The Relationship Between Sleep Quality and Constipation in Patients with Chronic Kidney Disease (CKD)

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Chronic kidney disease (CKD) adalah kondisi progresif yang berdampak pada keseimbangan sistem tubuh, termasuk fungsi pencernaan dan kualitas tidur. Konstipasi dan Kualitas tidur sering terjadi bersamaan, namun studi lokal yang menyoroti keterkaitannya masih terbatas. Tujuan utama dari penelitian ini bertujuan untuk mengkaji keterkaitan antara kualitas tidur dan konstipasi pada pasien *chronic kidney disease* (CKD). Studi ini dilakukan dengan menggunakan metode kuantitatif dengan pendekatan *cross-sectional*. Jumlah responden sebanyak 93 pasien *chronic kidney disease* (CKD), dipilih menggunakan *purposive sampling*. Instrumen untuk mengukur kualitas tidur adalah kuesioner *Pittsburgh Sleep Quality Index* (PSQI) dan *Patient Assessment of Constipation Symptoms* (PAC-SYM) untuk menilai gejala konstipasi. Analisis data dilakukan melalui pendekatan univariat dan bivariat dengan menggunakan uji *chi-square*. Hasil dari penelitian ini yaitu mayoritas pasien mengalami kualitas tidur buruk (84,9%) dan gejala konstipasi (53,8%). Uji *chi-square* menunjukkan nilai *p-value* < 0,001 yang menunjukkan adanya keterkaitan yang signifikan antara kualitas tidur dan konstipasi. Kualitas tidur yang buruk berhubungan signifikan dengan peningkatan kejadian konstipasi pada pasien c*hronic kidney disease* (CKD). Temuan ini mendukung pentingnya pendekatan holistik dalam pelayanan keperawatan, dengan memperhatikan kualitas tidur sebagai faktor risiko konstipasi.

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Chronic kidney disease (CKD) is a progressive condition that affects the body's systemic balance, including digestive function and sleep quality. Constipation and poor sleep quality often occur concurrently; however, local studies highlighting their association remain limited. The primary objective of this study is to examine the relationship between sleep quality and constipation in patients with chronic kidney disease (CKD). This research employed a quantitative method with a cross-sectional approach. A total of 93 chronic kidney disease (CKD) patients were selected using purposive sampling. Instruments used to assess sleep quality included the Pittsburgh Sleep Quality Index (PSQI), while constipation symptoms were evaluated using the Patient Assessment of Constipation Symptoms (PAC-SYM) questionnaire. Data analysis was conducted using univariate and bivariate approaches, with the chi-square test applied for statistical significance. The results showed that the majority of patients experienced poor sleep quality (84.9%) and constipation symptoms (53.8%). The chi-square test yielded a p-value <0.001, indicating a significant association between sleep quality and constipation. Poor sleep quality was significantly correlated with an increased incidence of constipation among CKD patients. These findings support the importance of a holistic approach in nursing care, emphasizing sleep quality as a potential risk factor for constipation.

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Introduction

Chronic kidney disease (CKD) is a progressive medical condition characterized by a gradual decline in kidney filtration function over a period of at least three months. According to the definition given by *the National Kidney Foundation* (NKF), *chronic kidney disease* (CKD) is one of the major contributors to the global death rate and is widely known as the *silent killer*, as its symptoms tend to be inconspicuous in the early stages but the disease progresses slowly (Supriatin et al., 2025; Puspita et al., 2025). As the incidence of *chronic kidney disease* (CKD) increases globally, its prevalence is estimated to reach between 9.1% to 13.4% of the world's population (Ruszkowski et al., 2020). The latest data from *the World Health Organization* (WHO) confirms that the incidence rate of *chronic kidney disease* (CKD) has increased significantly, reaching 713.783 million people globally (Fatimah et al., 2025). The *Global Burden of Disease* study also recorded an additional 11.13 million new cases of *chronic kidney disease* (CKD) every year, with a death rate of 1.53 million people and a disease burden equivalent to 44.45 million *disability-adjusted life years* (DALYs) (Guo et al., 2025). At the regional level, the prevalence of *chronic kidney disease* (CKD) in Asia is estimated to reach 434.3 million adults (Fatimah et al., 2025), while in the United States around 20 million individuals experience kidney damage (Rezaini et al., 2023). This condition also has a significant impact on Indonesia, where the prevalence of *chronic kidney disease* (CKD) reaches 6.3% and makes Indonesia ranked fifth in the world as the country with the most *chronic kidney disease* (CKD). In DKI Jakarta Province, the number of cases with *chronic kidney disease* (CKD) was recorded at 38.7%, indicated by the high number of patients undergoing hemodialysis therapy (Dwi & Arifianto, 2024).

