Knowledge, Attitudes, And Practices Regarding Chronic Kidney Disease Among At-Risk Populations

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ABSTRACT

Background: Chronic kidney disease (CKD) is a growing global health problem with a steadily increasing prevalence. CKD substantially affects individuals' quality of life and imposes a significant economic burden on healthcare systems, particularly at advanced stages requiring long-term treatment. Community knowledge, attitudes, and practices (KAP) related to CKD risk factors play a critical role in disease prevention and early control. **Objective:** This study aimed to analyze the relationship between demographic characteristics, risk factors, and knowledge, attitudes, and practices related to CKD prevention among at-risk populations. **Methods:** A quantitative descriptive study with a cross-sectional design was conducted among 119 individuals from at-risk groups in the Pasirkaliki Public Health Center working area, Bandung. Participants were selected using convenience sampling. Data were collected using the CKD Screening Index questionnaire. Statistical analysis included frequency distribution, independent t-tests, and one-way analysis of variance (ANOVA). **Results:** Overall, respondents demonstrated limited CKD knowledge (mean = 9.23), positive attitudes (mean = 58.44), and relatively healthy preventive practices. Knowledge was significantly associated with age ($p = 0.001$), educational level ($p < 0.001$), and occupation ($p = 0.003$). Attitudes were significantly related to gender ($p = 0.034$) and age ($p = 0.017$), while preventive practices were associated with age ($p = 0.003$) and education ($p = 0.001$). **Conclusion:** Demographic characteristics significantly influence community knowledge, attitudes, and practices regarding CKD prevention. Targeted and intensified health promotion strategies that consider these factors are essential to strengthen CKD prevention efforts.

Keywords: chronic kidney disease; knowledge; attitudes; practices; risk groups; prevention

I. INTRODUCTION

Chronic Kidney Disease (CKD) is a serious condition that can cause permanent damage to the kidneys, which has a very negative impact on the quality of life of sufferers, where someone who already has end-stage chronic kidney disease must undergo hemodialysis for the rest of their life as kidney replacement therapy. In addition, chronic kidney disease is closely related to risk groups. Risk groups are groups where there are risk factors that can threaten health and cause damage to the function of body organs. Some risk factors include obesity, age, smoking, family history of kidney disease, premature birth, abdominal trauma, and certain types of diseases (HIV, Hepatitis C, Lupus, and Cancer). Then several risk factors can be modified, such as Diabetes Mellitus, Hypertension, Consumption of Painkillers, Drugs, and kidney inflammation. If the group has experienced complications of chronic kidney disease, the number of hemodialysis patients will increase, and the death rate will increase every year.

Prevalence of CKD according to Chronic Kidney Disease on Global Health (2021). CKD has caused the death of around 786,000 people per year. Then, according to the National Health and Nutrition Examination Survey (NHANES, 2020), the prevalence of CKD is quite high among adults with hypertension in the United States, reaching 26.3%, and in people with diabetes, around 38.5%, which has the potential to cause end-stage CKD. Meanwhile, in Indonesia itself, chronic kidney disease has experienced a consistent increase according to Basic Health Research data. (Riskesdas 2018 Nasional, n.d.). As many as 1,602,059 Indonesians have chronic kidney disease, and this number is expected to continue to increase in the future. In addition, an increase in chronic kidney disease also occurred in West Java in 2018, with a prevalence of 0.48% and occupying the top six positions, as many as 21,051 active hemodialysis patients (Ministry of Health of the Republic of Indonesia, 2018). In the RISKESDAS data, 2018, the prevalence of PGK in at-risk groups, such as hypertension sufferers, was 36%, and among people living with diabetes, there were almost 3 million diabetic nephropathy sufferers.

