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Determinants of kidney Disease Knowledge Among Chronic Kidney Disease 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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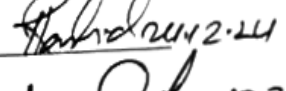
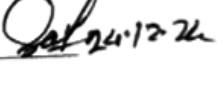
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APPROVAL

This Project titled “Determinants of kidney Disease Knowledge Among Chronic Kidney Disease Patients”, submitted by Ankhi Biswas to the Department of Nutrition and Food Engineering, Daffodil international university, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to it's style and contents.

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DECLARATION

We here by declare that this project has been done by us under the supervision of **Mr. Md. Shamsur Rahman, Lecturer (Senior Scale)**, Department of Nutrition and Food Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

A major global health concern, chronic kidney disease (CKD) necessitates early detection and treatment. To stop the course of the disease and enhance results, people must have enough awareness of CKD, particularly in high-risk groups. A cross-sectional study was conducted among 269 participants. Data were collected through structured questionnaires assessing demographic and clinical characteristics, along with a CKD knowledge score. Descriptive statistics, chi-square tests, and multiple regression analyses were performed to determine correlations and predictors of CKD knowledge. The majority of participants (53.9%) were female and (66.9%) male were aged 50 years or older. Most participants were from urban areas (69.5%), married (95.5%), and unemployment (69.5%). The education level varied, with 52.8% having completed high school and (21.9%) holding a bachelor's degree or higher. CKD knowledge scores revealed that (85.3%) of participants had good knowledge (score:13-18). Higher levels of education (AOR: 6.69, $p = 0.015$) and BMI >24.9 (AOR: 4.57, $p = 0.009$) were significant predictors of good CKD knowledge. Additionally, urban residents demonstrated significantly higher knowledge levels ($p = 0.006$). Despite this, knowledge gaps remained in areas such as kidney function, with only 24.2% recognizing the role of kidneys in maintaining red blood cells count and 26.8% understanding their role in phosphorus regulation. Key symptoms like unusual itching and shortness of breath were recognized by 65.1% and 59.5% of participants, respectively.

Keyword

Chronic Kidney Disease (CKD), Kidney Disease knowledge, patient Education, Health literacy, Healthcare Access, Disease Management, Health Outcomes etc.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A worldwide health issue, chronic kidney disease (CKD) is more common in underdeveloped nations because of their lack of resources. A glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m², renal damage, or both, for a minimum of three months is considered chronic kidney disease. Millions of individuals worldwide suffer from chronic kidney disease (CKD), a serious health issue that has a significant detrimental impact on both the economy and public health. A progressive loss of kidney function that can result in end-stage renal disease if left untreated is the hallmark of chronic kidney disease (Okoro et al., 2020). To enhance patient outcomes and slow the course of the disease, early identification and efficient care of CKD are crucial. Having knowledge about kidney illness is essential for patients to follow treatment plans, take preventative measures, and make well-informed decisions regarding their health. Despite the growing prevalence of CKD, studies consistently demonstrate a lack of adequate knowledge about the disease among the patients. Limited awareness about CKD symptoms, risk factors, and management strategies often leads to delayed diagnosis and poor adherence to prescribed interventions. Addressing this knowledge gap is crucial to empowering patients, improving self-management practices, and reducing the overall burden of the disease (Whaley-Connell et al., 2011).

One of the world's most densely populated regions is Bangladesh. Renal disorders account for a significant portion of the health sector and are becoming more well acknowledged. An estimated 35,000 to 40,000 of the 20 million persons with chronic kidney disease (CKD) each year progress to end-stage renal disease. The main causes of chronic kidney disease are diabetes mellitus, hypertension, and chronic glomerulonephritis. Acute kidney injury is frequently caused by hypovolemia, sepsis, obstetric problems, and medications, including homeopathic and herbal medicines (Sarker et al., 2022). Only 25% of patients with end-stage renal illness have access to treatment because of insufficient facilities and excessive healthcare expenses, despite the fact that all the three renal replacement therapy modalities - hemodialysis, peritoneal dialysis, and kidney transplantation are carried out in Bangladesh. About 300 nephrologists currently oversee the field, which began as a specialization in Bangladesh in 1973 (Mostafi & Jabin, 2023). The nation's economic standing has improved from low-income to low-middle-income. The health sector is likewise steadily getting better. In order to detect and prevent kidney and other noncommunicable illnesses early, the government is now establishing screening programs and building up renal care at the rural level. At the same time, efforts are underway to enhance secondary and tertiary healthcare facilities' advanced renal services (Hasan et

