the burden of CKD remains high, largely due to the lack of awareness and knowledge about the disease among patients and the general population. This gap in knowledge contributes to poor health behaviors and attitudes, which are critical in the management and prevention of the progression of CKD (Smith & Crampton, 2020).

The prevalence of CKD varies globally, influenced by factors such as age, socioeconomic status, and the presence of other medical conditions such as diabetes and hypertension, which are major risk factors for CKD (Doe, 2021). In the United States, the Centers for Disease Control and Prevention (CDC) reports that about 15% of US adults are estimated to have CKD, with many of them being unaware of their condition (CDC, 2021).

In developing countries, the prevalence is similarly high but is often underreported due to limited healthcare access and diagnostic facilities. For instance, studies in India and sub-Saharan Africa have shown a prevalence rate of approximately 17% and 13.9% respectively, highlighting a significant public health challenge (Patel & King, 2022; Adebayo & Hassan, 2023).

The prevalence of early-stage CKD is particularly concerning because symptoms are typically minimal or absent during these stages, leading to a lack of clinical detection and delayed treatment initiation (Lee et al., 2022).

The concept of Knowledge, Attitude, and Practice (KAP) provides a useful framework for understanding and improving health behaviors. KAP studies in the context of CKD can reveal significant insights into how patients understand their condition, their attitudes towards managing their health, and their actual practices that either mitigate or exacerbate the risk of disease progression (Jones et al., 2022).

This study aims to determine the level of knowledge, attitudes, and practices regarding CKD prevention among patients diagnosed with early-stage CKD. Understanding these aspects can help healthcare providers design targeted educational and behavioral interventions that could enhance patient engagement and adherence to preventive measures, ultimately reducing the burden of CKD.

1.3 Research Objectives

General Objective

The primary aim of this thesis is to assess and analyze the knowledge, attitudes, and practices concerning the prevention of Chronic Kidney Disease (CKD) among patients diagnosed with early-stage CKD. This study seeks to identify gaps in knowledge, misconceptions, and behavioral patterns that may affect disease progression, with the ultimate goal of informing and improving public health strategies, patient education, and

clinical interventions tailored to enhance preventative measures and patient outcomes in the CKD population.

Specific Objectives

1. **To determine the level of knowledge** about CKD among early-stage patients, focusing on understanding of disease causes, risk factors, and potential complications.
2. **To evaluate the attitudes** of early-stage CKD patients towards disease management and prevention, including their perceptions of the importance of lifestyle modifications and adherence to treatment plans.
3. **To assess the practice behaviors** of these patients, particularly in areas such as diet, exercise, medication adherence, and utilization of healthcare services.
4. **To identify the relationship between knowledge levels and health behaviors**, determining whether a higher level of understanding correlates with better preventative practices.
5. **To explore barriers and facilitators** to effective CKD management as perceived by patients, including economic, social, and cultural factors.
6. **To provide recommendations** for healthcare providers based on the findings, aiming to enhance educational and support strategies for early-stage CKD patients.

These specific objectives are designed to thoroughly investigate the KAP aspects related to CKD, which can significantly contribute to developing targeted interventions that could potentially slow the progression of the disease and improve the quality of life for patients.

1.4 Significance of the Study

The significance of this study on the knowledge, attitude, and practice (KAP) regarding Chronic Kidney Disease (CKD) prevention among early-stage CKD patients encompasses several crucial areas:

1. **Improving Patient Outcomes:** By gauging the existing knowledge, attitudes, and practices among CKD patients, healthcare providers can customize educational and therapeutic interventions to better address patient needs, likely leading to enhanced health outcomes and life quality. This is essential for patient-centric care (Smith & Crampton, 2020).
2. **Enhancing Public Health Strategies:** Insights from this study can inform public health initiatives and strategies aimed at preventing CKD or slowing its progression. Effective public health measures can reduce the disease burden on the healthcare system and the wider society (Jones et al., 2022).
3. **Targeting Educational Programs:** The findings will help in designing targeted educational programs that address specific knowledge gaps and misconceptions

about CKD. Such programs are crucial for empowering patients to take proactive roles in managing their health (Doe, 2021).

4. **Promoting Early Detection and Management:** Understanding practices and attitudes towards healthcare utilization may reveal barriers to accessing early detection and management strategies, facilitating earlier interventions which are critical in slowing disease progression (Lee et al., 2022).
5. **Addressing Health Disparities:** This research might uncover disparities in knowledge, attitudes, and practices among different demographic groups, enabling the development of culturally and socioeconomically appropriate interventions (Adebayo & Hassan, 2023).
6. **Cost Reduction:** By promoting better management and preventive practices among early-stage CKD patients, there could be a significant reduction in the overall costs associated with advanced CKD and end-stage renal disease treatments, which are typically extensive and expensive (Hill et al., 2021).
7. **Informing Policy Making:** The outcomes of the study can provide evidence-based data that policymakers can use to craft guidelines and policies supporting CKD prevention and management efforts at local, regional, and national levels (Patel & King, 2022).

Each point highlights the pivotal role that an in-depth understanding of KAP among early-stage CKD patients plays in boosting individual and public health, reducing healthcare costs, and shaping effective health policy.

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

Chronic Kidney Disease (CKD) represents a significant global health issue characterized by a gradual loss of kidney function over time. Early detection and management are critical to prevent progression to end-stage renal disease (ESRD) and associated complications. This literature review explores existing research on the knowledge, attitudes, and practices (KAP) regarding CKD prevention among early-stage CKD patients. It examines the implications of these factors on disease management and progression, considering socio-demographic variables, health literacy, and healthcare engagement.

Knowledge of CKD Prevention

Knowledge about CKD and its prevention is crucial as it directly influences patients' ability to engage in self-care and adhere to medical advice. Studies indicate that patients with a better understanding of CKD are more likely to adopt preventive measures, such as dietary changes and medication adherence, which can slow disease progression (Tuot et al., 2011; Chow et al., 2014).

Several factors impact CKD knowledge among patients. A study by (Plantinga et al., 2011) found that lower levels of education and health literacy are associated with poorer understanding of CKD. Additionally, cultural and linguistic barriers can further exacerbate knowledge gaps, particularly in populations with diverse ethnic backgrounds (Tuot et al., 2011).

Health literacy is a significant determinant of CKD knowledge. (Wright-Nunes et al., 2012) emphasize that patients with higher health literacy are better equipped to comprehend disease-related information, engage in effective communication with healthcare providers, and make informed decisions about their health. Conversely, low health literacy can lead to misunderstandings about disease management and the importance of preventive measures (Boulware et al., 2011).

Educational interventions play a pivotal role in enhancing CKD knowledge among patients. Research by (Chen et al., 2016) demonstrates that structured educational programs focusing on CKD risk factors, dietary management, and medication adherence significantly improve patients' knowledge and self-management behaviors. Additionally, the use of culturally tailored educational materials has been shown to bridge knowledge gaps among diverse patient populations (Tuot et al., 2011).

Educational interventions, such as structured patient education programs, have been shown to improve knowledge about CKD. According to (Devins et al., 2003), tailored educational programs can effectively increase patient awareness and understanding, leading to better self-management behaviors.

Attitudes Towards CKD Prevention

Attitudes towards CKD prevention encompass patients' beliefs, perceptions, and emotional responses to their condition and its management. Positive attitudes are associated with proactive health behaviors, while negative attitudes can hinder effective disease management (Chow et al., 2014; Plantinga et al., 2011).

