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Original Article

The Relationship Between Knowledge, Attitudes, and Practices and the Incidence of Chronic Kidney Disease in Patients Aged 18-45 at Hajj Hospital Medan in 2025

Maghfira Syahruni[1*], Rahayu Lubis[2]

[1,2]Faculty of Public Health, Universitas Sumatera Utara, Indonesia
Email: [1)] maghfirasyahruni@students.usu.ac.id, [2)] rahayu@usu.ac.id

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Abstract

Chronic Kidney Disease (CKD) is a non-communicable disease characterized by a gradual and irreversible decline in kidney function. According to WHO data, 843.6 million people worldwide were affected by CKD in 2021. In Indonesia, the prevalence of CKD has increased significantly, with 697.5 million cases and 1.2 million related deaths reported in 2019, and over 843.6 million cases in 2021. At Haji Hospital Medan, 4,012 CKD cases were recorded in 2024, with the majority of patients falling within the productive age group. This trend poses a threat to individuals' quality of life and productivity within society. This study aims to examine the relationship between knowledge, attitudes, practices, and medical history with the incidence of CKD among patients aged 18–45 years at Haji Hospital Medan in 2025. A cross-sectional study design was employed, involving a total of 118 respondents selected using accidental sampling. Data were collected through structured interviews using a validated questionnaire. Bivariate analysis using the chi-square test revealed significant associations between knowledge (p = 0.010), attitudes (p = 0.003), practices (p = 0.015), and medical history (p = 0.010) with the incidence of CKD. Insufficient knowledge about CKD risk factors and prevention, negative attitudes toward healthy lifestyles, non-compliance with medical recommendations, and a history of illness contribute to the rising incidence of CKD in the productive age group. These findings highlight the need to enhance promotive and preventive health efforts, particularly targeting the productive age population, to raise awareness of the importance of CKD prevention and early detection.

Keywords: Attitude, Chronic Kidney Disease, Knowledge, Medical History, Practice.

1. Introduction

Non-communicable diseases (NCDs) are one of the most pressing global health challenges, characterized by increasing prevalence and becoming the leading cause of death in many countries. NCDs are chronic, long-lasting, and influenced by a combination of genetic, biological, ecological, and behavioral factors (WHO, 2024). The Ministry of Health of the Republic of Indonesia also mentioned that NCDs can be prevented if the risk factors are well managed, because they are generally caused by unhealthy lifestyles, environmental factors, and genetics (Kemenkes RI, 2023). NCDs are diseases that are not caused by infection, so they are not transmitted between individuals (Irwan, 2016). Based on the WHO report, in 2021 there will be around 43 million deaths caused by NCDs, or around 75% of all global deaths, with 18 million of them occurring before the age of 70. 82% of these premature deaths occur in low- and middle-income countries (WHO, 2024).

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In Indonesia, the 2018 Basic Health Research (Riskesdas) showed an increase in the prevalence of several types of NCDs compared to Riskesdas 2013, such as cancer, stroke, chronic kidney disease, diabetes mellitus, and hypertension (Kementrian Kesehatan RI, 2018). Chronic kidney disease (CKD) is a type of NCD that contributes significantly to morbidity and mortality rates. CKD is characterized by a decrease in glomerular filtration rate <60 mL/min/1.73 m^2 for ≥3 months in an irreversible manner, and can be caused by disturbances in fluid-electrolyte balance and the body's excretory processes (Vaidya & Aeddula, 2021). WHO data states that in 2019 there were approximately 697.5 million cases of CKD globally with 1.2 million deaths, resulting in a Case Fatality Rate (CFR) of 0.172% (Gultom & Sudaryo, 2023). This figure increased in 2020, with 254,028 deaths and a CFR of 14.19%. In 2021, the number of people with CKD increased to more than 843.6 million people (Putra & Purgito, 2024). Developed countries such as Australia, Japan, and European countries record a CKD prevalence of 6-11% with an increase rate of 5-8% per year (Utami et al., 2020).