al., 2018). Since 1982, only live-related kidney transplants have been performed by several public and private institutions. Kidney transplants that are incompatible with ABO (A, B, and O blood group system) have already been carried out. Deceased kidney transplants have also been carried out recently. Opportunities for training and research are growing in partnership with global organizations. Although renal services in this nation are up to current, they require constant improvement to handle the growing demand (Hasan et al., 2018).

Knowledge about chronic kidney disease (CKD) is important for patients, especially in terms of improving their outcomes and quality of life. This is because it increases self-efficacy and adherence to the treatment protocols. Education enables patients to acquire the skills that they can use in self-management of their conditions in such a way that enhances the health outcomes of the patients and increases adherence to the treatment and the patients' active involvement in the treatment (Martin et al., 2009; Wu et al., 2020). In addition, education on symptoms and risk factors for the disease significantly changes the course of the disease through early diagnosis (Nanone et al., 2024), while the focus on biological markers and monitoring technologies enhances the quality of management. In addition, evidence-based approaches will lower the costs of healthcare provision while boosting the quality of life of the patients (Conditions, 2008; Nanone et al., 2024). However, self-care predominates in the organization of care for many patients with CKD, which indicates that there are still some gaps that should be filled, for example, through knowledge-based educational interventions, and support to induce behavior change (Wu et al., 2020).

Chronic kidney disease (CKD) cuts across all regions of the world and its advancement is greatly influenced by insufficient understanding of the disease as well as its risk factors and management methods (Hill et al., 2016). It is important to determine the causes of lack of knowledge regarding kidney disease among patients suffering from CKD in order to improve health outcomes, since well-informed patients find it easy to self-manage, follow treatment, and change their lifestyle so that the disease does not worsen (Narva et al., 2016). Knowing these determinants leads to the design of specific educational activities, thus correcting awareness deficiencies and customizing them to fit different populations of patients (Finkelstein et al., 2008).

1.2 Objectives

1.3 General objective

1. To assess the level of knowledge about Chronic Kidney disease (CKD) among patients with CKD in Bangladesh.

2. To identify the demographic, socioeconomic, and clinical factors associated

with CKD knowledge among patients.

1.4 Specific objective

1. To assess the study population's degree of knowledge on kidney disease among CKD patients.

2. To determine which sociodemographic characteristics—such as age, gender, income, and education—are linked to CKD patients' awareness of renal disease.

3.4. To investigate how clinical parameters (such as CKD stage, comorbidities, and treatment type) affect CKD patients' knowledge levels

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

According to a meta-analysis, finding of the nine included research, with a combined total of 225,206 participants revealed that frequency of CKD among the population of Bangladeshi was 22.48 % overall, greater the CKD prevalence of worldwide (Banik & Ghosh, 2021). A patient's understanding about chronic kidney disease (CKD) is influenced by a number of factors, such as socioeconomic status, demographic traits (e.g., age, gender, and educational attainment), healthcare access, and interactions with healthcare providers. Furthermore, psychological elements including psychological well-being, cultural values, and health literacy may have an impact on how well patients comprehend and remember information regarding their illness. To improve knowledge of CKD, focused educational interventions and strategies must be developed, and this requires an understanding of these drivers. Low quality of life (QOL), poor health outcomes, and high health care costs are all caused by chronic kidney disease (Sarker et al., 2022). The increasing prevalence of CKD is being acknowledged as a potential public health concern on a global scale. It has been reported that 8.9% of people worldwide had CKD in stage 1-3 with rates higher in low-income countries like Bangladesh (21.33%). Serum creatinine and albumin - to- creatinine ratio assays are typically used to diagnose early -stage chronic kidney disease (CKD), which is typically asymptomatic. End-stage renal disease, which necessitates costly renal replacement therapy like dialysis or kidney transplantation to save the patient's life, can develop from chronic kidney disease (CKD) if it is not identified and treated (Sarker et al., 2022). Many patients in Bangladesh are unable to identify the early signs of chronic kidney

