

How Attitudes, Perceptions, Culture, and Gender Influence the Incidence of Chronic Kidney Disease? A Mixed-Method Study in Surakarta, Indonesia

Diyono Diyono¹, Hartono Hartono², Sapja Anantanyu³, Anik Lestari⁴

Abstract

The prevalence of CKD has been rising in tandem with high rates of hypertension in Indonesia. Surakarta, a city in Indonesia, has notably high rates of both hypertension and CKD. Objectives: To analyze the factors influencing the increase in CKD cases in Surakarta City. Method: A mixed-method approach using a sequential explanatory design. The quantitative phase involved assessing the knowledge, attitudes, and preventive behaviors related to CKD among hypertensive patients. This was followed by a qualitative phase to investigate the experiences of patients diagnosed with CKD who had a history of hypertension. The study was conducted from February to June 2024. Results: (1) The average number of new CKD cases in 2023 was 33. (2) A positive correlation was found between knowledge and attitudes towards CKD prevention ($p: 0.001$; $r: 0.963$). Qualitative findings revealed the following factors influencing CKD incidence: (1) Inadequate knowledge and attitudes of patients regarding hypertension. (2) Misconceptions about antihypertensive medications. (3) Lack of family support due to gender and cultural factors. Conclusions: Knowledge, attitudes, perceptions, gender, and cultural factors significantly influence the increase in CKD cases among hypertensive patients in Surakarta City.

Keywords: Hypertension, Chronic Kidney Disease, Knowledge, Attitudes, Perception, Gender, Culture.

Introduction

The global prevalence of Chronic Kidney Disease (CKD) continues to rise, from approximately 425 million cases in 2017 to a projected 629 million by 2045 (Cockwell & Fisher, 2020), with an average annual increase of 0.49%. 998) (Kampmann et al., 2023). Currently, an estimated 10% of the global population is affected by CKD, but 9 out of 10 individuals remain unaware of their condition. In Indonesia, based on the 2018 Basic Health Research (Riskesdas), the prevalence of CKD reached 0.38%, a twofold increase compared to 2013, when it was 0.2%. Mortality rates associated with CKD are also high, with 2 million deaths globally in 2022. In Indonesia, CKD is among the top 10 causes of death, with an average of 42,000 deaths annually (P2PM, 2022). In Surakarta, the CKD-related mortality rate was 41 cases in 2019, dramatically increasing to 91 in 2020, and remaining within the top 10 causes of death in 2021 with 54 cases (Dinkes Kota Surakarta, 2021).

Economically, CKD ranks as the second most costly catastrophic illness after heart disease, with healthcare expenses per patient per day reaching Rp. 1,199,836, higher than for heart disease (Rp. 715,635) and stroke (Rp. 1,193,998) (Kemenkes RI., 2021). Hypertension is a major risk factor for CKD. Preventive efforts aimed at managing hypertension are critical for reducing CKD prevalence. The Indonesian government has implemented various hypertension control programs within the community, including the "Posbindu PTM" program (Kemenkes RI, 2012), the Healthy Indonesia Program with a Family Approach, where well-controlled hypertension is an indicator of a healthy family (Depkes, 2016), the "GERMAS" Healthy Living Movement (Kementerian Kesehatan RI, 2016), and CKD prevention initiatives like the PATUH and

¹ Doctoral Program in Development Extension / Community Empowerment: Primary Interest in Health Promotion, Postgraduate School of Universitas Sebelas Maret Surakarta, Central Java, Indonesia, Panti Kosala Institute of Health Sciences, Jalan Raya Solo Baki Km. 4 Grogol Sukoharjo Central Java, Indonesia, Email: dionsanfizio@gmail.com, (Corresponding Author), ORCID: 0000-0003-0479-2853, ID SCOPUS:57328465500

² Public Health Science, Faculty of Medicine Universitas Sebelas Maret Surakarta, Central Java, Indonesia, ORCID: 0000-0001-6112-497X, ID SCOPUS: 57213812491.

³ Development Extension / Community Empowerment Program, Postgraduate School Universitas Sebelas Maret Surakarta, Central Java, Indonesia, ORCID: 0000-0003-4197-3581 ID SCOPUS: 57188728132.

⁴ Public Health Sciences, Faculty of Medicine, Sebelas Maret University Surakarta, Central Java, Indonesia. ID SCOPUS: 56349197800.