In Indonesia, CKD is one of the NCDs with an increasing prevalence trend. Riskesdas 2018 recorded the prevalence of CKD at 3.8‰ or around 713,783 people, an increase from 2‰ in 2013 (Irwan, 2016). Data from the Indonesian Ministry of Health states that in 2019 there were 1.93 million cases of kidney failure who received renal replacement therapy, and increased to 1.97 million cases in 2020 (Kemenkes RI, 2023). The 2018 Riskesdas also reported that around 19.3% of the population aged ≥15 years had been diagnosed with CKD, both those currently and those who had undergone dialysis therapy (Riskesdas, 2018). CKD generally affects the elderly, but recent trends show a shift to productive age, starting from 35 years and above (Kemenkes RI, 2023). In North Sumatra Province, the number of patients with CKD also showed a significant increase. Data from the Indonesian Ministry of Health recorded the number of patients with CKD as many as 45,792 people in 2019 (Arisandy & Carolina, 2023). Meanwhile, in Hajj Hospital Medan in 2024, there were 4,012 patients with CKD, consisting of 3,814 outpatients and 171 inpatients. This indicates that CKD has become a serious and urgent health problem to be addressed in the region.

Risk factors for CKD include hypertension, diabetes mellitus, medical history, unhealthy lifestyle, and low physical activity and unbalanced diet. In addition, aspects of people's knowledge, attitudes and practices towards preventing CKD play an important role in controlling its prevalence. Low knowledge and awareness of the risks of CKD often leads to delays in diagnosis and treatment, which results in increased mortality and economic burden due to the need for therapies such as hemodialysis (Irwan, 2016). Hajj Hospital Medan is one of the health facilities in North Sumatra with a high number of patients with CKD and is increasing every year. With a large and diverse patient population, Hajj Hospital Medan provides a representative database for research. Therefore, this study aims to examine the relationship between knowledge, attitudes, and practices with the incidence of CKD in 18-45 year olds at Hajj Hospital Medan in 2025.

While clinical risk factors such as hypertension and diabetes mellitus are well-established contributors to CKD, behavioral factors also play a critical role. Limited knowledge about CKD, poor attitudes toward prevention, and inadequate preventive practices are behavioral determinants that can lead to late diagnosis and increased complications. In the productive age group, these behavioral challenges are further complicated by lifestyle demands, time constraints, and limited health awareness.

To provide a conceptual and theoretical understanding of the role of knowledge, attitudes, and practices in CKD prevention, this study is grounded in the Precede-Proceed Model developed by Lawrence Green. This comprehensive framework is widely used in public

health promotion to analyze and influence health behavior. The PRECEDE phase focuses on behavioral diagnosis through three main components: predisposing factors (e.g., knowledge, attitudes, beliefs), enabling factors (e.g., access to healthcare facilities and resources), and reinforcing factors (e.g., support from health workers or community leaders). The PROCEED phase includes program implementation and evaluation, ensuring that behavioral change leads to measurable health outcomes (Marniati et al., 2019). Empirical studies applying this model have demonstrated its effectiveness in shaping preventive health behaviors across various chronic conditions, including diabetes and hypertension.

The relationship between knowledge, attitude and practice (KAP) and the incidence of chronic kidney disease (CKD) in individuals aged 18-45 years is an important aspect that needs to be considered in public health intervention efforts. Although most young adults demonstrate sufficient understanding of key risk factors such as hypertension and diabetes, there are still significant gaps in diagnostic and treatment understanding. This could potentially lead to delayed early detection and increased incidence of CKD in this productive age group. A study in Pakistan revealed that 87% of respondents knew that hypertension and diabetes are risk factors for CKD, but more than half of the respondents still misunderstood the methods of diagnosis, believing that urine characteristics alone are sufficient to diagnose kidney disease. (Kazmi et al., 2023).