disease (CKD), which include change in urine, tiredness, and edema. Due to this ignorance, medical consultations are sometimes postponed until the illness has substantially worsened. Furthermore, there are still few or ineffective public health initiatives that could enhance CKD education. Patients frequently rely on unofficial sources or anecdotal advice because they have limited access to reliable health information, which might result in misconceptions regarding chronic kidney disease (CKD) and how to manage it. To bridge these gaps, structured educational initiatives that are adopted for the Bangladeshi community are crucial. It follows that EGF levels in patients with early-onset illness, stage 1-2, are either normal or somewhat lower (>90 to 60 mL/min/1.73m). EGF levels are mildly to moderately reduced in subject with CKD stages 3a-3b (59 - 45 and 45 - 30 mL/min/1.73m, respectively), which are suggestive of advanced illness and renal failure (Avila et al., 2023). Integrating CKD awareness into current primary healthcare services, for instance, could provide patients with vital information about the condition, encourage early detection and preventative actions. A key component of CKD therapy is self-management, which includes lifestyle adjustments. However, patients find it difficult to carry out these crucial procedures if they lack the necessary expertise. Self-management attempts are made more difficult in Bangladesh by the frequent conflicts between suggested CKD diets and cultural dietary patterns as well as budgetary limitations (Kar & Islam, 2023). These gaps can be filled by educational initiatives that emphasize workable, culturally relevant solutions, empowering patients to actively participate in their care. Enhancing understanding of CKD immediately tackles disparities in treatment results and self-management. Research shows that people who are well-informed are more likely to follow their treatment regimens, continue to practice healthy habits, and seek medical help when they need it. This may result in a decrease in the rate of illness progression and related medical expenses in Bangladesh. Better communication between patients and healthcare professionals can also result from increased patient understanding and successful treatment plans (Banik & Ghosh, 2021).

CHAPTER 3

MATERIALS AND METHODS

3.1 Study Design

A cross-sectional study was conducted from May to July 2024 among CKD people. The cases consisted of all patients with confirmed CKD who had follow-up appointments at the hospital. Greater than three months of glomerular filtration rate (GFR)<60mL/ min/1.73 m². Patients were considered as CKD. Patients with CKD were at least 18 years old. Pregnant ladies and patients in critical condition were not allowed during this survey.

3.2 Sample Size

The sample size for this cross-sectional study was calculated using the formula for single population proportion:

$$n = \frac{z^2 * p(1-p)}{d^2}$$

Where:

n is the required sample size,

Z is the Z-score corresponding to the 95% confidence level ($Z=1.96$ $Z = 1.96Z=1.96$),

P is the estimated prevalence of chronic kidney disease (CKD) in Bangladesh (22.48% or 0.2248), based on prior studies,

d is the margin of error (5% or 0.05).

Calculated sample size was 267. Total 269 CKD patients participated in the study.

3.3 Implementing the Questionnaires

While I visiting a hospital, I conducted interviews with all CKD patients, having them fill out my questionnaires. All participants were given verbal instructions before filling out the questionnaires. To improve participants' comprehension and facilitate their filling out, the questionnaire was slightly altered. To avoid making participants select an alternative or leaving certain questions unexplained, the following sections were updated: (i) all questions now included the yes/no option. (ii) the name of the medication (Tylenol) was changed from paracetamol to Tylenol in item number 4. Three domains made up the 28-item questionnaire. The general knowledge domain included nine items and covered topics such as blood pressure goals, medications that are important for kidney health, reasons why protein in urine is a problem, medications that people with chronic kidney disease should avoid, treatment options for kidney failure, the definition of "GFR" and the stages of CKD, as well as understanding the increased risk of heart disease and mortality. Roles in urine production, waste clearance ("cleaning blood"), bone health, hair loss, blood pressure control, potassium control, and phosphorus control were all included in the nine-item kidney function domain. Increased fatigue, shortness of breath, metallic or unpleasant taste, unusual itching, nausea or vomiting, hair loss, difficulty sleeping, weight loss, confusion, and no symptoms at all were among the ten symptoms of progression or failure domain.

3.4 Statistical Analysis

SPSS (Statistical Package for the Social Sciences) version 20 software was used for all analyses. At first the statistics were displayed as mean standard deviations, percentage and frequencies. Significant independent predictors of knowledge of chronic kidney disease were found using multivariate logistic regression analysis. The level of significance was determined at a $p <$

0.05.