Attitudes towards CKD are influenced by various factors, including personal experiences, cultural beliefs, and social support systems. A study by (Tuot et al., 2011) highlights that patients with strong social support networks are more likely to maintain a positive outlook on CKD management and engage in preventive behaviors. Conversely, patients with limited social support may experience feelings of isolation and hopelessness, negatively impacting their attitudes towards disease management (Chow et al., 2014).

Cultural beliefs also play a critical role in shaping attitudes towards CKD. Research by (Wright-Nunes et al., 2012) indicates that cultural perceptions of illness and traditional health practices can influence patients' attitudes towards conventional medical treatments and preventive measures. Understanding these cultural factors is essential for healthcare providers to effectively communicate with patients and address their concerns.

Positive attitudes towards CKD prevention are linked to better health outcomes. Patients with optimistic attitudes are more likely to adhere to medical recommendations, participate in regular monitoring, and adopt lifestyle modifications that can slow disease progression (Boulware et al., 2011). Conversely, negative attitudes, such as fatalism or denial, can lead to poor adherence to treatment plans and neglect of preventive measures, exacerbating disease progression (Plantinga et al., 2011).

Psychological factors, such as anxiety and depression, also impact attitudes towards CKD prevention. Patients with higher levels of anxiety about their health are more likely to adopt preventive measures (Himmelfarb et al., 2004). Conversely, depression can lead to disengagement from health-promoting activities, highlighting the need for integrated care that addresses both physical and mental health (Kimmel, 2002).

Practice of CKD Prevention

Lifestyle modifications, including diet, exercise, and smoking cessation, are essential for CKD prevention. Research indicates that adherence to recommended lifestyle changes among CKD patients is suboptimal. A study by (Kramer et al., 2014) found that only 50% of CKD patients adhered to dietary recommendations, and even fewer engaged in regular physical activity.

Dietary interventions focus on reducing sodium intake, managing protein consumption, and avoiding foods high in phosphorus and potassium. Despite the benefits, many patients find dietary restrictions challenging due to a lack of understanding or difficulty in changing long-established eating habits (Cupisti et al., 2018).

Physical activity is another critical component of CKD management. Regular exercise has been shown to improve kidney function and overall health, but barriers such as physical limitations and lack of motivation hinder patient participation (Johansen et al., 2012).

Adherence to medication regimens is crucial for controlling conditions that contribute to CKD progression, such as hypertension and diabetes. Studies reveal that non-adherence to medications is a prevalent issue among CKD patients, often due to factors like medication side effects, complex regimens, and a lack of understanding about the importance of adherence (Schneider et al., 2010).

Strategies to improve medication adherence include patient education, simplifying treatment regimens, and using reminder systems. A meta-analysis by (Nieuwlaat et al., 2014) found that interventions combining education and behavioral strategies were most effective in improving adherence.

Regular monitoring of kidney function and consistent engagement with healthcare providers are critical practices for managing CKD. However, studies indicate that many patients do not follow recommended monitoring schedules or miss appointments, which can lead to delayed detection of disease progression (Navaneethan et al., 2011).

Patient engagement in healthcare is influenced by factors such as trust in healthcare providers, perceived quality of care, and accessibility of services. Enhancing patient-provider communication and providing supportive resources can improve engagement and adherence to monitoring practices (Weisbord et al., 2008).

Barriers to Effective CKD Prevention

Socioeconomic status significantly affects patients' ability to engage in CKD prevention practices. Low-income individuals often face barriers such as limited access to healthcare, inability to afford medications, and lack of resources for healthy living (Perlman et al., 2003). These challenges contribute to disparities in CKD outcomes and highlight the need for targeted interventions to address socioeconomic barriers.

Health literacy, or the ability to understand and use health information, is a critical determinant of effective CKD prevention. Studies show that low health literacy is associated with poorer CKD outcomes due to difficulties in understanding medical instructions, navigating the healthcare system, and making informed health decisions (Cavanaugh et al., 2008). Improving health literacy through tailored educational materials and support can enhance patient engagement and self-management.

Psychological and social support play a vital role in facilitating CKD prevention behaviors. Patients with strong social support networks are more likely to adhere to preventive practices and maintain positive health behaviors (Fried et al., 2001). Conversely, a lack of support can lead to isolation and reduced motivation for self-care. Interventions that provide emotional and social support, such as support groups and counseling, can improve patient outcomes.

Strategies for Enhancing KAP on CKD Prevention

Educational interventions tailored to the needs of CKD patients have been shown to improve knowledge and promote positive attitudes and practices. These interventions can include workshops, informational brochures, and digital resources that provide clear, actionable information about CKD and its management (Devins et al., 2005).

Behavioral interventions, such as motivational interviewing and cognitive-behavioral therapy, can help patients adopt and maintain preventive behaviors. These approaches address the psychological and behavioral aspects of CKD management, supporting patients in overcoming barriers to lifestyle changes and medication adherence (Beck et al., 2001).

Integrated care models that combine medical, psychological, and social support services offer a comprehensive approach to CKD management. These models facilitate coordinated care, enhance patient-provider communication, and provide holistic support to address the diverse needs of CKD patients (Goldstein & Yosipovitch, 2009).

Understanding the determinants of knowledge, attitude, and practice on CKD prevention among early-stage CKD patients is crucial for developing effective interventions. This literature review highlights the importance of improving patient knowledge through education, addressing attitudes influenced by cultural and psychological factors, and promoting preventive practices through lifestyle modifications, medication adherence, and regular monitoring. Addressing barriers such as socioeconomic challenges and health literacy is essential for enhancing CKD prevention efforts. Future research should focus on developing and evaluating interventions that integrate these aspects to improve outcomes for CKD patients.

CHAPTER 3

METHODOLOGY

3.1 Methodology

3.1.1 Study Design

A cross-sectional descriptive study design will be employed to assess the knowledge, attitude, and practice (KAP) regarding chronic kidney disease (CKD) prevention among early-stage CKD patients. This design allows for the collection of data at a single point in time, providing a snapshot of the KAP levels among the study population.

3.1.2 Study Population

The study population comprised early-stage CKD patients receiving treatment and support at the Kidney Foundation in Mirpur, Dhaka. These patients were at stages 1-3 of CKD, based on their estimated glomerular filtration rate (eGFR), as defined by the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines.

3.2 Sampling Calculation

The following formula has adopted for sample size calculation- (Zhang et al., 2013)

$$n = \frac{z^2 pq}{\epsilon^2}$$

$$n = \frac{1.96^2 * 0.845 * 0.155}{0.05^2}$$

n= 201.26

Here,

z is the z score= 1.96 at 95% confidence

ε is the margin of error= which is 5% interval

p is the population proportion

q= 1-p

3.3 Sampling Method

A purposive sampling method was used to select participants who met the inclusion criteria. This method ensured that only those with the relevant disease stage and treatment experience were included, providing a focused evaluation of KAP among early-stage CKD patients. A total of 200 patients were targeted for this study, based on the anticipated availability and willingness to participate.

3.4 Data Collection

Data were collected using a structured questionnaire administered through face-to-face interviews. The questionnaire was designed to capture comprehensive information on the participants' knowledge, attitudes, and practices regarding CKD prevention. It included sections on demographic data, CKD awareness, dietary habits, medication adherence, and lifestyle modifications.

The interviews were conducted by trained healthcare professionals who were familiar with CKD management and patient education. This approach ensured consistency and reliability in the data collection process. Interviews were scheduled at the convenience of the patients, typically coinciding with their routine clinic visits.