CERDIK campaigns (Kementerian Kesehatan Republik Indonesia, 2018). However, despite these efforts, CKD and hypertension cases remain high (Hidayangsih et al., 2023).

Existing research on the relationship between hypertension and CKD has primarily been quantitative (Hengkesa & Lawalata, 2021);(Hustrini et al., 2022)(de Bhailis & Kalra, 2022). This study seeks to explore the factors contributing to the increase in CKD cases through a mixed-methods approach, focusing on hypertensive patients, CKD patients with hypertension as a risk factor, their families, and the non-communicable disease (NCD) control program officials at the Surakarta Health Office.

Materials and Method

Research Design

A mixed-method approach using a sequential explanatory design was conducted from February to July 2024. The quantitative research aimed to describe hypertension cases, new hypertension cases, chronic kidney disease (CKD), and the knowledge, attitudes, and preventive behaviors related to CKD among hypertensive patients in Surakarta City. Data were collected through surveys. The qualitative research aimed to investigate how hypertensive patients developed complications leading to CKD. Data were gathered through in-depth interviews using a semi-structured interview guide.

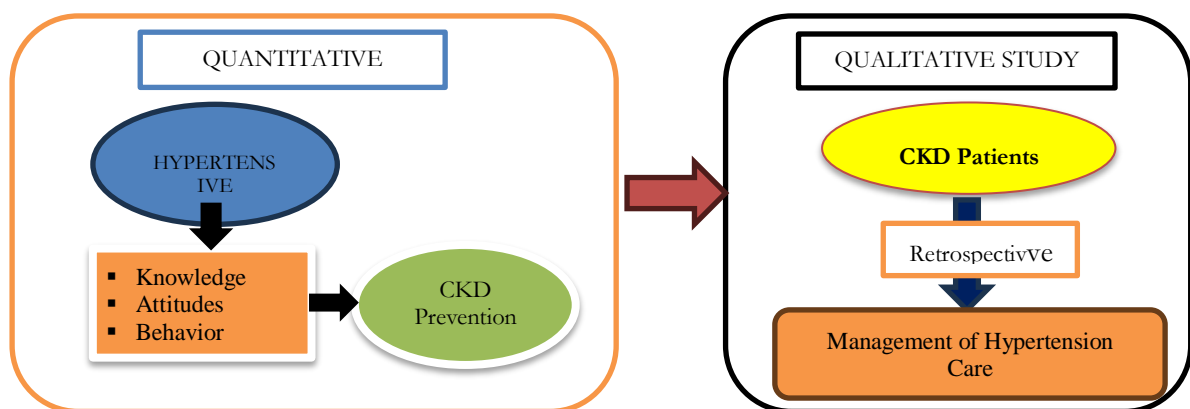


Figure 1. Research Framework

Study Participants

The study was conducted in 8 community health centers (Puskesmas) under the jurisdiction of the Surakarta City Health Office. The quantitative research involved 200 hypertensive patients recruited through multistage random sampling. The qualitative study included 16 informants selected based on predetermined criteria (Table 1).

Table 1. List of Qualitative Study Informants

Informant	Number	Criteria
CKD Patients	6	Diagnosed within the last year, with a history of hypertension only, and compos mentis awareness
CKD Patients' Families	6	Living in the same household as the patient, serving as a caregiver
Health Office Official	1	Responsible for the NCD hypertension program
Puskesmas Official	1	Responsible for the NCD hypertension program

Health Volunteer	2	Maximum age of 55 years, at least 5 years of experience as a volunteer, minimum education of high school diploma
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Figure 2. Research Location

Data Collection

The study was conducted from February to July 2024. Quantitative data were obtained through surveys and the distribution of questionnaires. Qualitative data were collected through in-depth interviews using a semi-structured interview guide.

Data Analysis

Data analysis was conducted in two stages. The first stage involved quantitative analysis to describe hypertension cases, chronic kidney disease (CKD) cases, and the knowledge, attitudes, and preventive behaviors related to CKD among hypertensive patients, using univariate and bivariate statistical analyses. The second stage involved qualitative analysis using a thematic approach to gain a deeper understanding of the reasons behind the high incidence of CKD in Surakarta (Sawatsky et al., 2019). Qualitative data were analyzed with the assistance of NVIVO 12 software (Dhakal, 2022). Interviews conducted in Javanese and Indonesian were translated into English.