Sampling Method

Participants that satisfy the following inclusion requirements will be chosen using a purposeful or systematic random sampling technique: CKD was diagnosed, 18 years of age or older, the capacity to give informed consent. To evaluate the factors influencing kidney disease knowledge among patients with chronic kidney disease (CKD) at Kidney Foundation Hospital, a case-control descriptive design will be used. A standardized questionnaire including demographic information, clinical history, and kidney disease knowledge will be used to gather data; validity and reliability will be checked through pre-testing. To maintain confidentiality and anonymity, the questionnaire will be given out during regular hospital visits. The dependent variable will be knowledge of kidney disease, whereas the independent variables will include age, gender, education, socioeconomic level, length of CKD, family history, and access to health information.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Result

4.1.1 Demographic information

Table 1 A total of two hundred sixty-nine (269) participants were included in this study. Both participants included 46.10% males, 53.90% females, and at least 50 years old. Most participants have a BMI within the normal range (18.5-24.9), comprising 55% of the sample. However, about 34.9% have BMI >24.9, indicating a notable prevalence of overweight individuals, which is a known risk factor for CKD and hypertension. Married people make up the bulk of participants (95.5%), which may be related social and economic issues that affect health. The majority of people (69.5%) are unemployed and (69.5%) reside in cities, which may be reflection of socioeconomic issues surrounding urban employment. Access to healthcare and healthy living options may be impacted by the lower economic level of a significant portion of participants (58%) whose family income is less than 15,000 BDT per month. There may be a genetic or environmental sustainability to CKD in this population, as approximately (34.6%) of the individuals have a family history of the condition. The largest group (52.8%) has completed high school, which is linked to greater health awareness but may still restrict access to more expensive healthcare options. More than half (53.9%) of the participants have high blood pressure, which is a significant risk factor for CKD and other cardiovascular diseases. A substantial portion of the sample (79.9%) requires dialysis, which highlights the high burden of CKD or related complications in this group.

Table 1: Sample characteristics (N= 269)

Variable		(%)
Gender		
	Male	127 (46.10)
	Female	145 (53.90)
Age		
	<50	89 (33.10)
	>50	180 (66.9)
BMI		

	<18.5	27 (10.00)
	18.5-24.9	148 (55.00)
	>24.9	94 (34.90)
Marital status		
	Married	257 (95.50)
	Unmarried	12 (4.5)
Occupation		
	Employed	82 (30.50)
	Unemployed	187 (69.5)
Type of Resident		
	Urban	188 (69.50)
	Rural	81 (30.10)
Household income per months		
	<15,000 BDT	156 (58.00)
	15,000- 30,000 BDT	83 (30.90)
	>30,000 BDT	30 (11.20)
Family history of CKD		
	Yes	93 (34.60)
	No	176 (65.40)
Education status		
	Primary school/Below	68 (25.3)
	High school	142 (52.80)
	Bachelor/Above	59 (21.90)

Blood pressure		
	High	145 (53.90)
	Normal	110 (40.90)
Dialysis needed		
	No	54 (20.10)
	Yes	215 (79.9)

4.1.2 Participants response to CKD knowledge questionnaire

Table 2 The table reveals several insights into participants knowledge of CKD (chronic kidney disease), covering three main areas. General knowledge, kidney function, and symptoms of disease progression or failure. Participants demonstrated strong general knowledge, especially on questions about the impact of medications and CKD risks. Notably, all participants (100%) were aware that medications could help maintain kidney health and that CKD could increase the risk of death. Additionally, 75.5% recognized that excessive protein in the urine and CKD elevate heart attack risks. This suggests a high level of awareness about CKD's general health implications. Knowledge on kidney functions was more variable. while a substantial majority (72.9%) knew that kidneys produce urine, fewer participants understood the kidneys' role in other bodily processes. Less than half (39.8%) knew that kidneys help filter blood, and only(24.2%) recognized that they aid in maintaining red blood cell counts. Other critical functions, such as helping with blood pressure (68.8%)and potassium regulation (41.6%), had moderate awareness. The participants were more knowledgeable about the symptoms of CKD progression, with the majority identifying key symptoms like weight loss (97%), trouble sleeping (86.6%),and metallic taste in the mouth (77.7%). Symptoms that were less recognized included shortness of breath (59.5%) and nausea (66.9%). Interestingly, (17.5%) of participants indicated a belief in the absence of symptoms, which could reflect a misunderstanding about CKD'S silent progression.