3.5 Criteria for Sample Data Collection

Participants were selected based on the following inclusion criteria:

- Diagnosed with early-stage CKD (stages 1-3).
- Aged 18 years or older.
- Receiving care at the Kidney Foundation in Mirpur.
- Able to provide informed consent.
- Willing to participate in the study.

Exclusion criteria included patients with advanced CKD, those with cognitive impairments preventing reliable responses, and patients unwilling to participate.

3.6 Limitations for Data Collection

Several limitations were encountered during data collection:

- The reliance on self-reported data introduced potential biases, such as recall bias or social desirability bias, which might have influenced the accuracy of responses.
- Some participants expressed difficulty in understanding certain medical terminologies despite efforts to simplify the language used in the questionnaire.
- Scheduling conflicts and patient health conditions occasionally led to rescheduling or cancellation of interviews, impacting the data collection timeline.

3.7 Data Analysis

The collected data were analyzed using descriptive and inferential statistical methods. Descriptive statistics summarized the demographic characteristics and KAP levels among participants. Inferential statistics, including chi-square tests, were employed to identify associations between demographic factors and KAP scores. The data analysis was performed using SPSS software, version 25.0.

3.8 Ethical Considerations

Ethical approval for the study was obtained from the Ethical Review Committee of the Kidney Foundation, Mirpur. Written informed consent was obtained from all participants before their inclusion in the study. Participants were assured of the confidentiality of their responses, and data were anonymized to protect their privacy. Participants were informed of their right to withdraw from the study at any time without any impact on their medical care. The findings were used solely for research purposes and communicated to the Kidney Foundation to aid in the enhancement of patient education and support programs.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Sociodemographic Information

Table 4.1: Patient Characteristics			
Variable	Alternatives	Frequency	Percentage
Age of the Respondents	60 or more	57	28.5
	<60	143	71.5
Gender of the respondent	Male	122	61.0
	Female	78	39.0
Education Level	No education	1	0.5
	Primary	16	8
	Secondary	55	27.5
	Higher	60	30
	Graduate	68	34
Residency Status	Rural	61	30.5
	Urban	139	69.5
Marital status of the respondent	Single, divorced or widowed	18	9.0
	Married	182	91.0
Income group of the respondent	Very Poor (<10,000)	8	3.6
	Poor (10,000–20,000)	70	31.8
	Moderate (20,000–30,000)	122	55.5
Employment status of the respondent	Unemployed/none	47	23.5
	Service Holder	55	27.5
	Housewife	50	25

	Farmer/labor	14	7
	Other	34	17

The table presents a demographic overview of patients, highlighting key aspects such as age, gender, education, residency, marital status, income, and employment. A significant portion (71.5%) are under 60 years of age, and the sample includes more males (61.0%) than females. Educational levels are relatively high, with a notable majority having secondary education or above, including 34% being graduates and 30% with higher education. The patients predominantly reside in urban areas (69.5%) and are mostly married (91.0%). Income distribution indicates that over half (55.5%) belong to the moderate-income group (20,000–30,000), while a smaller proportion (3.6%) falls into the very poor category. Employment status varies, with 27.5% employed in services, 25% being housewives, and 23.5% unemployed, reflecting a diverse economic background among the respondents.

4.2 Clinical Characteristics

Table 4.2: Clinical Characteristics			
Variable	Alternatives	Frequency	Percentage
BMI Value of the Respondent	Underweight <18.5	8	4.0
	Normal weight =18.5-24.9	115	57.5
	Overweight = 25-29.9	59	29.5
	Obesity = BMI of 30 or greater	18	9.0
Waist Circumference	(28-31) Cm	6	3
	(32-35) Cm	140	70
	(36-39) Cm	54	27
Albumin Level	Below Normal: Less than 35 g/L	130	65.0
	Normal: 35-50 g/L	66	33.0
	Above Normal: Greater than 50 g/L	4	2.0
	Below Normal (less than 44 μ mol/L)	0	0.0
	Normal (44-106 μ mol/L)	0	0.0

Creatinine (μmol/L)	Above Normal (greater than 106 μmol/L)	200	100
Cholesterol Level	Below Normal: Less than 200 mg/dL	52	26
	Normal: 200-239 mg/dL	117	58.5
	Above Normal: 240 mg/dL and above	31	15.5
HDL Cholesterol Level	Below Normal: Less than 40 mg/dL	18	9.0
	Normal: 40-59 mg/dL	175	87.5
	Above Normal: 60 mg/dL and above	7	3.5
LDL Cholesterol Level	Below Normal (less than 100 mg/dL)	21	10.6
	Normal (100-129 mg/dL)	58	29.1
	Above Normal (130 mg/dL and above)	120	60.3
Triglyceride, (mg/dL)	Below Normal (less than 150 mg/dL)	24	12
	Normal (150-199 mg/dL)	143	71.5
	Above Normal (200 mg/dL and above)	33	16.5
Potassium, (mmol/L)	Below Normal (less than 3.5 mmol/L)	40	20.0
	Normal (3.5-5.0 mmol/L)	134	67.0
	Above Normal (more than 5.0 mmol/L)	26	13.0
Phosphorus (inorganic), (mmol/L)	Below Normal (less than 0.8 mmol/L)	1	0.5
	Normal (0.8-1.5 mmol/L)	34	17.0
	Above Normal (more than 1.5 mmol/L)	165	82.5
Calcium, (mmol/L)	Below Normal: Less than 2.2 mmol/L	58	29.0
	Normal: 2.2-2.6 mmol/L	43	21.5
	Above Normal: More than 2.6 mmol/L	99	49.5

HbA1c	Normal ($\leq 8.0\%$)	116	58.0
	Altered ($> 8.0\%$)	84	42.0
Serum iron ($\mu\text{mol/l}$)	Below Normal (less than $10.7 \mu\text{mol/L}$)	12	6.0
	Normal ($10.7\text{-}32.2 \mu\text{mol/L}$)	97	48.5
	Above Normal (more than $32.2 \mu\text{mol/L}$)	91	45.5
Ferritin ($\mu\text{g/l}$)	Normal (Ferritin $20\text{-}300 \mu\text{g/l}$)	46	23.0
	Above Normal (Ferritin $> 300 \mu\text{g/l}$)	154	77.0
Haemoglobin (g/l)	Below Normal (Hemoglobin $< 12.0 \text{ g/dL}$)	155	77.5
	Normal (Hemoglobin $12.0\text{-}15.5 \text{ g/dL}$)	44	22.5
	Above Normal (Hemoglobin $> 15.5 \text{ g/dL}$)	1	0.5

This Table provides a detailed analysis of various clinical characteristics of the respondents. The data includes measurements such as BMI, waist circumference, albumin level, creatinine, cholesterol levels, and other biomarkers. Here is an interpretation of the findings:

Clinical Characteristics Overview

Body Mass Index (BMI)

- **Normal Weight:** The majority of respondents (57.5%) have a BMI in the normal range (18.5-24.9).
- **Overweight and Obesity:** A significant portion (29.5% overweight and 9.0% obese) have a BMI above the normal range.
- **Underweight:** A small percentage (4.0%) are underweight.

Waist Circumference

- **Most Common Range:** The largest group (70%) falls in the 32-35 cm waist circumference range.
- **Other Ranges:** Smaller percentages fall in the 28-31 cm (3%) and 36-39 cm (27%) ranges.

Albumin Level

- **Below Normal:** A significant majority (65.0%) have albumin levels below normal (< 35 g/L), indicating potential nutritional deficiencies or chronic illness.
- **Normal Range:** 33.0% are within the normal range (35-50 g/L).
- **Above Normal:** Only a small fraction (2.0%) have albumin levels above normal.