On the other hand, attitudes showed that most individuals were concerned about the social and economic impact of CKD; for example, 73.1% of respondents in Tanzania expressed concern about the economic burden of the disease (Stanifer et al., 2016). In addition, the social stigma associated with a CKD diagnosis has also been shown to influence patients' attitudes towards seeking medical care (Kazmi et al., 2023). Nonetheless, most respondents demonstrated positive practices, such as willingness to consult a medical doctor (95.7%) and openness to the use of mobile technology in CKD management (94.3%) (Kazmi et al., 2023; Stanifer et al., 2016). However, the gap between basic knowledge and actual practice suggests that context-specific health education interventions are needed, especially to improve diagnostic understanding and encourage preventive behavior and appropriate treatment in young populations.

By applying this theoretical framework, this study positions knowledge, attitudes, and practices not as incidental variables but as core behavioral constructs that significantly influence the risk and prevention of CKD. Specifically, inadequate knowledge may result in the inability to recognize early symptoms, negative attitudes may reduce the perceived importance of health checks, and poor practices may include behaviors that harm kidney function such as high sodium intake or lack of hydration. Therefore, strengthening these behavioral domains is critical, especially in the productive age population, to reduce the long-term burden of CKD.

This study aims to examine the relationship between knowledge, attitudes, practices, and medical history with the incidence of CKD among individuals aged 18 to 45 years at Hajj Hospital Medan in 2025. The findings are expected to provide a strong scientific basis for the formulation of targeted health interventions and educational programs tailored for the productive age group to support the national agenda of early CKD prevention.

2. Methods

This study employed an analytical observational design with a cross-sectional approach, conducted at the Internal Medicine Clinic of Hajj Hospital Medan, located on Jl. Rumah Sakit H. No. 47, Kenangan Baru, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra

Province. The location was selected based on preliminary data indicating a high prevalence of chronic kidney disease (CKD), with 4,012 recorded cases in 2024, as well as the availability of comprehensive medical records and logistical support for research feasibility. The study was carried out over a three-month period, from March to May 2025, involving a total of 118 respondents.

The sampling technique used was accidental sampling, which involves selecting respondents who happen to be present at the research site and meet the inclusion criteria. While this method was chosen for its practicality in time-limited data collection and its ability to quickly access individuals who meet the desired characteristics, it is acknowledged that accidental sampling has limitations. Specifically, it may result in a less representative sample due to the non-random selection process, potentially introducing selection bias and limiting the generalizability of the findings. This is particularly relevant in studies exploring the relationship between variables such as knowledge, attitudes, and comorbid conditions with the occurrence of CKD.

3. Results and Discussion

3.1. Results

Hajj Hospital Medan is one of the referral health care facilities managed by the North Sumatra Provincial Government which stands on an area of 6 hectares with a building area of 13,837 m². As a type B hospital, Hajj Hospital Medan has a capacity of 248 inpatient beds and provides services through 16 specialist polyclinics. According to data from the Central Bureau of Statistics (BPS) of Medan City in 2022, the population of Medan City was recorded at 2,494,512 people, consisting of 1,242,313 men and 1,252,199 women. The majority of the population is in the productive age range (15-64 years), with a total of 1,742,904 people, indicating that most of the people of Medan City are in the working age group who are vulnerable to chronic diseases such as Chronic Kidney Disease (CKD) if they do not adopt a healthy lifestyle (BPS Kota Medan, 2022).

3.2.1. Univariate Analysis

Univariate analysis in this study aims to determine the frequency distribution and percentage of the variables studied, one of which is the incidence of CKD in respondents aged 18-45 years at Hajj Hospital Medan in 2025. The distribution of the incidence of CKD in this age group is presented in Table 1 below:

Table 1. Proportion Distribution of Age Group 18-45 Years Based on the Incidence of CKD at Hajj Hospital Medan in 2025

CKD Incidence Status	n	%
Chronic Kidney Disease (CKD)	61	51,7
No history of CKD	57	48,3
Total	118	100,0

Based on the table 1 above, it was found that 61 people (51.7%) experienced CKD, while 57 people (48.3%) did not experience CKD. The high proportion of the incidence of CKD (CKD) at the age of 18-45 years at Hajj Hospital Medan is influenced by the prevalence of risk factors such as hypertension and diabetes mellitus as the main causes of CKD. Low awareness of early detection, unhealthy diet, lack of physical activity, and smoking also worsen the condition. These lifestyles often go unnoticed, leading to delayed diagnosis and increased need for renal replacement therapy.