Table 2: Descriptive statistics of the participants ' correct answer CKD knowledge

CKD knowledge Item	Correct answer (%)
General Knowledge about CKD	
Can medication help keep your kidneys healthy?	269 (100.00)
Is too much protein in urine harmful to kidneys?	203 (75.50)
Does Chronic Kidney disease increase the risk of heart attack?	269 (100.00)
Does Chronic Kidney disease increase the risk of death?	269 (100.00)
Knowledge of kidney functions	
Do kidney make urine?	196 (72.90)
Do you have no symptoms since kidney disease?	
Do kidneys clean blood?	107 (39.8)
Do kidneys help keep bones healthy?	85 (31.60)
Do kidneys prevent hair loss?	175 (65.1)
Do kidneys help keep red blood cell counts normal?	65 (24.20)
Do kidneys help keep blood pressure normal?	185 (68.80)
Do kidneys help keep blood sugar normal?	79 (29.4)
Do kidneys help keep potassium levels normal?	112 (41.0)
Do kidneys help keep phosphorus levels normal?	72 (26.80)
Knowledge of symptoms of progression or failure	
Shortness of breath	160 (59.50)

Metallic taste in the mouth	209 (77.70)
Increased confusion	269 (100.00)
Nausea or Vomiting	180 (66.90)
Hair loss since	166 (61.70)
Trouble sleeping	233 (86.60)
Unusual itching	175 (65.10)
Weight loss	261 (97.00)
No Symptoms at all	47 (17.50)

4.1.3 Correlation of demographic and clinical factors with CKD knowledge level

Table 3 This table analyze the correlation between demographic and clinical factors with CKD (chronic kidney disease) knowledge levels using the chi-square test. 18.5% of men and 11.0% of women, respectively, lacked sufficient expertise. There is no significantly significant correlation between gender and CKD knowledge levels, as indicated by the P-value of 0.81. It doesn't seem that gender has a big impact on CKD knowledge. Those under 50 had a slightly larger percentage of poor knowledge (18.0%) than those 50 and over (12.8%). With a p-value of 0.25, there is no discernible correlation. In this study, there is no significant correlation between age and understanding of CKD. Poor understanding was most prevalent among participants with a BMI of less than 18.5 (29.6%), followed by those with a BMI of 18.5 - 24.9 (16.2%) and >24.9 (7.4%). A statistically significant correlation is indicated by the p-value of 0.11. Knowledge of CKD may be influence by BMI, with underweight people possibly knowing less. Participants without jobs were slightly more likely to have poor knowledge (15.5%) than those with jobs (12.2%). There is no significant relationship, as indicated by the P-value of 0.47. Knowledge of CKD is not much impacted by employment Rural residents were more likely to have poor knowledge (23.5%) than urban residents (10.6%). A statistically significant correlation is indicated by the P-value of (0.006). Compared to urban dwellers, rural inhabitants might not have as much access to information about chronic kidney disease (CKD), indicating a gap in health education. As education levels increased, poor knowledge declined: primary school (20.6%), high school (16.2%), and bachelor's degree or higher (3.4%). A statistically significant correlation is indicated by the P-value of 0.016. Better knowledge of CKD is closely correlated with higher education levels, highlighting the importance of education in rising health awareness. Those who required dialysis (14.5%) and those who did not significantly differ in

their level of inadequate knowledge. There is no significant relationship, as indicated by the P-value of 0.941. Knowledge of CKD does not seem to be associated with the requirement for dialysis.