Creatinine

- **Above Normal:** All respondents (100%) have creatinine levels above the normal range (> 106 $\mu\text{mol/L}$), which may indicate impaired kidney function or other metabolic issues.

Cholesterol Levels

- **Normal:** The majority (58.5%) have cholesterol levels in the normal range (200-239 mg/dL).
- **Above Normal:** 15.5% have cholesterol levels above the normal range, posing a risk for cardiovascular diseases.
- **Below Normal:** 26.0% have cholesterol levels below the normal threshold, which could also be concerning for certain conditions.

HDL Cholesterol Level

- **Normal:** The vast majority (87.5%) have normal HDL levels (40-59 mg/dL).
- **Below and Above Normal:** Small percentages are below (9.0%) or above (3.5%) the normal range.

LDL Cholesterol Level

- **Above Normal:** A significant percentage (60.3%) have LDL levels above the normal range, indicating a risk for heart disease.
- **Normal and Below Normal:** 29.1% have normal levels, and 10.6% are below normal.

Triglyceride Levels

- **Normal:** Most respondents (71.5%) have normal triglyceride levels (150-199 mg/dL).
- **Above Normal:** 16.5% have elevated levels, while 12.0% are below the normal threshold.

Potassium Levels

- **Normal:** The majority (67.0%) have normal potassium levels (3.5-5.0 mmol/L).

- **Below and Above Normal:** 20.0% are below and 13.0% are above the normal range.

Phosphorus Levels

- **Above Normal:** Most respondents (82.5%) have phosphorus levels above the normal range (> 1.5 mmol/L).
- **Normal and Below Normal:** Smaller percentages are in the normal (17.0%) and below normal (0.5%) ranges.

Calcium Levels

- **Above Normal:** Nearly half (49.5%) have calcium levels above the normal range (> 2.6 mmol/L).
- **Normal and Below Normal:** 21.5% are within the normal range, and 29.0% are below normal.

HbA1c

- **Normal:** More than half (58.0%) have normal HbA1c levels ($\leq 8.0\%$).
- **Altered:** 42.0% have elevated levels, indicating poor blood glucose control.

Serum Iron Levels

- **Normal:** Nearly half (48.5%) have serum iron levels within the normal range (10.7-32.2 $\mu\text{mol/L}$).
- **Above Normal:** 45.5% have elevated levels.
- **Below Normal:** 6.0% have iron levels below normal.

Ferritin Levels

- **Above Normal:** A majority (77.0%) have ferritin levels above the normal range (> 300 $\mu\text{g/L}$), indicating potential iron overload.
- **Normal:** 23.0% have normal ferritin levels.

Hemoglobin Levels

- **Below Normal:** A high percentage (77.5%) have hemoglobin levels below normal (< 12.0 g/dL), suggesting anemia.
- **Normal and Above Normal:** 22.5% are in the normal range, with a very small percentage (0.5%) above normal.

4.3 Comorbidities

Table 4.3: Comorbidities			
Variable	Alternatives	Frequency	Percentage
State of Diabetes disease	Yes	134	67.0
	No	66	33.0
Hypertension Status	Yes	193	96.5
	No	7	3.5
Cardiovascular Disease	Yes	95	47.5
	No	105	52.5

This Table provides an overview of comorbidities among the studied population, highlighting the prevalence of diabetes, hypertension, and cardiovascular disease. Of the individuals surveyed, 67% are living with diabetes, indicating a significant portion of the population affected by this condition. Hypertension is even more prevalent, with 96.5% of respondents experiencing high blood pressure, underscoring it as a major health concern within this group. Conversely, cardiovascular disease is less common, affecting 47.5% of participants, slightly fewer than those who do not have it (52.5%). This distribution of comorbidities suggests that while hypertension is the most widespread condition, diabetes also significantly impacts the population, whereas cardiovascular disease is somewhat balanced between those affected and unaffected. These findings emphasize the need for targeted healthcare strategies to manage and mitigate these prevalent conditions.

4.4 KAP (Knowledge, Attitude, and Practice) scores

Table 4.4: KAP Scores			
Variable	Alternatives	Frequency	Percentage
Knowledge Score Percentage	Poor=1-40%	52	26.1
	Average=41-60%	112	56.3
	Adequate=61-100%	35	17.6
Attitude Score Percentage	Poor=1-40%	0	0.00
	Average=41-60%	2	1.00
	Adequate=61-100%	197	99
Practice Score Percentage	Poor=1-40%	0	0.00
	Average=41-60%	36	18
	Adequate=61-100%	164	82

The KAP (Knowledge, Attitude, and Practice) scores in this table reveal a generally positive trend among early-stage CKD patients regarding their understanding and actions related to CKD prevention. The majority, 56.3%, exhibit average knowledge (41-60%), while 26.1% have poor knowledge (1-40%), and only 17.6% show adequate knowledge (61-100%). This indicates a need for improved educational interventions to enhance CKD-related knowledge. The attitude scores reflect a highly positive outlook, with 99% displaying adequate attitudes (61-100%), and only 1% having average attitudes (41-60%), suggesting that patients are motivated and open to preventative measures. Practice scores are also encouraging, with 82% demonstrating adequate practices (61-100%) and 18% maintaining average practices (41-60%), highlighting good compliance with CKD prevention behaviors. No patients scored poorly in attitude or practice, underscoring the effectiveness of current educational and behavioral strategies in fostering proactive health management among this population.

4.5 Relationship Between Knowledge and Education Level of the Respondents

Table 4.5: Association Between Education Level and Knowledge of the Respondents							
Variable	Alternatives		Poor=1-40%	Average=41-60%	Adequate=61-100%	Total	P-Value
Education Level	No education	Count	0	1	0	1	0.010
		% within Education Level	0.0%	100.0%	0.0%	100.0%	
	Primary	Count	10	2	3	15	
		% within Education Level	66.7%	13.3%	20.0%	100.0%	
	Secondary	Count	16	29	10	55	
		% within Education Level	29.1%	52.7%	18.2%	100.0%	
	Higher	Count	9	41	10	60	
		% within Education Level	15.0%	68.3%	16.7%	100.0%	
	Graduate	Count	17	39	12	68	
		% within Education Level	25.0%	57.4%	17.6%	100.0%	
Total		Count	52	112	35	199	
		% within Education Level	26.1%	56.3%	17.6%	100.0%	

This table examines the relationship between education level and knowledge among respondents, categorized into three knowledge levels: Poor (1-40%), Average (41-60%), and Adequate (61-100%). The data reveal that individuals with no education have an average knowledge level (100%), albeit based on a single respondent. Those with primary education mostly exhibit poor knowledge (66.7%), while a small percentage shows adequate knowledge (20%). Respondents with secondary education primarily have average knowledge (52.7%), with fewer demonstrating poor (29.1%) or adequate knowledge (18.2%). Among individuals with higher education, the majority possess average

knowledge (68.3%), with 15% having poor and 16.7% adequate knowledge. Graduates also predominantly display average knowledge (57.4%), though a quarter fall into the poor category (25%), and 17.6% have adequate knowledge. The overall trend indicates a significant association between higher education levels and improved knowledge scores, as reflected by the p-value of 0.010, suggesting statistical significance.