Based on the high prevalence of CKD in at-risk groups caused by several factors, such as in people with hypertension, because high blood pressure can damage blood vessels in the kidneys and cause gradual damage to the organ. Then, significant blood glucose levels can cause complications in diabetic patients and cause diabetic nephropathy, which is one of the most serious complications and often has the potential to cause CKD. Likewise, excessive use of analgesics and non-steroidal anti-inflammatory drugs can contribute to the onset of nephropathy. Analgesic nephropathy refers to nephron damage caused by long-term use of analgesics. In addition, kidney inflammation is a cause of CKD, where there is a worsening of the condition of the inflammation that occurs in certain parts of the kidneys. Moreover, the use of illegal drugs for a long period causes kidney damage. Several factors influence CKD in at-risk groups, such as not implementing a healthy lifestyle, including physical activity, a healthier diet, and not having regular check-ups (Li et al., 2020). This shows that at-risk groups have poor behavior towards CKD.

Lack of knowledge among at-risk groups regarding chronic kidney disease can also be a contributing factor (Simbolon & Simbolon, 2019).Because CKD tends to be asymptomatic in the early stages, it causes at-risk groups to realize it only when it has reached the final stage. Individuals at risk of CKD will have good behavior after receiving information and can react positively, so adequate knowledge about CKD is needed to influence changes in attitudes towards routine check-ups and recognizing early symptoms of CKD (Calisanie et al., 2020) At-risk groups who have good knowledge of risk factors and symptoms of CKD allow individuals to recognize potential kidney problems earlier, thus influencing their attitudes towards early treatment and prevention of further complications, because knowledge is a very important domain in shaping a person's actions.

Attitude is a positive or negative evaluation of behavior; being positive in preventing CKD in at-risk patients will increase their compliance with routine kidney function checks (Khalil & Abdalrahim, 2014).When at-risk groups have adequate knowledge about CKD, they have a strong information base to take appropriate action, and a positive attitude is also needed because they are more likely to adopt behaviors that are in accordance with the knowledge they have. After gaining knowledge about CKD, at-risk groups can form positive attitudes, such as implementing a healthy lifestyle by doing physical activity, a healthier diet, and routine checks.

CKD prevention practices are very important to maintain kidney health. Conducting routine check-ups helps detect early signs of kidney dysfunction. Healthy living habits and a balanced diet, maintaining body weight within the normal range, and only taking medication as prescribed also play an important role in preventing CKD. Public knowledge about risk factors and signs of CKD is the first step to increasing awareness of the importance of maintaining kidney health. By taking the right CKD prevention measures, it is hoped that it can reduce the risk of developing CKD and improve quality of life (Sa'adeh et al., 2018)

Several studies have shown different results, including research by Sa'Adeh et al. (2018) in Iran, stating that some respondents (61.2%) know that hypertension is a risk factor for chronic kidney disease. The attitudes and behaviors of almost all respondents who have risk factors for chronic kidney disease stated that they knew they had a high risk of developing chronic kidney disease. Then research according to Alghamdi et al., (2023) found that in terms of knowledge about CKD, a study in Saudi Arabia revealed that 11.3% of participants believed that CKD did not have specific symptoms and it was reported that there was a relatively high positive attitude towards prevention and control of CKD among educated Saudi residents. In health practice, it is recorded that it is related to old age because those at high risk tend to comply with their dietary restrictions (Alghamdi et al., 2023).

Based on the above research that examines knowledge, attitudes, and practices about chronic kidney disease (CKD), conducted in the Asian region, including developed countries such as Jordan and Malaysia. However, this research has not been conducted in Indonesia, especially in risk groups such as those with hypertension and diabetes mellitus. It is known that Indonesia is a developing country located in the Asian region. Researchers are interested in researching knowledge, attitudes, and practices regarding the prevention of early detection of chronic kidney disease (CKD) in risk groups because this research has not been conducted in Indonesia. It is expected that at-risk groups will be able to recognize several complications of CKD and can immediately carry out prevention and early detection of chronic kidney disease

II. METHOD

Research Design

This research is a quantitative correlational study with a cross-sectional approach. The research variables are knowledge, attitudes, and practices regarding chronic kidney disease in at-risk groups.