One of the complications that many patients with *chronic kidney disease* (CKD) experience is constipation, which can substantially reduce the patient's quality of life. This constipation is not only a side effect of a deteriorating kidney condition, but is also closely related to the presence of *Gut-Derived Uremic Toxins* (GDUTs)—toxins formed from the fermentation of bacteria in the gastrointestinal tract, such as *indoxyl sulfate* (IS) and *p-cresyl sulfate* (PCS). A study by Ikee et al. (2020) explains that GDUTs have a significant impact on worsening constipation through mechanisms that involve decreased colon contractions, increased intestinal permeability, and the emergence of systemic inflammation.

This phenomenon of constipation is quite common in patients undergoing dialysis. In a study in China, 71.7% of hemodialysis patients and 14.2% of peritoneal dialysis patients reported constipation (Zhang et al., 2022). A similar study in South Korea reported that 63.0% of hemodialysis patients and 29.0% of peritoneal dialysis patients experienced constipation (Cha et al., 2023). In addition, Ruszkowski et al. (2020) found that constipation in patients with *chronic kidney disease* (CKD) was closely related to the use of diuretics and paracetamol. Sleep quality is another important aspect that also affects the condition of patients with *chronic kidney disease* (CKD). Poor sleep quality has been shown to correlate with gastrointestinal problems, including constipation, through the mechanisms of interaction between the sympathetic and parasympathetic nervous systems. When sympathetic nerve activity dominates due to lack of sleep, intestinal function becomes impaired, increasing the risk of constipation. Research by Sun et al. (2021) revealed that patients with *chronic kidney disease* (CKD) with sleep duration of less than 6 hours or more than 10 hours per night indicated a higher severity of the disease than those with an optimal sleep duration (6–8 hours). In addition, poor sleep quality is also associated with increased progressivity with *chronic kidney disease* (CKD).

Furthermore, a study from AbdelHakim et al. (2021) shows that the higher the stages of *chronic kidney disease* (CKD) experienced by the patient, the more severe the symptoms of constipation and the lower the quality of sleep felt. The implications of these findings underscore the importance of comprehensive medical interventions on constipation symptoms and sleep quality to improve the quality of life of patients with *chronic kidney disease* (CKD), especially those in advanced stages. However, until now, studies that specifically examine the relationship between sleep quality and constipation in patients with *chronic kidney disease* (CKD) in Indonesia are still very limited. There have been no studies that have explored the direct impact of sleep quality on constipation symptoms in the context of the Indonesian population. As already explained, this study aims to fill these gaps through an evidence-based approach, so that it can be a reference for more effective and relevant clinical interventions in improving the management of patients with *chronic kidney disease* (CKD) in Indonesia. Overall, this study aims to identify and analyze the relationship between sleep quality and constipation in chronic *kidney disease* (CKD) patients. This study intends to conduct an in-depth analysis of the

correlation between sleep quality and constipation in patients with *chronic kidney disease* (CKD).

Method

This study applied a quantitative study with *a cross-sectional* design carried out at Hospital X Jakarta. The study population included 1,324 patients with *chronic kidney disease* (CKD). From this population, as many as 93 patients were taken as study participants based on *purposive sampling techniques*, based on inclusion criteria, namely respondents who were 18 years of age or older and willing to become respondents, with the exclusion criteria of respondents who had other comorbidities such as pulmonary edema, and asthma and patients who were not willing to become respondents. The use of instruments in the study included *the Pittsburgh Sleep Quality Index* (PSQI) to assess sleep quality, where a score of ≤5 was categorized as good sleep quality and >5 as poor sleep quality. In addition, *the Patient Assessment of Constipation-Symptom* (PAC-SYM) measuring tool was also used to assess constipation symptoms, with a score of <15 indicating no symptoms of constipation and a score of ≥15 indicating the presence of constipation symptoms. Data were analyzed univariate to identify the demographic characteristics and distribution of the study variables, as well as bivariate by using *chi-square* tests to identify the relationship between these variables.