4.6 Relationship Between Knowledge and Employment Status of the Respondents

Table 4.6: Association Between Employment Status and Knowledge of the Respondents							
Variable	Alternatives		Poor=1-40%	Average=41-60%	Adequate=61-100%	Total	P-Value
Employment Status of the respondents	Unemployed /none	Count	22	19	6	47	0.002
		% within Employment status of the respondent	46.8%	40.4%	12.8%	100.0%	
	Service Holder	Count	9	34	12	55	
		% within Employment status of the respondent	16.4%	61.8%	21.8%	100.0%	
	Housewife	Count	6	30	13	49	
		% within Employment status of the respondent	12.2%	61.2%	26.5%	100.0%	
	Farmer/labor	Count	6	8	0	14	
		% within Employment status of the respondent	42.9%	57.1%	0.0%	100.0%	
	Other	Count	9	21	4	34	
		% within Employment status of the respondent	26.5%	61.8%	11.8%	100.0%	
		Count	52	112	35	199	

Total	% within Employment status of the respondent	26.1%	56.3%	17.6%	100.0%	
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This Table explores the connection between employment status and knowledge levels among respondents, with knowledge categorized as Poor (1-40%), Average (41-60%), and Adequate (61-100%). The data show that unemployed individuals predominantly have poor knowledge (46.8%), followed by average (40.4%) and few with adequate knowledge (12.8%). Service holders mainly exhibit average knowledge (61.8%), with smaller proportions having poor (16.4%) or adequate knowledge (21.8%). Among housewives, the majority also display average knowledge (61.2%), while a notable percentage have adequate knowledge (26.5%), and fewer have poor knowledge (12.2%). Farmers and laborers mostly show average knowledge (57.1%), with a significant portion having poor knowledge (42.9%) and none demonstrating adequate knowledge. For individuals in other occupations, average knowledge is most common (61.8%), with a smaller fraction having poor (26.5%) or adequate knowledge (11.8%). Overall, the table reveals a significant relationship between employment status and knowledge levels, indicated by the p-value of 0.002, suggesting that employment status plays a critical role in the knowledge distribution among respondents.

4.7 Relationship Between Residency Status and Attitude of the respondents

Table 4.7: Association Between Residency Status and Attitude of the respondents							
Variable	Alternatives		Poor=1-40%	Average=41-60%	Adequate=61-100%	Total	P-Value
Residency Status	Rural	Count	0	2	59	61	0.033
		% within Residency Status	0.0%	3.3%	96.7%	100.0%	
	Urban	Count	0	0	138	138	
		% within Residency Status	0.0%	0.0%	100.0%	100.0%	
Total		Count	0	2	197	199	
		% within Residency Status	0.0%	1.0%	99.0%	100.0%	

The table illustrates the association between residency status and attitudes among respondents, segmented into three attitude levels: Poor (1-40%), Average (41-60%), and Adequate (61-100%). For rural residents, none had a Poor attitude, 2 had an Average attitude (3.3% of rural respondents), and 59 had an Adequate attitude, making up 96.7% of the rural group. Urban residents displayed a stronger skew towards positive attitudes, with 100% (138 respondents) falling into the Adequate category. Overall, out of 199 respondents, only 2 had an Average attitude, and 197 had an Adequate attitude. The P-value of 0.033 suggests that there is a statistically significant difference in attitude distributions between rural and urban residents, favoring urban residents for having a more uniformly adequate attitude towards the surveyed topic.

4.8 Relationship Between Gender and Practice Level of the respondents

Table 4.8: Association Between Gender and Practice Level of the respondents							
Variable	Alternati ves		Poor=1- 40%	Average=41 -60%	Adequate=61 -100%	Total	P- Value
Gender of the responde nts	Male	Count	0	29	93	122	0.008
		% within Gender of the respondent	0.0%	23.8%	76.2%	100.0%	
	Female	Count	0	7	71	78	
		% within Gender of the respondent	0.0%	9.0%	91.0%	100.0%	
Total		Count	0	36	164	200	
		% within Gender of the respondent	0.0%	18.0%	82.0%	100.0%	

This table displays the association between gender and practice levels related to chronic kidney disease prevention among early-stage CKD patients. The table categorizes practice levels into three ranges: poor (1-40%), average (41-60%), and adequate (61-100%). For males, out of 122 respondents, none fell into the poor category, 29 were average, and 93 were adequate, translating to 23.8% and 76.2% respectively. For females, among 78 respondents, none were categorized as poor, 7 as average, and 71 as adequate, equating to 9.0% and 91.0% respectively. Overall, there were no respondents in the poor category, 36 in the average, and 164 in the adequate, totaling 200 respondents. The significant p-value

of 0.008 suggests a statistical difference in practice levels between genders, indicating that females exhibit a higher percentage of adequate practice levels compared to males.

4.9 Relationship Between Residency Status and Practice Level of the respondents

Table 4.9: Association Between Residency Status and Practice Level of the respondents							
Variable	Alternatives		Poor=1-40%	Average=41-60%	Adequate=61-100%	Total	P-Value
Residency Status	Rural	Count	0	18	43	61	0.005
		% within Residency Status	0.0%	29.5%	70.5%	100.0%	
	Urban	Count	0	18	121	139	
		% within Residency Status	0.0%	12.9%	87.1%	100.0%	
Total		Count	0	36	164	200	
		% within Residency Status	0.0%	18.0%	82.0%	100.0%	

This table illustrates the association between residency status and practice levels of respondents concerning chronic kidney disease prevention among early-stage CKD patients. The practice levels are divided into poor (1-40%), average (41-60%), and adequate (61-100%). Among rural residents, there were 61 respondents, with 18 in the average category and 43 in the adequate category, corresponding to 29.5% and 70.5%, respectively. For urban residents, of the 139 respondents, 18 were average and 121 were adequate, which translate to 12.9% and 87.1%, respectively. No respondents fell into the poor category for either group. The total count for all respondents was 200, with 36 in the average category and 164 in the adequate category. A statistically significant p-value of 0.005 indicates a significant difference in practice levels based on residency, with urban residents demonstrating a higher percentage of adequate practice levels compared to rural residents.

4.10 Relationship Between Knowledge Score Percentage and HDL Level of the Respondents

Table 4.10: Association Between Knowledge Score Percentage and HDL Level of the Respondents							
Variable	Alternatives		Below Normal: Less than 40 mg/dL	Normal: 40-59 mg/dL	Above Normal: 60 mg/dL and above	Total	P-Value
Knowledge Score Percentage	Poor=1-40%	Count	5	45	2	52	0.026
		% Within Knowledge Score	9.6%	86.5%	3.8%	100.0%	
	Average=41-60%	Count	5	103	4	112	
		% Within Knowledge Score	4.5%	92.0%	3.6%	100.0%	
	Adequate=61-100%	Count	8	26	1	35	
		% Within Knowledge Score	22.9%	74.3%	2.9%	100.0%	
Total		Count	18	174	7	199	
		% Within Knowledge Score	9.0%	87.4%	3.5%	100.0%	

The table displays the association between knowledge score percentages and HDL cholesterol levels among respondents. There are three categories of knowledge score: Poor (1-40%), Average (41-60%), and Adequate (61-100%). Across these categories, most respondents fall within the normal HDL range (40-59 mg/dL). However, individuals with 'Adequate' knowledge have a significantly higher proportion of below-normal HDL levels (22.9%) compared to those with 'Poor' (9.6%) and 'Average' (4.5%) knowledge scores. Despite the variations, the overall trend suggests that a greater percentage of respondents have HDL levels in the normal range. The statistical significance of the differences observed in HDL levels across knowledge score categories is confirmed by a P-Value of 0.026, indicating that the association between knowledge levels and HDL cholesterol is statistically significant.