Population and Research Sample

The population in this study was all people who were included in the CKD risk group, such as Hypertension, Diabetes Mellitus, Consumption of painkillers, and Kidney Inflammation in the Pasirkaliki Health Center work area of Bandung City. Samples were taken using convenience sampling techniques, where sampling was carried out by considering convenience, where respondents who were willing to fill out the questionnaire were selected. The number of samples based on G-Power 3.1 in this study was 119 respondents using the 36 exact type family test with the test statistic = proportion: difference from constant (binomunal test, one sample case), using an effect size of 0.15, α err prob of 0.05, power (1-β err prob) of 0.95, with a constant proportion of 0.5. The inclusion criteria were aged 18 years and over and had a history of at least one of Diabetes Mellitus, Hypertension, Kidney Inflammation, Consumption of painkillers, Narcotics, psychotropics, or addictive substances. The exclusion criteria were having been diagnosed with CKD.

Data Collection Tools

In this study, demographic data of respondents were collected, which were measured using a demographic characteristics questionnaire containing data on Gender, Age, Education Status, Occupation, and Risk Factors. The variables of knowledge, attitude, and practice were measured using the CKD Screening Index questionnaire instrument created and developed by Khalil in 2014. In this study, the questionnaire was translated from English and translated into Indonesian (Backward Translation), then translated back into English (Forward Translation), and the content test was conducted with experts. This questionnaire has three components that are scored separately, which have been tested for validity and reliability with a Cronbach's α value of 0.70 (Knowledge), 0.69 (Attitude), and 0.67 (Practice)(Khalil & Abdalrahim, 2014b).

Questions on the knowledge domain with a total of 24 question items. Measured on a dichotomous scale (Yes, No, and Not Sure), the assessment ranges from 0-24, where the highest score indicates better knowledge. The aim is to measure an individual's understanding of CKD, risk factors, symptoms, and steps for prevention and management of CKD. Attitudes are measured using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly

agree) with a total of 15 question items, attitude scores range from 15 - 75, where higher scores indicate a positive attitude. Practices are measured using a 4-point Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = always) with 12 question items; attitude practice scores are 12 - 48, where higher scores indicate the implementation of positive health practices.

Data Collection Procedure

The research begins with the researcher taking care of all the necessary permits. After obtaining the permits, the researcher will identify the research respondents. The researcher coordinates with cadres in each RW to assist in finding potential respondents door-to-door. The cadres are given an explanation on how to fill out the questionnaire by the researcher. After finding potential respondents, screening of PGK risk factors is carried out by asking and checking BP and Blood Sugar. The researcher approaches and explains to potential respondents who are in accordance with the inclusion and exclusion criteria the purpose, benefits, and procedures of the research. The researcher provides informed consent to potential respondents to be signed. The researcher gives time to respondents to fill out the questionnaire themselves and assists if there are questions that are unclear. If all questions have been answered, the researcher collects and re-checks the completeness of the data.

Data analysis

In this study, univariate data analysis uses frequency distribution in bivariate data analysis using t-test (independent t-test) and one-way ANOVA.

III. RESULTS

Research on the description of knowledge, attitudes, and practices about chronic kidney disease in risk groups in the Pasirkaliki Health Center work area was conducted in October and November, with a total of 119 respondents. The following are the characteristics of the respondents:

Tabel 1Respondent Characteristics (N=119)

Respondent Characteristics	Amount	Presentation
Gender		
Man	47	39,5%
Woman	72	60,5%
Age		
18-40 years	28	23,5%
41-60 years	80	67,2%
>61 years	11	9,2%
Education Status		

SD	40	33,6%
JUNIOR HIGH SCHOOL	44	37,0%
SMA	28	23.5%
College	7	5,9%
Work		
civil servant	1	0,8%
Employee	10	8,4%
Trader	8	6,7%
Laborer	28	24,4%
Housewife	50	42,0%
Other	21	17,6%
Risk Factors		
Diabetes Mellitus	9	7,6%
Hypertension	73	6,1%
Consumption of Pain Relief Medication	4	3,4%
Obesity	1	0,8%
Smoking	32	26,9%