Results

Quantitative Study

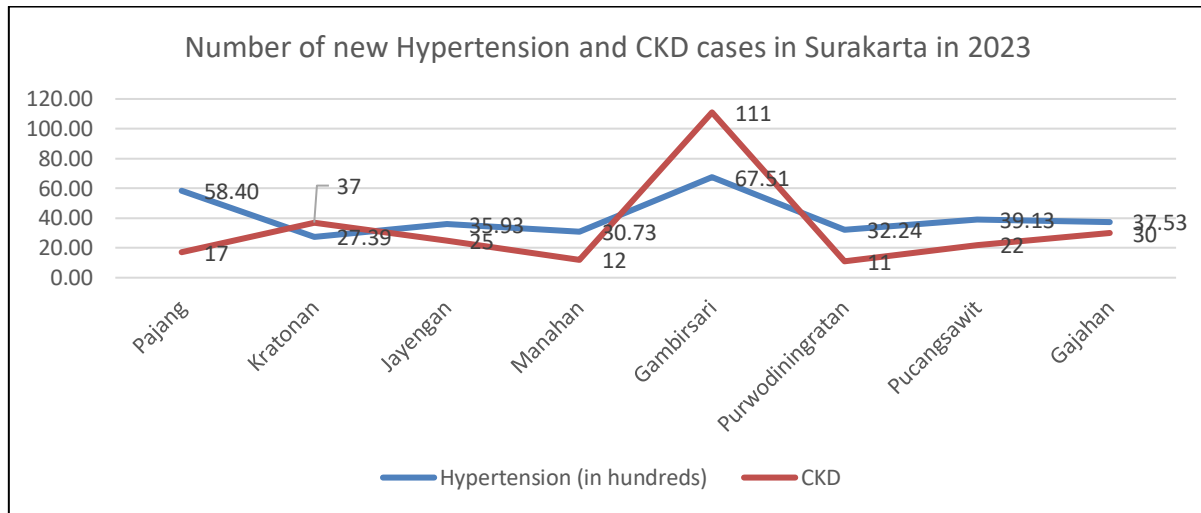


Figure 3. The Survey Results on New Cases of Chronic Kidney Disease (CKD) In Surakarta in 2023

Based on data from 8 community health centers, recorded a total of 265 new CKD cases, with an average of 33 cases per community health centers. For hypertension, there were 38,886 cases, with an average of 4,111 cases per community health centers.

Table 2. Respondents' Demographic Characteristics

Variable	f	%
Gender		
Male	56	28.00
Female	144	72.00
Age		
Minimum	30	
Maximum	70	
Average	58.8	
Education		
Elementary	6	3.00
Secondary	75	37.50
Tertiary	119	59.50
History of Hypertension		
<3 years	30	15.00
>3 years	75	37.50
Do not know	95	47.50

Table 2 shows that a larger proportion of hypertensive patients were female, with an average age of 58.8 years. Most patients did not know when their hypertension began.

Table 3. Analysis of the Relationship Among Knowledge, Attitude, and Behavior Towards CKD Prevention

Component	Univariate Analysis			Bivariate analysis (Pearson Correlation Test)		
	Knowledge	Attitude	Behavior	Knowledge	Knowledge	Attitude
				Attitude	Behavior	Behavior

Mean	38.27	58.68	61.32	p=0.001	p=0.060	P=0.400
Median	40.00	59.22	62.02	r=0.963	r=1	r=0.060
Mode	53.33	52.59	45.23			
Std. Deviation	20.05	7.99	8.10			
Minimum	6.67	35.69	39.05			
Maximum	86.67	81.79	78.43			

Table 3 presents the average scores for hypertensive patients' knowledge, attitudes, and behaviors related to chronic kidney disease (CKD) prevention. The average knowledge score was 38.27, the average attitude score was 58.68, and the average behavior score for CKD prevention was 61.32. The results of the Pearson correlation test indicated a positive relationship between knowledge and attitude ($p=0.001$; $r=0.963$). However, no significant relationship was found between knowledge and behavior ($p=0.060$), nor between attitude and behavior ($p=0.400$).