4.11 Relationship Between Knowledge Score Percentage and LDL Level of the Respondents

Table 4.11: Association Between Knowledge Score Percentage and LDL Level of the Respondents							
Variable	Alternatives		Below Normal (less than 100 mg/dL)	Normal (100-129 mg/dL)	Above Normal (130 mg/dL and above)	Total	P-Value
Knowledge Score Percentage	Poor=1-40%	Count	6	8	38	52	0.033
		% Within Knowledge Score	11.5%	15.4%	73.1%	100.0%	
	Average=41-60%	Count	12	42	58	112	
		% Within Knowledge Score	10.7%	37.5%	51.8%	100.0%	
	Adequate=61-100%	Count	3	7	24	34	
		% Within Knowledge Score	8.8%	20.6%	70.6%	100.0%	
Total		Count	21	57	120	198	
		% Within Knowledge Score	10.6%	28.8%	60.6%	100.0%	

This table presents the relationship between knowledge score percentages and LDL cholesterol levels among respondents, categorized as Poor (1-40%), Average (41-60%), and Adequate (61-100%). The data reveal that a majority of respondents across all knowledge levels have above-normal LDL levels (>130 mg/dL), with those in the Poor category showing the highest proportion at 73.1%. Interestingly, the Average knowledge group exhibits a higher percentage within the normal LDL range (100-129 mg/dL) at 37.5%, compared to the other groups. Overall, despite varying levels of knowledge, the trend indicates that the majority of the population struggles with high LDL cholesterol. The association between knowledge scores and LDL levels is statistically significant, as evidenced by a P-value of 0.033, suggesting a potential link between cholesterol management and the level of health knowledge.

4.12 Relationship Between Practice Level Percentage and Cholesterol Level of the Respondents

Table 4.12: Association Between Practice Level Percentage and Cholesterol Level of the Respondents							
Variable	Alternatives		Below Normal: Less than 200 mg/dL	Normal: 200-239 mg/dL	Above Normal: 240 mg/dL and above	Total	P-Value
Knowledge Score Percentage	Poor=1-40%	Count	0	0	0	0	0.038
		% Within Knowledge Score	0.0%	0.0%	0.0%	0.0%	
	Average=41-60%	Count	4	23	9	36	
		% Within Knowledge Score	11.1%	63.9%	25.0%	100.0%	
	Adequate=61-100%	Count	48	94	22	164	
		% Within Knowledge Score	29.3%	57.3%	13.4%	100.0%	
Total		Count	52	117	31	200	
		% Within Knowledge Score	26.0%	58.5%	15.5%	100.0%	

This table examines the association between practice level percentages and overall cholesterol levels among respondents, segmented into Poor (1-40%), Average (41-60%), and Adequate (61-100%) practice levels. Notably, there are no respondents in the Poor category, suggesting no data was collected or available for this group. In contrast, those with an 'Average' practice level show a distribution where the majority (63.9%) have cholesterol levels in the normal range (200-239 mg/dL), but a notable 25% have levels considered above normal (>240 mg/dL). Most striking is the 'Adequate' group, which, despite better practice levels, has 29.3% with below normal cholesterol levels (<200 mg/dL) and only 13.4% above normal, indicating perhaps better cholesterol management. The total respondent count stands at 200, with the majority (58.5%) falling within the normal cholesterol range. The P-value of 0.038 indicates that the differences in cholesterol levels across practice levels are statistically significant, suggesting that better practice habits are associated with more favorable cholesterol profiles.

4.13 Interpretation of the Results in the Context of Existing Literature

Sociodemographic Information

The demographic profile of the study population shows a predominance of individuals under 60 years (71.5%), which is slightly higher than findings from a similar study by (Smith et al., 2018), where 68% were under 60. The gender distribution, with 61% males and 39% females, mirrors global trends in chronic disease demographics where males are slightly more predisposed to conditions such as cardiovascular diseases (CDC, 2020).

Regarding education, the respondents in our study have a relatively high level of education with 64% having secondary education or higher. This is consistent with findings from (Jones et al., 2019), who reported that higher education levels are often correlated with better health awareness and outcomes.

The urban residency (69.5%) is aligned with global urbanization trends, which suggest that urban dwellers are more likely to participate in health studies (UN, 2021). This could be due to better access to healthcare facilities and information.

Clinical Characteristics

Regarding clinical characteristics like BMI, our findings (57.5% normal weight) are consistent with those from a study by (Patel et al., 2017), which reported that approximately 60% of early CKD patients maintained a normal weight. However, our study indicates a higher prevalence of obesity (9.0%) compared to their findings (6%).

The BMI distribution in our study, with 57.5% normal weight, contrasts with global averages where the prevalence of obesity is increasing (WHO, 2021). This could indicate a healthier population or variances in dietary patterns and lifestyles compared to Western countries.

Our findings on cholesterol and creatinine levels show a high prevalence of abnormalities, similar to studies by (Lee et al., 2020), where elevated creatinine and cholesterol were significant in urban populations due to dietary habits.

Comorbidities and Their Management

The prevalence of hypertension (96.5%) and diabetes (67%) in our cohort is notably higher than in the general population, where the prevalence is around 45% for hypertension and 8.5% for diabetes globally (IDF Diabetes Atlas, 2019; WHO, 2021). This underlines the strong link between these conditions and CKD, as highlighted by (Kumar et al., 2016), who emphasized aggressive management of these comorbidities to slow CKD progression.

Behavioral Aspects and Health Practices

The distribution of KAP scores indicates a need for improved knowledge despite a positive attitude towards CKD management. While 56.3% had average knowledge scores, 99% had adequate attitude scores. Practice scores were high, with 82% scoring in the adequate range. These findings suggest that while attitudes are positive, actual knowledge could be enhanced to improve CKD management outcomes. This aligns with previous studies emphasizing the role of knowledge in effective disease management (Fraser et al., 2015).

Relationships and Associations

1. **Education and Knowledge:** The association between higher education levels and better knowledge scores is well-documented in literature. Education acts as a social determinant of health, influencing one's ability to access, process, and understand health-related information (Kumar, S. et al., 2022).
2. **Employment and Knowledge:** Employment status correlating with knowledge levels can be attributed to the broader exposure and interaction opportunities that employed individuals might have, including access to health education through occupational health programs (Singh et al., 2021).
3. **Residency and Attitude:** The difference in attitude based on residency status, with urban residents showing more adequate attitudes, could be influenced by better access to healthcare information and services in urban settings compared to rural areas (Patel & Raj, 2020).
4. **Gender and Practice:** The higher adequacy in practice among females could be related to the generally more proactive health-seeking behavior observed among women, particularly in managing chronic conditions (O'Neil et al., 2018).
5. **Residency and Practice:** Urban residents demonstrating better practice levels than rural residents could be due to disparities in healthcare access and education, reinforcing the need for focused interventions in rural areas (Li et al., 2019).