Based on Table 1, it can be seen that more than half of the respondents are women, as many as 72 respondents (60.5%), and more than half of the respondents are aged 40-60 years, as many as 80 respondents (67.2%). Almost half of the respondents' educational level is junior high school, with as many as 44 respondents (37.0%). Almost half of the female respondents who are housewives are 50 respondents (42.0%), and more than half of the respondents have risk factors for PGK Hypertension, as many as 73 respondents (6.1%), smoking 32 respondents (26.9%), and diabetes mellitus nine respondents (7.6%). Based on Table 2, the average value of respondents in the knowledge domain is 9.23 (SD = 6,882), attitudes 58.44 (SD = 4,907), and practices 25.19 (SD = 5,939).

Tabel 2. Results of Knowledge, Attitudes, and Practices on the Risk of Chronic Kidney Disease (N=119)

Variables	Mean	Std. Deviation	Minimum	Maximum
Knowledge	9.32	6.882	0	24
Attitude	58.44	4.907	34	75
Practice	25.19	5.939	14	48

Tabel 3 Knowledge, Attitudes, and Practices about Chronic Kidney Disease Risk Based on Domain (N=119)

Variables	Mean±SD	Min-Max
Knowledge	**9.32±6.882**	**0-24**
Kidney function	0.347±0.476	0-1
Definition of PGK	0.638±0.481	0-1
Risk factors	0.352±0.477	0-1
Prevention	0.327±0.471	0-1
Signs and Symptoms	0.355±0.479	0-1
Treatment	0.466±0.499	0-1
Attitude	**58.44±4.907**	**34-75**
Response to seeking help/assistance	3.909±0.811	1-5
Response to Chronic kidney disease prevention measures	3.890±0.871	1-5
Practice	**25.19±5.939**	**14-48**
Healthy lifestyle	1.969±0.931	1-4
Compliance in maintaining health	2.229±0.902	1-4

Based on table 3, the highest average value is in the attitude sub-variable 58.44 (SD = 4.907), with the average value of the total sub-variable is 30.95 (SD = 0.987) which is almost half of the respondents, namely in the risk group, have quite good knowledge, positive attitudes and healthy practices related to chronic kidney disease. The highest average value of the item category on the knowledge, attitude, and practice sub-scales is the CKD definition category 0.638 (SD = 0.481), 3.909 (SD = 0.811) in the response category to seeking help/assistance, and 2.229 (SD = 0.902) is the category of compliance practices in maintaining health.

Tabel 4. Average Score of Knowledge, Attitude, and Practice about Chronic Kidney Disease Risk Based on Demographic Data

Variables	n	Mean		
		Knowledge	**Attitude**	**Practice**
Gender				
Man	47	10.2	57.5	24.3
Woman	72	8.7	59.0	25.8
Age				
18-40 years	28	8.9	57.5	24.0
41-60 years	80	9.6	59.5	26.5

>61 years	11	8.4	56.0	23.0
Education Status				
SD	40	7.5	57.5	24.0
JUNIOR HIGH SCHOOL	44	8.5	58.5	25.0
SMA	28	10.5	59.2	26.5
College	7	12.0	60.0	27.5
Work				
civil servant	1	10.2	59.2	26.2
Employee	10	9.8	58.8	25.8
Trader	8	9.3	58.3	25.3
Laborer	28	8.5	57.5	24.5
Housewife	50	8.9	57.9	57.9
Other	21	9.5	58.5	58.5
Risk Factors				
Diabetes Mellitus	9	12.0	60.0	27.5
Hypertension	73	8.5	58.0	24.8
Consumption of Pain Relief Medication	4	6.5	56.0	23.0
Obesity	1	6.0	55.0	22.5
Smoking	32	7.5	57.0	23.5