Table 3 correlation of demographic and clinical factors with CKD knowledge level (Chi square test)

Variable		Knowledge level		X ²	P- value
		Poor	Good		
		n%			
Gender					
	Male	23 (18.50)	101 (81.5)	3.4	0.81
	Female	16 (11.0)	129 (89.0)		
Age					
	<50 years	16 (18.0)	73 (82.0)	1.29	0.25
	≥50 years	23 (12.8)	157 (87.2)		
BMI					
	<18.5	8 (29.6)	19 (70.4)	9.11	0.011*
	18.5-24.9	24 (16.2)	124 (83.8)		
	>24.9	7 (7.4)	87 (92.6)		
Occupation					
	Employed	10 (12.2)	72 (87.8)	0.50	0.47
	Unemployed	29 (15.5)	158 (84.5)		

Type of Resident					
	Yes	20 (10.6)	168 (89.4)	7.50	0.006*
	No	22 (12.5)	62 (76.5)		
Family history of CKD					
	Yes	17 (18.3)	76 (81.7)	1.64	0.20
	No	22 (12.5)	154 (87.5)		
Education status					
	Primary school	14 (20.6)	54 (79.4)	8.23	0.016*
	High school	23 (16.2)	119 (83.8)		
	Bachelor or/Above	2 (3.4)	57 (96.6)		
Dialysis needed					
	No	8 (14.8)	46 (85.2)	0.005	0.941
	Yes	31 (14.5)	184 (85.6)		
Blood pressure					
	High	25	120	0.02	0.36
	Normal	12	98		
	Low	2	12		

4.1.4 Multiple regression analysis for variable predicting CKD knowledge

Table 4 This table summarizes the association between various predictors (education level and BMI) and high knowledge of chronic kidney disease (CKD). Compared to this group, person's with a high school education (Exp(b)=1.34) have somewhat higher probabilities of possessing high CKD knowledge, albeit this result is not statistically significant (p= 0.44). The odds of having high CKD knowledge are considerably greater for those with a bachelor's degree or higher (Exp (b)= 6.69,p= 0.015). Given that those in this group are roughly 6.7 times more likely than those in the reference group to have high CKD knowledge, this shows that higher education is highly

connected with increased CKD knowledge. People whose BMI is less than 18.5. The odds of having high awareness of chronic kidney disease (CKD) are 1.98 times greater for those with a BMI in the 18.5-24.9 range, although this difference is not statistically significant ($p = 0.157$). High CKD knowledge is substantially more likely to be present in those with a BMI > 24.9 ($\text{Exp (b)} = 4.57, p = 0.009$). This finding implies that people with higher BMI are more likely to know about chronic kidney disease (CKD), possibly as a result of more interactions with healthcare professionals or weight - management education.

Table 4 Multiple regression analysis for variable predicting CKD knowledge

Predictor		High CKD knowledge		AOR (95% CI)	
		p- value	Exp (b)	Lower Bound	Upper Bound
Educational level					
	Primary school (Ref)	0.44	1.34	0.63	2.84
	High school	0.015*	6.69	1.43	31.15
	Bachelor/Above				
BMI					
	<18.5 (Ref)				
	18.5-24.9	0.157	1.98	0.76	5.13
	>24.9	0.009*	4.57	1.45	14.36

4.2 Discussion

This study provides valuable insights into the factors influencing knowledge

and awareness of chronic kidney disease (CKD) among participants in Bangladesh, highlighting key demographic, socioeconomic, and clinical determinants. Participants were predominantly middle-aged, with a balanced gender distribution, and most had a normal BMI (55%). However, a notable proportion (34.9%) were overweight, a known risk factor for CKD and hypertension. Socioeconomic challenges were evident, as 69.5% were unemployed, 69.5% resided in urban areas, and 58% reported a family income below 15,000 BDT, potentially limiting access to healthcare and preventive measures. CKD knowledge assessment revealed strong awareness of general health implications, with all participants recognizing the role of medications and the risk of death associated with CKD. However, gaps in understanding of kidney functions were noted, with only 39.8% identifying their role in blood filtration and 24.2% recognizing their involvement in red blood cell production. Awareness of CKD symptoms was high for common signs like weight loss (97%) and trouble sleeping (86.6%), but less common symptoms such as nausea (66.9%) and shortness of breath (59.5%) were less recognized, with 17.5% mistakenly believing CKD to be asymptomatic. Urban residents exhibited better knowledge than rural counterparts, likely due to greater access to healthcare and education, while higher educational attainment and BMI were significantly associated with greater CKD knowledge. These findings emphasize the importance of education and tailored interventions to improve awareness, particularly for vulnerable groups such as rural residents, those with lower educational attainment, and underweight individuals. Addressing misconceptions about CKD symptoms and enhancing understanding of kidney functions could play a crucial role in mitigating the burden of CKD and associated complications in this population. We discovered that people had an excellent general understanding of chronic kidney disease (CKD), with significantly higher knowledge related to age, place of residence, education, occupation, and a recent kidney function test. A novel CKD knowledge measure that aims to evaluate public understanding of CKD using evidence-based literature was developed and validated by this study. All of the components correlated with the full scale's with high Significance, indicating very excellent reproducibility, and the scale's nine factors exhibited extremely good internal consistency. However, given the low correlation coefficients between the scale's items and the complete scale, more research is still advised to confirm the scale's validity and reproducibility. In contrast to these results, half of participants in a study on the Australian public's comprehension of chronic kidney disease (CKD) had knowledge score's below the median. Additionally, low levels of knowledge and awareness of CKD were connected by (Hussain et al). Based on the median score of the knowledge measure, we discovered a fair degree of CKD knowledge. Our findings are in line with prior research that indicated a high level of CKD knowledge.