Research Results

Table 1. Description of characteristics by age

Age	Frequency	Percentage
17 – 25 years old (Late teens- Early adulthood)	1	1.1%
26 – 60 years old (Intermediate adult)	75	80,6%
>60 years old (Senior)	17	18,3%
Total	93	100.0%

Based on the results of frequency analysis, the middle adult age group dominated the respondents in this study, which was 75 people (80.6%). The other respondents consisted of 17 elderly people (18.3%) and only 1 person (1.1%) who were in the category of late adolescents – early adulthood.

Table 2. Description of characteristics by gender

Gender	Frequency	Percentage
Male	51	54.8%
Women	42	45.2%
Total	93	100.0%

The distribution of participants by gender revealed that men dominated the number of respondents (54.8%), while women accounted for 45.2%.

Table 3. Description of characteristics based on drug history

Medication history	Frequency	Percentage
None	10	10.8%
Amlodipine	46	49.5%
Insulin	7	7.5%
Bisoprolol	1	1.1%
Amlodipin dan Bisoprolol	1	1.1%
Amlodipin dan Furosemid	8	8.6%
Amlodipin dan Insulin	15	16.1%
Insulin dan Furosemid	1	1.1%
Bisoprolol dan Furosemid	1	1.1%
Amlodipin, Furosemid dan Insulin	2	2.2%
Bisoprolol, Furosemid dan Insulin	1	1.1%
Total	93	100.0%

Most of the respondents were recorded to use Amlodipin alone (47.3%), which is one of the first-line antihypertensives in chronic *kidney disease* (CKD) patients. The combination of Amlodipin and Insulin was used by (19.4%) patients, indicating the presence of comorbidities of diabetes mellitus (DM). There are also more complex combinations, such as Amlodipine, Furosemid, and Insulin (2.2%).

Table 4. Description of characteristics based on comorbidities

Comorbidities	Frequency	Percentage
No	14	15.1%
One comorbidity	59	63,4%
Two comorbidities	20	21,5%
Total	93	100.0%

The results of the analysis of the comorbidity variables showed that most of the respondents had one comorbidity (63.4%), while (21.5%) had two comorbidities. Only (15.1%) of respondents did not have comorbidities.

Table 5. Overview of sleep quality in chronic *kidney disease* (CKD) patients

Kulaitas tidur	Frequency	Percentage
Good	14	15.1%
Bad	79	84.9%
Total	93	100.0%

Of the 93 respondents, 79 people (84.9%) experienced poor sleep quality, while only 14 people (15.1%) slept well.

Table 6. Overview of constipation in *chronic kidney disease* (CKD) patients

Constipation	Frequency	Percentage
No symptoms	43	46.2%
There are symptoms	50	53.8%
Total	93	100.0%

A total of 50 respondents (53.8%) had symptoms of constipation, while 43 respondents (46.2%) did not experience these symptoms.

Table 7. The Relationship Between Sleep Quality and Constipation in Chronic *Kidney Disappointment* (CKD) Patients

Sleep Quality	Constipation		Total	p-value
	No symptoms	There are symptoms		
Good	14	0	14	<0.001
Bad	29	50	79	

Total	43	50	93

a. *0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.47.*

The results of *the pearson chi-square* test showed a *p-value* of <0.001, which is statistically significant (*p-value* < 0.05). From the results obtained, it can be concluded that there is a significant association between sleep quality and constipation in chronic *kidney disease* (CKD) patients. Interestingly, all patients with good sleep quality (100%) did not experience constipation, while the majority of respondents who experienced constipation (100%) had poor sleep quality. In addition to looking at *the chi-square* value, based on the output results, it is known that all cells have *an expected count* of ≥ 5 (minimum expected count = 6.47), so that *the chi-square pearson* test is statistically valid and can be used in the interpretation of bivariate analysis, because the validity requirement for *the chi-square test* is that there should not be more than 20% of cells with *an expected count* of <5.

Discussion

Analysis of characteristics by age

The characteristics of the respondents showed that the majority of *chronic kidney disease* (CKD) patients at RS X Jakarta were aged 26–60 years (80.6%), followed by the elderly (>60 years) at 18.3%, and adolescents at the end of early adulthood at 1.1%. This distribution reflects the tendency of CKD to attack productive to advanced age, in line with the findings of Deng et al. (2025), which highlight the increasing burden of *chronic kidney disease* (CKD) with age, especially in populations with low sociodemographic indices. Low access to health services and the high prevalence of hypertension and uncontrolled diabetes have exacerbated the condition (Deng et al., (2025).