Qualitative Study

Table 4. Informants' Characteristics (n=16)

Characteristics	Key Informants (CKD Patients) (n=6)	Main Informants (Patients' Family) (n=6)	Supporting Informants	
			Health Office Puskesmas (n=2)	Health Cadre (n=2)
Gender				
Female	2 (33.33%)	4 (66.67%)	2 (100%)	2 (100%)
Male	4 (66.67%)	2 (33.33%)	0 (0.00%)	0 (0.00%)
Age				
Age Range	40 – 54	47 – 58	30 - 56	72 - 73
Age Mean	48.67	51.5	43	72.50
Education				
Elementary	1 (16.67%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Secondary	3 (50.0%)	6 (100%)	0 (0.00%)	2 (100%)
Tertiary	2 (33.33%)	0 (0.00%)	2 (100%)	0 (0.00%)
Employment Status				
Employed	4 (66.67%)	5 (83.33%)	2 (100%)	1 (50%)
Not employed	2 (33.33%)	16.67%	0 (0.00%)	1 (50%)

Interviews with family members who lived with and cared for CKD patients with a history of hypertension revealed that most families were unaware that hypertension could lead to chronic kidney disease (CKD).

One family member stated, *"I didn't know that hypertension could cause chronic kidney failure. What I knew was that my husband had hypertension, but how it developed into kidney failure, I don't know"* (Family 1)

"I'm not a healthcare professional, so I wasn't sure if it could lead to CKD or not. But it seems like there's a correlation" (Family 2).

"Hypertension can't cause chronic kidney failure. As far as I know, hypertension doesn't lead to kidney failure. What often causes kidney failure is frequently consuming energy drinks" (Family 3).

Misconceptions About Antihypertensive Medication

The research revealed a surprising finding: the majority of CKD patients with a history of hypertension did not adhere to the antihypertensive medications prescribed by doctors or community health centers. Furthermore, nearly all patients and their families held the misconception that medications provided by doctors or health centers contained chemicals that, if taken over a long period, could cause kidney damage or lead to CKD.

"I have never taken medication from a doctor. I am also afraid that if I go to the doctor or health center, I will be asked to undergo various tests. There is also a posyandu for the elderly in my village, but I have never attended it because I am afraid that if I get checked, any disease might be detected, which would only confuse me" (Patient 1).

"I was given medication called amlodipine when I left the hospital. However, I took the medication irregularly, only occasionally. I didn't stop completely, but I often forgot to take it and ended up not taking it at all. I didn't know that the medication needed to be taken regularly. I've heard that medications from doctors or health centers contain chemicals, and taking them for a long time might damage the kidneys" (Patient 2)

"Since I didn't feel any pain, I didn't take medication from the doctor, hospital, or health center. I am also afraid because these medications contain chemicals" (Patient 3).

"I didn't know that high blood pressure was considered hypertension, so I didn't take any medication" (Patient 4).

Family members, whether as spouses, siblings, or other relatives, have made efforts to encourage CKD patients to take antihypertensive medications regularly. Despite this, many patients still refuse to adhere to the prescribed treatment.

One family member noted, *"I have often 'nagged' my husband to attend check-ups and take his medication, but he refuses, fearing that he will be asked to undergo various tests"* (Family 1).

"Sometimes I am unable to monitor my wife's medication intake. Additionally, I am concerned that the medications from the health center are chemical-based, and people say that taking them for a long time could be harmful to the kidneys" (Family 4).

"My sibling is used to taking over-the-counter medication, which is locally referred to as 'Os,' and he feels better. Because of this, he rarely goes for check-ups and never monitors his blood pressure, let alone takes medication from doctors or health centers" (Family 5).

Data triangulation from informants responsible for programs at the Health Office, community health centers (Puskesmas), and health cadres confirmed the difficulty in encouraging hypertensive patients to adhere to treatment programs, especially in taking antihypertensive medications prescribed by doctors or health centers regularly.

"I know that many people with high blood pressure do not want to take medication from doctors or health centers. People say that these medications contain chemicals, and taking them for a long time can damage the kidneys" (Health Cadre 1).

"It is challenging here; if we check a resident's blood pressure and find it high, they often become angry and do not come back the following month. As a result, they do not take the medications provided by the health center" (Health Cadre 2).

"Hypertensive patients at the Puskesmas are divided into two groups: those who are aware and those who are not. The aware group manages to control and take their medications regularly on their own without being forced. However, the unaware group not only neglects to take their medications but also does not even attend blood pressure checks at the health posts. They do not feel sick. Unfortunately, this second group is larger" (Puskesmas Program Informant).