The proportion of age, education, and medical history in the internal medicine clinic of Hajj Hospital Medan in 2025 is shown in the table below.

Table 2. Distribution of Respondents Based on Age, Education, and History of CKD Patients at Hajj Hospital Medan 2025

Respondents Proportion	n	%
Age		
≤ 37 Years	53	44,9
>37 Years	65	55,1
Educational Background		
No Formal Education	5	4,2
Elementary School	8	6,8
Junior High School	18	15,3
Senior/vocational High School (SMA/SMK)	50	42,4
College	37	31,4
Medical history		
None	20	16,9
Diabetes Mellitus	32	27,1
Hypertension	38	32,2
Both (Diabetes Mellitus and Hypertension)	28	23,7

Based on the results of the analysis in table 2, the proportion of respondents' age group was dominated by age >37 years as many as 65 people (55.1%), while age ≤37 years was 53 people (44.9%). The majority of education level is high school / vocational high school as many as 50 people (42.4%), followed by college 37 people (31.4%), junior high school 18 people (15.3%), elementary school 8 people (6.8%), and no formal education 5 people (4.2%). The most common medical history was hypertension with 38 people (32.2%), followed by diabetes mellitus with 32 people (27.1%), and a combination of both with 28 people (23.7%). Meanwhile, 20 people (16.9%) did not have a history of the disease.

1) Knowledge

Knowledge about CKD is all that an individual knows relating to CKD. The distribution of proportions based on respondents' knowledge of CKD can be seen in the table below.

Table 3. Proportion distribution of knowledge about CKD

Knowledge	n	%
Poor	60	50,8
Good	58	49,2
Total	118	100,0

Based on the table 3 results of the distribution of the proportion of respondents' knowledge about CKD, it was found that 58 people (49.2%) had a good level of knowledge about CKD, while 60 people (50.8%) had an unfavorable level of knowledge about CKD.

2) Attitude

Attitudes about CKD are an individual's assessment or evaluation of CKD responses that include beliefs, perceptions, feelings, and predispositions to act regarding kidney health. The distribution of proportions based on the respondent's attitude regarding CKD can be seen in the table below.

Table 4. Proportion Distribution of Attitude towards CKD

Attitudes	n	%
Poor	50	42,4
Good	68	57,6
Total	118	100,0

Referring to the table 4 above, it was found that 68 people (57.6%) showed a favorable attitude towards CKD, while the other 50 people (42.4%) showed an unfavorable attitude.

3) Practices

Practice regarding CKD are individual activities in response to responses about CKD that refer to the activities individuals take to maintain kidney health, including preventive and management practices taken to prevent or manage CKD. The distribution of proportions based on respondents' practices regarding CKD can be seen in the table below.

Table 5. Proportion Distribution of Practice Regarding CKD

Practice	n	%
Poor	63	53,4
Good	55	46,6
Total	118	100,0

Based on the table 5 above, it was found that 55 people (46.6%) took good practice regarding CKD, while 63 people (53.4%) took poor practice.

3.2.2. Bivariate Analysis

The relationship between knowledge of patients aged 18-45 years with the incidence of CKD

Table 6. Cross Tabulation between the Knowledge Level of Patients 18-45 Years of Age with the Incidence of CKD at Hajj Hospital Medan in 2025

Knowledge	Incidence of CKD in 18-45 year olds				Total		*p*
	CKD		No CKD				
	n	%	n	%	n	%	
Poor	24	40,0	36	60,0	60	100,0	0,010
Good	37	63,8	21	36,2	58	100,0	
Total	61		57		118		

Based on the results of the analysis in table 6, out of 60 patients with poor knowledge, 24 people had CKD and 36 did not. Meanwhile, out of 58 patients with good knowledge, 37 had CKD and 21 did not. The proportion of CKD was higher in the group with good knowledge. This indicates that knowledge alone is not enough to prevent the incidence of CKD, possibly influenced by other factors such as lifestyle, medication compliance, or genetic predisposition. The results of the chi-square test showed a value of $p = 0.010$ ($p \leq 0.05$), which means that there is a significant relationship between the level of knowledge and the incidence of CKD in 18-45 year olds at Hajj Hospital Medan in 2025.