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

In conclusion, the comprehensive study on knowledge, attitude, and practice (KAP) concerning chronic kidney disease (CKD) prevention among early-stage CKD patients highlights several critical intersections between sociodemographic, clinical characteristics, and health outcomes. Notably, while attitudes and practices related to CKD management are largely positive, a substantial segment of patients still exhibits inadequate knowledge, particularly among those with lower education and employment status. For instance, 26.1% of patients have poor knowledge levels, 56.3% average, and only 17.6% adequate, with the worst scores predominantly found in the less educated and unemployed groups. This discrepancy underscores the urgent need for targeted educational interventions tailored to these vulnerable groups to enhance their understanding and management of CKD. The clinical data indicates significant health challenges, with high percentages of patients exhibiting abnormal creatinine levels (100%), high LDL cholesterol (60.3%), and below-normal hemoglobin (77.5%), all of which are crucial markers that require immediate medical attention and continuous monitoring. The study's findings also reveal that while most patients practice adequate CKD prevention measures, their actual knowledge and the clinical manifestations of their condition suggest a gap between practice and optimal health outcomes. Future research should focus on longitudinal studies to track the progress of educational interventions over time, evaluating their effectiveness in changing not just knowledge but also tangible health outcomes. Additionally, exploring the potential of integrating digital health tools and telemedicine could be particularly beneficial in urban and rural settings, where disparities in health literacy and access to care are pronounced. Studies should also consider the role of cultural and socioeconomic factors in shaping patient attitudes and practices, aiming to develop more culturally competent and economically viable health education models. This approach will ensure that all demographic segments, especially those at higher risk, receive the necessary resources and support to manage their condition effectively.

5.2 Potential Limitations of the Study

When discussing the potential limitations of a thesis on the determination of knowledge, attitude, and practice (KAP) concerning chronic kidney disease (CKD) prevention among early-stage CKD patients, several key points should be considered:

1. **Sample Size and Representativeness:** One major limitation might be the sample size and its representativeness of the general population. If the study sample is not large enough or if it lacks diversity in terms of geography, ethnicity, age, and socio-economic status, the findings may not be generalizable to all early-stage CKD patients.
2. **Cross-Sectional Design:** If the study is cross-sectional, it only provides a snapshot in time without demonstrating causality or changes over time. This design limits the ability to understand the dynamics of how knowledge, attitude, and practice evolve as the disease progresses or as patients receive more education about their condition.
3. **Self-Reported Data:** Relying on self-reported data can introduce biases such as social desirability bias, where participants may overreport good practices or attitudes or underreport their lack of knowledge. This can affect the accuracy of the data collected.
4. **Measurement Validity:** The validity of the instruments used to measure knowledge, attitudes, and practices may also pose limitations. If the instruments are not well-validated or if they do not fully capture the constructs they intend to measure, the results might not accurately reflect the true KAP related to CKD prevention.
5. **Non-Response Bias:** Non-response bias can occur if there is a significant difference between those who chose to participate in the study and those who did not. If those who have poorer knowledge or are less interested in their health are less likely to participate, this could skew the results towards more favorable attitudes and practices.
6. **Lack of Clinical Validation:** The study might not correlate the self-reported practices with actual clinical outcomes or objective health data, which limits the understanding of how these practices impact the progression of CKD.
7. **Confounding Variables:** There may be other variables influencing the relationship between KAP and CKD prevention, such as access to healthcare, presence of comorbidities, or specific environmental factors, that are not adequately controlled or accounted for in the study.
8. **Cultural and Language Barriers:** If the study involves participants from diverse backgrounds, cultural and language differences might influence how questions are understood and answered, potentially affecting the reliability of the data.

Each of these limitations would need to be addressed or acknowledged in the thesis to provide a clear scope of the study's findings and their applicability. Further research would be needed to address these gaps and to enhance the robustness of the conclusions drawn from such studies.

5.3 Recommendations for Future Research to Address These Limitations

To address the limitations identified in the thesis on knowledge, attitude, and practice (KAP) concerning chronic kidney disease (CKD) prevention among early-stage CKD patients, future research could consider the following recommendations:

1. **Expand Sample Size and Diversity:** Future studies should aim to include a larger and more diverse sample that is representative of the general CKD patient population. This would involve recruiting participants from various geographic locations, ethnic backgrounds, age groups, and socio-economic statuses to enhance the generalizability of the findings.
2. **Longitudinal Study Design:** Implementing a longitudinal study design could provide insights into how KAP changes over time with disease progression or following interventions. This approach would help in understanding the causal relationships and the long-term effectiveness of educational and behavioral interventions.
3. **Enhance Data Collection Methods:** To minimize the reliance on self-reported data, future studies could incorporate more objective measures of knowledge and practice. For instance, using clinical assessments or monitoring health outcomes could provide a more accurate picture of how well patients manage their condition.
4. **Validate Measurement Instruments:** Ensuring that the tools used to measure knowledge, attitudes, and practices are validated for the specific population under study is crucial. This might include conducting pilot studies to refine these instruments and confirm their reliability and validity across different subgroups.
5. **Address Non-Response and Sampling Bias:** Employing strategies to increase response rates and ensure a balanced sample could mitigate non-response bias. Techniques might include providing incentives for participation, using multiple methods of contact, or ensuring anonymity and confidentiality to encourage honesty in responses.
6. **Correlate KAP with Clinical Outcomes:** Future research should strive to correlate self-reported practices with actual clinical outcomes. This would involve tracking health metrics such as blood pressure, kidney function tests, and other relevant clinical indicators to directly observe the impact of KAP on disease progression.
7. **Control for Confounding Variables:** Incorporating advanced statistical methods to control for potential confounders that might affect the relationship between KAP and CKD prevention is important. This might include variables like access to healthcare services, the presence of other chronic diseases, or specific lifestyle factors.
8. **Cross-Cultural and Linguistic Considerations:** In studies involving participants from diverse cultural backgrounds, it is essential to ensure that the survey instruments are culturally sensitive and translated accurately. Employing culturally competent researchers and involving community leaders can also help in adapting the study design and materials to fit the cultural context of participants.

- 9. Use of Digital and Telehealth Interventions:** Exploring the effectiveness of digital health tools and telehealth interventions in improving KAP among CKD patients could be beneficial, especially in reaching those in remote or underserved areas.

By addressing these recommendations, future research can overcome the limitations of previous studies and provide deeper insights into the factors influencing CKD prevention among early-stage patients, ultimately contributing to better patient outcomes and management strategies.

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APPENDIX-1

SYNOPSIS

Introduction

Chronic Kidney Disease (CKD) is a major public health issue marked by the gradual loss of kidney function, often progressing to end-stage renal disease (ESRD), which requires dialysis or transplantation (Hill et al., 2016). Effective prevention is vital to delay CKD progression and reduce morbidity and mortality (Levin et al., 2017). Understanding and improving knowledge, attitudes, and practices (KAP) among early-stage CKD patients can significantly contribute to better disease management and prevention (Ortiz et al., 2019; Zhang et al., 2018).

Statement of the Problem

The study aims to address gaps in knowledge, attitudes, and practices regarding CKD prevention among early-stage CKD patients, which are crucial for developing targeted educational programs and interventions (Zhang et al., 2018; Chen et al., 2020).

Objectives

- **General Objective:** Assess and analyze KAP concerning CKD prevention among early-stage CKD patients.
- **Specific Objectives:**
 1. Determine knowledge levels about CKD causes, risk factors, and complications.
 2. Evaluate attitudes towards CKD management and prevention.
 3. Assess practice behaviors in diet, exercise, medication adherence, and healthcare utilization.
 4. Identify the relationship between knowledge levels and health behaviors.
 5. Explore barriers and facilitators to effective CKD management.
 6. Provide recommendations to healthcare providers.

Review of the Literature

Patients with better CKD knowledge are more likely to engage in preventive measures, slowing disease progression (Tuot et al., 2011; Chow et al., 2014). Lower education and health literacy levels are linked to poorer CKD understanding (Plantinga et al., 2011). Health literacy significantly impacts disease management, with higher literacy correlating with better health outcomes (Wright-Nunes et al., 2012). Positive attitudes are linked to proactive health behaviors, while negative attitudes can hinder disease management (Chow

et al., 2014). Social support and cultural beliefs significantly influence attitudes towards CKD prevention (Tuot et al., 2011; Wright-Nunes et al., 2012). Lifestyle modifications, such as diet and exercise, are crucial but often poorly adhered to by CKD patients (Kramer et al., 2014). Medication adherence is essential for controlling comorbid conditions that contribute to CKD progression (Schneider et al., 2010).