Cultural and Gender-Related Issues

The third theme identified in this study is particularly intriguing, highlighting the influence of gender and cultural factors on the attitudes and behaviors of hypertensive patients who subsequently develop CKD. In cases where the husband is healthy, he can influence his hypertensive wife to stop taking medications prescribed by doctors or health centers. Conversely, for men suffering from CKD, while their wives provide appropriate advice, the husbands often disregard it due to a perceived sense of authority.

"Initially, I took my medication regularly. However, when my husband said that long-term use of chemical medication could damage the kidneys and asked me to stop taking it, I complied. A wife is supposed to obey and follow her husband" (Patient 5).

"I was prescribed medication by Doctor I, but I only took it for about six months before stopping. I was afraid of my husband. He said that taking chemical medication from doctors for a long time could harm the kidneys, so I stopped taking the medication. My younger sister also advised me to take my medication regularly, but since she is only a younger sister, she didn't dare to insist against my husband's wishes" (Patient 5).

"As a husband and head of the household, my main responsibility is to earn money, so I sometimes cannot monitor my wife's medication intake. I am also concerned that medication from the health center, being chemical-based, could be harmful to the kidneys if taken for too long" (Family 3).

"I am just a younger sibling, so I am not very bold in reminding my older sister. Moreover, my brother-in-law is quite resistant to discussing these issues. He believes that hypertension is normal, especially with old age, and advises against taking too many chemical medications, as it might harm the kidneys" (Family 5).

Discussion

Chronic Kidney Disease (CKD) is defined as a condition characterized by a decline in kidney function and irreversible failure (American Kidney Fund, 2022). Currently, there is no definitive therapy for CKD except for kidney transplantation or lifelong hemodialysis (Kalantar-Zadeh et al., 2021); (Neild, 2023). Pathologically, the decline in kidney function is influenced by the number of functional nephrons in each kidney. The fewer functioning nephrons, the more severe the stage of kidney failure (Sandiya et al., 2022). The reduction in nephron number does not occur rapidly but progresses gradually, except in cases of acute poisoning (Džidić-Krivić et al., 2024). Therefore, the best approach to reduce CKD prevalence is through preventive and promotive efforts. One major risk factor increasing CKD prevalence is hypertension. Consequently, effective management of CKD involves proper care for hypertensive patients. Quantitative research results show that the average number of new CKD cases across eight community health centers in Surakarta is 33 cases, with the highest number reported at Gambirsari (111 cases) and the lowest at Purwodiningratan (11 cases). Meanwhile, the incidence of hypertension remains significantly high, averaging 4,111 cases. A key risk factor for developing CKD is hypertension (de Bhailis & Kalra, 2022) (Francis et al., 2024).

This study elucidates the factors contributing to the progression of CKD in hypertensive patients through both quantitative and qualitative analyses. The quantitative research, which surveyed 200 hypertensive patients, reveals that knowledge, attitudes, and behaviors related to CKD prevention are still very low among patients in Surakarta. The average knowledge score was 38.27, the attitude score was 58, and the behavior score was slightly higher at 61.32, all on a scale of 0–100. Knowledge is acquired through sensory experiences such as seeing or hearing based on past experiences (Hulu et al., 2020) and is a crucial component in shaping individual health behavior (Rincón Uribe et al., 2021). Lack of knowledge or awareness can lead to inappropriate attitudes and, ultimately, improper behaviors.

The findings from the quantitative study were confirmed by the qualitative study involving informants who were CKD patients with the primary comorbid condition of hypertension. The first factor identified is the inadequate knowledge and attitudes of patients regarding hypertension. The majority of patients and their families reported a lack of understanding about hypertension. This ignorance negatively affects patients' attitudes toward hypertension management efforts, as evidenced by the Pearson correlation test results ($p=0.001$; $r=0.963$). This aligns with other research demonstrating that knowledge influences attitudes (Machaalani et al., 2022); (Blessing Onyinye et al., 2020). The inaccuracy of patients' attitudes towards CKD prevention efforts is further exacerbated by the fact that most families are also unaware that hypertension can lead to CKD. Many families only recognize risk factors such as inadequate water intake and excessive consumption of energy supplements but are unaware that poorly controlled hypertension is a significant risk factor for CKD. Generally, CKD is associated with unhealthy habits like inadequate water consumption (Lo et al., 2021) and excessive energy drink intake (Diyono & Indriati, 2017); however, uncontrolled hypertension remains a primary cause (de Bhailis & Kalra, 2022). The lack of family knowledge impacts the quality of care provided to hypertensive patients (Sung & Paik, 2022) (Shamsi et al., 2017). When individuals do not recognize the dangers or complications of a disease, they are less likely to exhibit caution, attention, and preventive behaviors. This often results in a realization of complications only after they have become severe (Kisokanth et al., 2018); (Lissanu et al., 2019); (Shamsi et al., 2017). Long-term care also induces anxiety and stress in families, which can lead to fatigue and negligence in managing a hypertensive family member (Sung & Paik, 2022).