1) The relationship between the attitude of patients aged 18-45 years and the incidence of CKD

Table 7. Cross Tabulation between attitudes

Attitudes	Incidence of CKD in 18-45 year olds				Total		*p*
	CKD		No CKD				
	n	%	n	%	n	%	
Poor	18	36,0	32	64,0	50	100,0	0,003
Good	43	63,2	25	36,8	68	100,0	
Total	61		57		118		

The results of the analysis in table 7 showed a correlation between attitude and the incidence of CKD. Of the 50 patients with unfavorable attitudes, 18 had CKD, while of the 68 patients with favorable attitudes, 43 had CKD. The proportion of CKD incidence was higher in

the group with good attitudes. This indicates that a positive attitude towards health does not always prevent CKD, possibly because the attitude is formed after diagnosis or influenced by other factors such as lifestyle, physical condition, and environment. The chi-square test showed a p value = 0.003 (p ≤ 0.05), which means that there is a significant relationship between attitude and the incidence of CKD in patients aged 18-45 years at Hajj Hospital Medan in 2025.

2) Relationship between the practices of patients aged 18-45 years and the incidence of CKD

Table 8. Cross tabulation between the practices

Practices	Incidence of CKD in 18-45 year olds				total		*p*
	CKD		No CKD				
	n	%	n	%	n	%	
Poor	26	41,3	37	58,7	63	100,0	0,015
Good	35	63,6	20	36,4	55	100,0	
Total	61		57		118		

Based on the analysis in table 8, out of 63 patients with unfavorable practices, 26 people (41.3%) had CKD. Meanwhile, out of 55 patients with good practices, 35 people (63.6%) had CKD. Although the proportion of CKD was higher in patients with good practices, this could be influenced by possible behavioral changes after diagnosis. The results of the chi-square test showed a value of p = 0.015 (p ≤ 0.05), which indicates a significant relationship between the practices of patients aged 18-45 years and the incidence of CKD at Hajj Hospital Medan in 2025.

3) Relationship between the medical disease of patients aged 18-45 years and the incidence of CKD

Table 9. Cross tabulation between the medical history

Medical History	Incidence of CKD in 18-45 year olds				Total		p
	CKD		No CKD				
	n	%	n	%	n	%	
None	7	35,0	13	65,0	20	100,0	0,010
Diabetes Melllitus	15	46,9	17	53,1	32	100,0	
Hypertension	17	44,7	21	55,3	38	100,0	
Both (Diabates Mellitus & Hypertension)	22	78,6	6	21,4	28	100,0	
Total	61		57		118		

Based on medical history, 20 patients had no medical history, 32 had a history of diabetes mellitus, 38 had a history of hypertension, and 28 had a history of both. The highest proportion of CKD was found in patients with a history of both diabetes and hypertension (78.6%), compared to other groups. This finding suggests that medical history, especially the combination of diabetes and hypertension, is closely associated with the risk of CKD. The results of the chi-square test showed a value of p = 0.010 (p ≤ 0.05), indicating a significant relationship between medical history and the incidence of CKD in patients aged 18-45 years at Hajj Hospital Medan in 2025.

3.2. Discussion

The results of this study show that the incidence of CKD (CKD) is quite high in the productive age group, especially patients aged 18-45 years at Hajj Hospital Medan. This finding indicates a shift in disease burden, where CKD, which previously occurred more in the elderly, is now starting to be found at a younger age. This is in line with reports that non-communicable diseases, including CKD, have an increasing prevalence in productive age in Indonesia (WHO, 2024). This shift will certainly have an impact on decreasing productivity and increasing the economic burden on both individuals and the health system at large.