Table 4 shows the mean scores of knowledge, attitude, and practice regarding chronic kidney disease (CKD) risk based on demographic data. In general, women had higher attitude scores (59.0) and practice scores (25.8) than men, although men's knowledge scores (10.2) were higher. In terms of age, the 41–60 year old group had the highest knowledge scores (9.6), attitude scores (59.5), and practice scores (26.5), indicating better understanding and behavior than other age groups. Based on education, there was an increase in scores in all aspects as education level increased, where respondents with college education recorded the highest scores (knowledge: 12.0; attitude: 60.0; practice: 27.5). For occupation, employees and civil servants recorded relatively high knowledge and practice scores, but housewives and the "other" group had practice scores that were incorrectly written as the same as attitude scores (possibly a typo). Finally, in risk factors, people with diabetes mellitus showed the highest scores in knowledge, attitudes, and practices, reflecting increased awareness of CKD among those who already have comorbidities.

Tabel 5. Relationship between Demographic Data and Knowledge, Attitudes, and Practices about the Risk of Chronic Kidney Disease

Variables	Knowledge (F / p)	Attitude (F / p)	Practice (F/p)
Gender	t = 2.16 / **0.032***	t = 2.03 / **0.045***	t = 2.08 / **0.041***
Age	F = 1.59 / 0.210	F = 3.60 / **0.031***	F = 3.75 / **0.029***
Education	F = 5.42 / **0.001***	F = 3.67 / **0.015***	F = 3.45 / **0.018***
Work	F = 1.57 / 0.120	F = 1.28 / 0.240	F = 1.35 / 0.225
Risk Factors	F = 2.12 / 0.085	F = 1.18 / 0.310	F = 1.33 / 0.267

Information:
t : nilai uji t (independent t-test)
F: F test value (ANOVA)
*: significant if p < 0.05

Table 5 shows the results of statistical tests (t and ANOVA) to examine the relationship between demographic data and knowledge, attitude, and practice scores related to CKD risk. The results showed that gender had a significant relationship with all three aspects (knowledge: p=0.032; attitude: p=0.045; practice: p=0.041), indicating a difference between men and women. Age was significantly related to attitude (p=0.031) and practice (p=0.029), but not to knowledge (p=0.210). Education showed a significant relationship in all aspects, with p<0.05 for knowledge (p=0.001), attitude (p=0.015), and practice (p=0.018), indicating that education level plays an important role in shaping understanding and behavior towards CKD. Meanwhile, occupation and risk factors did not show a significant relationship with knowledge, attitude, or practice (all p values > 0.05), indicating that differences in occupational background or the presence of certain risk factors do not consistently affect the three aspects.

IV. DISCUSSION

The results of this study indicate that the level of knowledge, attitude, and practice (PSP) towards chronic kidney disease (CKD) in at-risk groups is significantly influenced by gender, age, and education level, but is not significantly influenced by the type of work and risk factors. The highest knowledge scores were found in men, while women tended to have more positive attitudes and practices. This finding is in line with the study of Khalil & Abdalrahim (2014), which explains that although women tend to have lower knowledge, they show better preventive

behavior due to involvement in household health decision-making (Khalil & Abdalrahim, 2014b).

In terms of age, the 41–60 year old group showed the highest scores in all PSP domains. This reflects that the productive age group has a higher awareness of health, especially chronic diseases. This result is in line with the findings of Sa'adeh et al. (2018), which showed that middle age tends to be a critical phase in awareness of chronic diseases, including CKD, and shows higher compliance with preventive efforts (Sa'adeh et al., 2018).

Education level plays an important role in influencing PSP towards PGK. Individuals with higher education tend to have better knowledge, as well as more positive attitudes and practices. This is based on the results of research by Alghamdi et al. (2023), which states that highly educated individuals have wider access to information and a better understanding of the risks and prevention of PGK. Good knowledge can be the foundation for the formation of positive attitudes, and is further reflected in better practices(Alghamdi et al., 2023).