The second factor contributing to suboptimal hypertension management, which subsequently leads to chronic kidney disease (CKD), is the incorrect perception of antihypertensive medications prescribed by doctors or health centers. This misconception results in ineffective management of antihypertensive therapy. The majority of hypertensive patients avoid taking antihypertensive medications because they perceive these drugs as chemical substances that, when used long-term, could damage the kidneys. This erroneous perception is significant among patients and their families. The findings provide evidence that perceptions shape attitudes towards an object, which in turn influence behavior. The strong impact of incorrect perceptions is evident, with some family members even advising patients to discontinue their medications. This illustrates how attitudes profoundly affect the decisions and behaviors of individuals. Informants often linked information and experiences they had heard to the conclusion that long-term use of what they perceived as chemical medications could harm the kidneys. As a result, patients either stopped taking their medications or took them irregularly, or turned to inappropriate herbal remedies. These findings align with the concept of behavior formation or change, where individual behavior is influenced by personal beliefs or perceptions about an object, including diseases and available preventive measures (Abraham & Sheeran, 2014), and is affected by knowledge (Blessing Onyinye et al., 2020) (Machaalani et al., 2022). In-depth interviews with program managers at health centers supported these findings. They reported that hypertensive patients are divided into two groups: those who are aware and take their medications regularly without coercion, and those who are not aware and disregard their hypertension. Similarly, program managers from the Department of Health confirmed that the target for hypertensive patient visits to healthcare facilities is still below the set goal.

The third notable finding from the qualitative research is the impact of cultural and gender factors on the prevention behaviors of chronic kidney disease (CKD) in hypertensive patients. All qualitative informants in this study were Javanese, who strongly adhere to Javanese cultural norms. According to Javanese customs, wives and younger siblings, particularly younger sisters, are expected to respect and obey their husbands or older brothers. This study demonstrates that hypertensive patients in the role of wives comply with their husbands' instructions to stop taking antihypertensive medications, even when these instructions contradict medical guidelines. Similarly, caregivers in the role of younger siblings also feel compelled to respect their older siblings and are hesitant to enforce adherence to medical advice. The Javanese cultural perspective emphasizes that wives and younger siblings should obey and respect their husbands or older brothers (Saleh, 2019), which significantly influences decision-making, including health-related matters (Budi, 2012)(Widayanti et al., 2020). Local cultural norms play a role in health issues, as gender dynamics also affect patient care (Bujawati et al., 2024). This research illustrates how a wife and younger sibling, as women, may fear or hesitate to follow health recommendations due to their adherence to traditional gender roles and respect for male authority figures. Conversely, a husband, as a male figure, can influence his hypertensive wife to discontinue her medication, and she complies despite having a different understanding. The perception of a wife as a “konco wingking” (a supportive partner) in Javanese tradition—where women are expected to handle household tasks and support their husbands further compounds this issue (Maulana, 2021). These findings align with existing concepts about the relationship between gender and health (Haworth-Brockman, 2019)(Karaçam Yılmaz et al., 2023);(Gjellestad et al., 2024).

Conclusion

Factors contributing to the development of chronic kidney disease (CKD) in hypertensive patients include insufficient knowledge, attitudes, and preventive behaviors. Incorrect perceptions and attitudes towards antihypertensive medications significantly affect medication adherence. Cultural and gender issues also play a crucial role in shaping medication behaviors. Health education through effective communication, information, and education should actively involve family members and be conducted extensively to improve knowledge, attitudes, and preventive behaviors concerning CKD among hypertensive patients.

Acknowledgement

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Ethical Consideration

This study received ethical approval from the Health Research Ethics Committee of RSUD dr. Moewardi Surakarta (Number: 616/II/HREC/2024) and research permission from the Regional Research and Innovation Agency of Surakarta City (Number: 070/3611.LIT/III/2024). Informed consent was obtained from all participants as evidence of their agreement to be involved in the research.

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