CHAPTER 5

CONCLUSION

5.1 Conclusion

This study underscores the significant gaps in CKD knowledge among the Bangladeshi population, particularly among rural residents, individuals with lower educational attainment, and underweight participants. While awareness of general CKD risks and common symptoms was relatively high, critical knowledge of kidney functions and less recognized symptoms was limited. Socioeconomic challenges, such as low income and unemployment, further compound these disparities. Education and BMI emerged as key predictors of CKD knowledge, highlighting the importance of targeted health education programs and interventions. Addressing these gaps, particularly in underserved and vulnerable groups, is essential to enhance CKD prevention, early detection, and management, ultimately reducing the disease burden in Bangladesh.

5.2 Recommendation

It is advised to establish specialized educational programs that cater to each patient's needs according to age, literacy level, and stage of chronic kidney disease (CKD) in order to increase kidney disease awareness among CKD patients. While organized counseling sessions can improve patient-provider communication, utilizing digital technologies like telemedicine services and smartphone apps can increase accessibility and participation. Through the use of multilingual resources and community engagement, efforts should also concentrate on overcoming linguistic and culture hurdles. Early detection and prevention can also be facilitated by addressing socioeconomic disparities through the provision of subsidized educational programs and the incorporation of CKD awareness into public health initiatives. To direct interventions and guarantee their efficacy, it is essential to regularly assess patient knowledge using standardized instruments. In order to improve the quality of life and outcomes for CKD patients, policymakers should incorporate CKD education into national health initiatives and give it top priority when it comes to funding.

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APPENDICES

Appendix 1 Ethical Permission

The Head

Department of Nutrition and Food Engineering

Daffodil International University

Daffodil Smart City, Biruliya, Saver, Dhaka1216, Bangladesh

Subject: Ethical Approval of Research Study

Dear Sir,

With due regards, I am Ankhi Biswas, student of the 201 batch, wishes to submit the project title "Determinants of kidney Disease Knowledge Among Chronic Kidney Disease (CKD) patients" for ethical clearance.

I request you to kindly consider the project for review by the Ethical Committee. I shall be highly obliged for the same.

Kindly find attached there required documents regarding the project.

Sincerely

Ankhi Biswas

I'd : 201-34-1090

Nutrition and Food Engineering

Daffodil International University

APPENDIX:2

Questionnaires

Decoding awareness: Determinants of kidney Disease Knowledge Among Chronic Kidney Disease (CKD) patients.

Name	
Gender	
Age	
Weight	
Height	
BMI	
Marital status	
Education level	
Place of residence	
Monthly Income	
Occupational status	
Family history	
Blood pressure	
Creatine level	
eGFR	
Stage of CKD	
On average, your blood pressure should be ?	
Are there certain medications your doctor can prescribe to help keep your kidney (s) as healthy as possible?	

Why is too much protein in the urine not good for the kidney?	
Select the one medication from the list below that a person with Chronic Kidney Disease should avoid?	
Does Chronic Kidney Disease increase a person's chance for death from any cause?	
Does Chronic Kidney Disease increase a person's chance for a heart attack?	
Does the kidney make urine ?	
Does the kidney clean blood?	
Does the kidney help keep bones healthy?	
Does the kidney keep a person from losing hair?	
Does the kidney help keep red blood cell counts normal?	
Does the kidney help keep blood pressure normal?	
Does the kidney help keep blood sugar normal?	
Does the kidney help keep potassium levels in the blood normal?	
Does the kidney help keep phosphorus levels in the blood normal?	
Is your fatigue increased after kidney disease?	
Shortness of breath?	
Metal taste/bad taste in the mouth?	