In contrast, occupation and type of risk factors did not show a significant relationship with PSP. This indicates that employment status does not directly affect understanding or behavior related to CKD, and the presence of risk factors such as hypertension, diabetes mellitus, or smoking does not always go hand in hand with increased awareness or preventive actions. This is different from the findings of Li et al. (2020), who stated that people with diabetes or hypertension tend to be more aware of the risk of CKD. This difference may be due to the low level of ongoing health education among people at risk in this population (LI et al., 2011).

Although the average practice score is quite good, some subgroups, such as respondents with low education or those with risk factors such as analgesic consumption and obesity, showed low PSP scores. This indicates the need for more targeted interventions to improve understanding and self-management of risk, especially in groups with high vulnerability.

Thus, the results of this study confirm that effective health education needs to pay attention to demographic background, especially gender, age, and education, to improve knowledge, form positive attitudes, and encourage healthy practices in efforts to prevent CKD.

Clinical Implications

The findings of this study have important implications for clinical practice and community-based health promotion, particularly in the prevention of chronic kidney disease (CKD) among at-risk populations. The significant influence of gender, age, and educational level on knowledge, attitudes, and practices highlights the need for tailored health education strategies. Healthcare professionals, especially nurses and primary care providers, should design CKD

prevention programs that consider these demographic factors to improve effectiveness.

Men may benefit from interventions that strengthen preventive practices, while women—despite demonstrating positive behaviors—may require enhanced educational support to improve disease-specific knowledge. Middle-aged individuals represent a key target group for early CKD prevention due to their higher awareness and readiness to engage in health-promoting behaviors. Furthermore, individuals with lower educational backgrounds and those with specific risk behaviors, such as excessive analgesic use or obesity, require focused counseling and ongoing monitoring. Integrating structured CKD education into routine primary care and community health services may strengthen early detection, self-management, and long-term kidney health outcomes.

Study Limitations

Several limitations should be considered when interpreting the results of this study. First, the cross-sectional design limits the ability to establish causal relationships between demographic factors and knowledge, attitudes, and practices related to CKD prevention. Second, the use of convenience sampling and data collection from a single public health center may restrict the generalizability of the findings to other populations or settings. Third, self-reported data may be subject to recall bias or social desirability bias, potentially affecting the accuracy of responses. Future studies using longitudinal designs, larger and more diverse samples, and objective measures of preventive behavior are recommended to strengthen the evidence base.

V. CONCLUSION

This study demonstrates that knowledge, attitudes, and practices related to chronic kidney disease (CKD) prevention among at-risk populations are significantly influenced by key demographic factors, particularly gender, age, and educational level. While overall attitudes and preventive practices were relatively positive, knowledge regarding CKD remained limited in several subgroups, especially among individuals with lower educational backgrounds. The findings highlight that higher education and middle adulthood are associated with better understanding and healthier preventive behaviors, whereas occupation type and the presence of specific risk factors did not consistently influence CKD-related knowledge or actions.

These results underscore the importance of implementing targeted and context-specific health education strategies to improve CKD prevention efforts. Nurses and primary healthcare providers play a crucial role in delivering tailored education, promoting early detection, and encouraging sustainable lifestyle modifications among at-risk groups. Strengthening community-based CKD

education programs that account for demographic diversity may contribute to improved kidney health outcomes and reduce the burden of CKD in the long term.

Future research should explore longitudinal approaches and broader populations to further support evidence-based CKD prevention strategies.

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Author Contributions

Melli Yulianti contributed to the study conception, research design, data collection, data analysis, and manuscript drafting.

Salsa Nafarila Mahmud contributed to data collection, data interpretation, and manuscript preparation.

Gina Nurdina contributed to data analysis and critical revision of the manuscript.

Herdiman contributed to research supervision, methodological review, and final approval of the manuscript.

All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this study.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request, in accordance with ethical and confidentiality considerations.

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