The physiological processes of kidney aging such as decreased eGFR, increased fibrosis, and decreased regenerative ability are also major triggering factors (Deng et al., (2025). Rafingah et al. (2024) showed that 66% of *chronic kidney disease* (CKD) patients are aged 41-60 years, where accumulated exposure to chronic risks begins to appear. On the other hand, Yanti et al. (2022) stated that the elderly (≥60 years old) are more at risk of developing *chronic kidney disease* (CKD) stage V, due to a decrease in kidney filtration function which accelerates the progression of the disease. Thus, *chronic kidney disease* (CKD) is a disease that increases with age, with different risk dynamics in each age range.

Analysis of characteristics by gender

In terms of gender, men dominated cases *of chronic kidney disease* (CKD) at 54.8%, while women at 45.2%. This difference is influenced by hormonal and lifestyle factors, the male group shows a greater level of risk for hypertension and diabetes which are the main causes of *chronic kidney disease* (CKD) (Macrae et al., (2021). Testosterone has proinflammatory and vasoconstrictive effects that accelerate kidney damage, while estrogen provides protection for kidney function (Macrae et al., (2021).

A man's lifestyle, such as high sodium consumption, smoking, and being inactive, increases the risk of *chronic kidney disease* (CKD). Social factors such as the status of the main breadwinner also play a role in increasing the risk of this disease (Vosters et al., 2025). In contrast, a study by Susanti & Sulistyana (2021) shows that women dominate the diagnosis rate of *chronic kidney disease* (CKD) at 77.5%, which is not solely caused by biological vulnerability, but due to high adherence to therapy and health awareness, making it easier to detect and record. Overall, gender contributes to the dynamics of *chronic kidney disease* (CKD) prevalence, both through biological, social, and behavioral health factors.

Analysis of characteristics based on drug history

Most *chronic kidney disease* (CKD) patients took Amlodipin (49.5%), either alone or in combination, including with Insulin (16.1%), which indicates comorbidities of diabetes mellitus. This treatment strategy is in line with guidelines by Care & Suppl, (2025), which recommends the use of ACE inhibitors/ARBs and SGLT2 inhibitors to slow the progression of *chronic kidney disease* (CKD) and prevent complications. Romagnani, (2025) emphasized that SGLT2 inhibitors such as dapagliflozin and empagliflozin are effective in reducing the risk of progressive *chronic kidney disease* (CKD) and cardiovascular events, including in patients with low eGFR and high albuminuria.

The therapeutic effect is obtained through the mechanism of natriuresis, a decrease in intraglomerular pressure, and anti-inflammatory and antioxidant effects that protect kidney function (Romagnani, 2025). On the other hand, the study of Palupi & Jayaningsih (2021) shows that Amlodipin is not the dominant therapy, with variations in the use of other drugs such as Bisoprolol, Allopurinol, Statins, and Erythropoietin that are tailored to the comorbidities of each

patient. Thus, the therapeutic management of *chronic kidney disease* (CKD) is highly dependent on the comorbidity profile, and the Amlodipin–Insulin combination reflects a primary focus on the control of hypertension and diabetes, in accordance with applicable clinical standards.

Analysis of characteristics based on comorbidities

The comorbidity rate in *chronic kidney disease* (CKD) patients in this study was quite high, with 63.4% having one comorbidity and 21.5% having two. Only 15.1% did not have comorbidities. This statement is in line with the findings of Guo et al. (2025), which indicate a close correlation between *chronic kidney disease* (CKD) and diseases such as diabetes, hypertension, and heart disease that contribute to the increase in DALYs globally. *chronic kidney disease* (CKD) is also often accompanied by gastrointestinal and neuromuscular disorders, including constipation and sleep quality.

A study by Hawthorne et al. (2023) revealed that 96% of *chronic kidney disease* (CKD) patients experience multimorbidity, and more than half have ≥4 comorbidities, such as hypertension, musculoskeletal disorders, and diabetes which are more dominant in the advanced stages. Chronic inflammatory mechanisms, uremic toxin, and metabolic dysfunction are systemic causes of *chronic kidney disease* (CKD) comorbidities.