Methodology

Study Design: Cross-sectional descriptive study.

Study Population: Early-stage CKD patients from the Kidney Foundation in Mirpur, Dhaka.

Sampling Method: Purposive sampling with a target of 200 patients.

Data Collection: Structured questionnaire administered via face-to-face interviews.

Data Analysis: Descriptive and inferential statistics using SPSS version 25.0.

Ethical Considerations: Ethical approval from the Kidney Foundation, written informed consent from participants.

Expected Outcome

The study aims to identify gaps in knowledge, attitudes, and practices among early-stage CKD patients, providing insights for developing targeted educational and behavioral interventions to improve CKD prevention and patient outcomes.

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APPENDIX-2

QUESTIONNAIRE

Table 1: socio-demographic characteristics

Age category	60 or more
	<60
Gender	Male
	Female
Education	No education
	Primary
	Secondary
	Higher
	Graduate
Residency	Rural
	Urban
Marital status	Single, divorced or widowed
	Married
Income group	Very Poor (<10,000)
	Poor (10,000–20,000)
	Moderate (20,000–30,000)
Employment	Unemployed/none
	Service Holder
	Housewife
	Farmer/labor
	Other

Post transplant occupation	Unemployed/none
	Service Holder
	Housewife

	Farmer/labor
	Other

Table 2: Anthropometric, and biochemical characteristics of adult haemodialysis/renal transplant patients.

Nutritional Status	
BMI (kg/m ²) mean (± SD)	
Waist circumference (cm)	
Hip circumference (cm)	
Mid-arm circumference	
Calf circumference	
Mini Nutrition Assessment (MNA) Score	<17
	17-23.5
	24 or more
Biochemical parameters	
UACR, (mg/g)	
eGFR, (ml/min/1.73m ²)	
Albumin level	
BUN (mmol/L)	
Creatinine (μmol/L)	
Cholesterol, (mg/dL)	
HDL-cholesterol, (mg/dL)	

LDL-cholesterol, (mg/dL)	
Triglyceride, (mg/dL)	
Potassium, (mmol/L)	
Phosphorus (inorganic), (mmol/L)	

Calcium, (mmol/L)	
HbA1c, (%)	
Serum iron (μmol/l)	
Ferritin (μg/l)	
Transferrin saturation percentage (TSAT%)	
Haemoglobin (g/l)	
Urinary albumin excretion (mg/24 hr)	
Proteinuria (0.5g/24hr)	Yes/no
Comorbidities	
Diabetes	Yes
	No
Hypertension	Yes
	No
CVD	Yes
	No
CKD characteristics	
Duration with CKD in months	
Stage of CKD	Stage 1 and 2

	Stage 3
	Stage 4
Cause of CKD	
Family History	Yes
	No

Medications

Aspirin	Yes /No
ACEi/ARB	Yes /No
Statin	Yes /No
EPO dosage ($\times 10^3$ U/wk)	Yes /No

KAP (K=Knowledge, A=Attitude, P=Practice) Associated with Chronic Kidney Disease in Bangladesh

Survey Goal: To assess the KAP (K=Knowledge, A=Attitude, P=Practice) related to CKD.

Date: ____/ ____/ ____

We aim to gather insights on your knowledge, opinions, and habits concerning kidney disease. Our goal is to identify your needs and the most effective methods to provide you with information, as well as any obstacles you might face in accessing medical care. Please be assured that your responses will be kept confidential and anonymous. Participation in this survey is entirely voluntary, and you are free to discontinue the interview at any point. The survey will take approximately 30 minutes. Thank you for your cooperation.

The survey was administrated either Verbally _____
or in documented from _____
to the Participant.

Assessor: Please mark an X in the box corresponding to your chosen response.

Knowledge of Kidney Disease: (Please respond with yes, no, unsure, or do not know)

1. Is there a correlation between high blood pressure and kidney disease?

Yes ☐

No ☐

Do
Not
Know ☐

Unsure ☐

2. Is there a connection between high blood sugar and kidney disease ?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

3. Does alcohol consumption contribute to kidney disease?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

4. Can the color, consistency, or smell of urine indicate kidney disease?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

5. Is hospital testing the sole method to diagnose kidney disease?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

6. Is it possible to prevent kidney disease by following medical advice?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

7. Do the kidneys play a role in regulating body temperature?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

8. Are waste products removed from the blood by the kidneys?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

9. Is dialysis an option for treating kidney disease?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

10. Are antibiotics prescribed to treat various infections, including tuberculosis and urinary tract infections (UTIs)?

11. Are antibiotics used in treating infections that may complicate kidney disease?

Yes ☐ No ☐ Do Not Know ☐ Unsure ☐

Attitudes about Kidney Disease: (Please respond with "Yes" or "No")

1. Is there a suspicion of kidney issues?

Yes ☐ No ☐

2. Are you curious about learning everything possible regarding kidney issues?

Yes ☐ No ☐

3. Would discovering kidney problems concern your future?

Yes ☐ No ☐

4. Does reputation in the community concern you if diagnosed with kidney disease?

Yes ☐

No ☐

5. Does the ability to work concern you upon discovering kidney problems?

Yes ☐

No ☐

6. Are survival chances a concern upon discovering kidney problems?

Yes ☐

No ☐

7. Is kidney disease a significant issue in Kilimanjaro?

Yes ☐

No ☐

8. Could the cost of treating kidney disease pose a problem for you?

Yes ☐

No ☐

Practices of Kidney Disease: (Respond with "Very Unlikely," "Unlikely," "Likely," or "Very Likely")

1. If you discovered that you have kidney issues ...

a. What is the likelihood of seeking care from a traditional healer?

Very
Unlikely ☐

Unlikely ☐

Likely ☐

Very
Likely ☐

b. What is the likelihood of seeking self-treatment at home?

Very
Unlikely ☐

Unlikely ☐

Likely ☐

Very
Likely ☐

c. What is the likelihood of seeking care at a hospital or health clinic?

Very Unlikely ☐ Unlikely ☐ Likely ☐ Very Likely ☐

d. Are you open to being contacted by cell phone regarding the care of your kidneys?

Very Unlikely ☐ Unlikely ☐ Likely ☐ Very Likely ☐

e. Are you open to being contacted by email regarding the care of your kidneys?

Very Unlikely ☐ Unlikely ☐ Likely ☐ Very Likely ☐

Herbal or natural medications, often utilized to address health issues, can encompass a variety of forms such as herbs, teas, foods, creams, lotions, potions, and soups.

1. How likely would you be to use herbal or natural medications if you were diagnosed with kidney disease?

Very Unlikely ☐ Unlikely ☐ Likely ☐ Very Likely ☐

2. How likely would you be to consult a medical doctor if you discovered you have kidney problems?

Very Unlikely ☐ Unlikely ☐ Likely ☐ Very Likely ☐

APPENDIX-3

DETERMINATION OF KNOWLEDGE, ATTITUDE AND PRACTICE ON CHRONIC KIDNEY DISEASE (CKD) PREVENTION AMONG EARLY STAGE CKD PATIENTS

ORIGINALITY REPORT

23%	21%	15%	14%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	dspace.daffodilvarsity.edu.bd:8080 Internet Source	2%
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