Has your confusion increased after having kidney disease?	
Nausea and/ or vomiting?	
Does your hair fall after kidney disease?	
Increased trouble sleeping after kidney disease?	
Have unusual itching after kidney disease?	
Have you lost weight after kidney disease?	

Appendix 3

Synopsis

1 Title: Determinants of Kidney Disease Knowledge Among Chronic Kidney Disease patients.

2.1 Introduction

Chronic Kidney Disease (CKD) is a progressive condition that affects millions globally, contributing significantly to morbidity, mortality, and healthcare costs. Early detection and effective management of CKD are often hindered by patients' limited awareness and understanding of the disease. Knowledge gaps regarding the causes, symptoms, progression, and treatment options can negatively impact adherence to medical regimens and lifestyle modifications, ultimately leading to poorer outcomes. This study included 269 CKD (chronic kidney disease) patients who will be chosen from National Kidney Foundation and Research Institute. The majority of participants (53.9%) were female and (66.9%) male were aged 50 years or older. Most participants were from urban areas (69.5%), married (95.5%), and unemployment (69.5%). The education level varied, with 52.8% having completed high school and (21.9%) holding a bachelor's degree or higher. CKD knowledge scores revealed that (85.3%) of participants had good knowledge (score:13-18). Higher levels of education (AOR: 6.69, $p = 0.015$) and BMI >24.9 (AOR: 4.57, $p = 0.009$) were significant predictors of good CKD knowledge. Additionally, urban residents demonstrated significantly higher knowledge levels ($p = 0.006$). Despite this, knowledge gaps remained in areas such as kidney function, with only 24.2% recognizing the role of kidneys in maintaining red blood cells count and 26.8% understanding their role in phosphorus regulation. Key symptoms like unusual itching and shortness of breath were recognized by 65.1% and 59.5% of participants, respectively (Seng et al., 2020; Wang et al., 2023).

2.1 Objective

1. To assess the level of knowledge about Chronic Kidney disease (CKD) among patients with CKD in Bangladesh.
2. To identify the demographic, socioeconomic, and clinical factors associated with CKD knowledge among patients.

3. Methodology

3.1 Sample Selection

A total of 300 patients will be examined: 269 individuals with chronic kidney disease (CKD) receiving regular treatment. Based on their willingness to participate. Patients with CKD will be at least 18 years old. Pregnant ladies and patients in critical condition will not be allowed during this survey.

3.2 Implementing the Questionnaires

While I visiting a hospital, I conducted interviews with all CKD patients, having them fill out my questionnaires. All participants were given verbal instructions before filling out the questionnaires. The questionnaires were slightly modified to enhance the understanding of the participants and make the filling easier for them.

4. Statistical Analysis

SPSS version 20 software was used for all analyses. At first the statistics were displayed as mean standard deviations, percentages and frequencies. Significant independent predictors of knowledge of chronic kidney disease were found using multivariate logistic regression analysis. The level of significance was determined at a $P < .005$.

5. Expected Outcomes

The current study will assist us in assessing the impact and prevalence of CKD patients in Bangladesh. Understanding the particular difficulties that the community of renal disease sufferers faces is crucial. These people may be more susceptible to infection or worse results, and they may already be facing challenges receiving regular medical treatment. Our evaluation process and health standards are quite simple, quick, affordable, and trustworthy. CKD sufferers' will also benefit from it. The moment has come to develop and put into practice the strategies for CKD patients

Signature of Supervisor and Fellow

6. Time Schedule of Activities

- Each assignment has a realistic and thorough timeframe with monthly checkpoints.
- Tasks for certain project activities may include data collecting, analysis, reporting, procedure development, and literature research.

Task	Activities by Months or Days (Starts to Ends)											
	1	2	3	4	5	6	7	8	9	10	11	12
Literature research	←→											
Study protocol and questionnaire development		←→										
Ethical approval			←→									
Training of anyone (if needed)				←→								
Pretesting of study protocols, questionnaire					←→							
Data and sample collection phase						←→						
Laboratory analysis (if needed)							←→	←→				
Data analysis and report writing										←→	←→	
Report Submission and article publication												←→

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