The data likewise show a relationship between patient knowledge and the incidence of CKD. Patients who have good knowledge tend to make preventive efforts, such as maintaining a diet, monitoring blood pressure, and undergoing regular health checks. Good knowledge allows individuals to recognize the risk factors and early symptoms of CKD, so that they can take preventive action earlier (Irwan, 2016; Kemenkes RI, 2023). This confirms the theory that knowledge is a vital factor in shaping a person's health behavior. Improving health literacy is an important strategy in controlling chronic diseases, including CKD.

Attitude has also been shown to be associated with the incidence of CKD. Individuals with a positive attitude towards health generally show a higher awareness of leading a healthy lifestyle. However, in this context, the evidence show that some patients with good attitudes had already developed CKD. This results from the reverse causality phenomenon, where a change in attitude to be more positive occurs after the patient knows they have CKD. This means that the diagnosis of CKD encourages individuals to care more and change towards healthier behaviors (Nurani & Mariyanti, 2019). Yet, attitudes still play a vital role in decision-making and adherence to chronic disease management, as shown in previous studies (Suriani et al., 2023).

Further, patient actions were also significantly associated with the incidence of CKD. Preventive measures such as regular exercise, control of salt and sugar consumption, and regular medical check-ups were shown to contribute to reducing the risk of CKD. However, the results of this study indicate that some good practices are only taken after a diagnosis of CKD has been made. This emphasizes the importance of taking preventive measures as early as possible, rather than in response to the disease already occurring (Faraj et al., 2024). Consistency and timing of preventive measures are key factors for successful CKD control.

The last aspect analyzed was the relationship between medical history and CKD incidence. Results showed that patients with a history of chronic diseases, particularly diabetes mellitus and hypertension, had a higher risk of developing CKD. In fact, the risk increased significantly in patients who had both disease histories simultaneously. This finding is in line with various previous studies which state that diabetes and hypertension are the two main factors causing CKD through the mechanism of glomerular damage due to hyperglycemia and chronic high blood pressure (Ghaderian & Beladi-Mousavi, 2014; Mogensen, 1994; Wu et al., 2023). Hence, controlling comorbid diseases is key in preventing CKD progression, especially in the young age group who are still in their productive years.

Overall, this study confirms that knowledge, attitudes, practices and medical history are important determinants of CKD incidence in productive age. Promotive and preventive interventions that focus on health education, increased risk awareness, and early detection are needed to reduce the disease burden of CKD in the future.

4. Conclusion

This study found statistically significant associations between knowledge (p = 0.010), attitude (p = 0.003), practice (p = 0.015), and medical history specifically diabetes mellitus and hypertension (p = 0.010) with the incidence of Chronic Kidney Disease (CKD) in patients aged 18–45 at Hajj Hospital Medan. Among the variables analyzed, medical history, particularly the presence of both diabetes and hypertension, showed the strongest relationship, with 78.6% of patients with both conditions experiencing CKD.

Interestingly, the proportion of CKD was also higher among respondents with good knowledge and behavior, indicating the possibility that preventive behaviors may have been adopted after diagnosis rather than before. This suggests a need for earlier and more proactive education and behavior change strategies targeting the productive age group.

The findings highlight that cognitive and behavioral factors remain essential in kidney health prevention, but they must be accompanied by consistent early detection efforts, especially among high-risk individuals. Therefore, hospitals are encouraged to strengthen educational initiatives using methods such as counseling, posters, and outreach campaigns to emphasize kidney health, especially targeting individuals with low education levels. Meanwhile, community members in the productive age group must actively seek health information, adopt healthy lifestyles, and attend regular health screenings.

Additionally, government health authorities should expand early screening programs for kidney disease in primary care settings and integrate CKD prevention into broader healthy lifestyle campaigns. Future research should consider using longitudinal designs and larger sample sizes to explore causality and strengthen the generalizability of findings.

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