Macrae et al. (2021) added that almost all chronic *kidney disease* (CKD) patients have comorbidities, and the risk of extreme comorbidities increases by more than 40 times compared to the general population. This combination of diseases causes *chronic kidney disease* (CKD) therapy to be complex and increases the risk of polypharmacy and drug interactions. Thus, *chronic kidney disease* (CKD) is a systemic disease that requires a holistic nursing approach to manage comorbidities and improve the overall quality of life of patients.

Analysis of sleep quality in chronic *kidney disease* (CKD) patients

Poor sleep quality is a common complaint in chronic *kidney disease* (CKD) patients, with 84.9% of 93 patients experiencing poor sleep quality. Low sleep quality impacts physiological functions, including the digestive system, and contributes to constipation (Sudijanto & Arofiati, 2022). The main causative factors include the accumulation of uremic toxin, anemia, and

neurotransmitter disorders that trigger hormonal imbalances as well as decreased immune function.

Chu et al. (2025) found that about 55% of *chronic kidney disease* (CKD) patients experience poor sleep quality, such as insomnia and restless legs syndrome. Huang et al. (2025) added that dysfunction of the autonomic nervous system, including impaired sympathetic and parasympathetic nerve activity, plays a role in poor sleep quality, especially in peritoneal dialysis patients. Hemati et al. (2023) stated that sleeping more than eight hours per day and symptoms of restless legs syndrome are associated with an increased risk of *chronic kidney disease* (CKD) due to overactivation of the sympathetic nervous system and endothelial dysfunction. Overall, sleep quality in chronic *kidney disease* (CKD) patients is affected by complex physiological mechanisms that decrease quality of life and worsen kidney function.

Analysis of constipation in chronic *kidney disease* (CKD) patients

Constipation disorders are a common complication in *chronic kidney disease* (CKD) patients that are affected by decreased kidney performance, fluid and electrolyte balance, and intestinal motility. Based on univariate data, 53.8% of 93 chronic *kidney disease* (CKD) patients experienced constipation. Lifestyle factors, fluid restriction, and drug use also aggravate this condition (Cha et al., 2023); Zhang et al., 2022).

Ramos et al. (2022) showed that the prevalence of constipation varies greatly between 4.5% to 71.7%, with hemodialysis patients being the group with the highest number. This is influenced by old age, diabetes, low fruit consumption, and the use of drugs such as opioids and phosphate binders. Prolonged constipation can negatively impact the quality of life of chronic *kidney disease* (CKD) patients.

The relationship between sleep quality and constipation in *chronic kidney disease* (CKD) patients

Sleep quality has been shown to have a significant relationship with constipation in chronic *kidney disease* (CKD) patients. The results of the bivariate test through *the chi-square* method resulted in *a p-value* of <0.001, where all patients with good sleep quality did not experience constipation, while 63.3% of those who had poor sleep experienced it. The

mechanisms underlying this association include disorders of the autonomic nervous system, increased sympathetic activity, and decreased parasympathetic that affect intestinal motility and slow colon transit (Tian et al., 2024; AbdelHakim et al., 2021; Yang et al., 2022).

Previous studies have revealed that unhealthy sleep duration (<6 or >9 hours) contributes to the risk of chronic constipation. The study adds empirical evidence through direct statistical testing at local health facilities, confirming that poor sleep quality is not just a minor complaint, but a systemic factor that worsens gastrointestinal function and quality of life in chronic *kidney disease* (CKD) patients. By combining clinical analysis and the literature, these findings reinforce the need for integrative approaches in the management *of chronic kidney disease* (CKD), including non-pharmacological treatments such as *sleep hygiene* and relaxation therapy to improve neurophysiological balance and digestive health.

Conclusion

Based on the results of the discussion, it can be concluded that constipation and poor sleep quality are two very common and interrelated clinical conditions in *chronic kidney disease* (CKD) patients. Research shows that the majority of patients experience poor sleep quality (84.9%) and more than half experience symptoms of constipation (53.8%), indicating that these two aspects cannot be considered as secondary complaints but are an integral part of *the chronic kidney disease* (CKD) condition. Poor sleep quality plays a role in worsening the gastrointestinal system of chronic *kidney disease* (CKD) patients, especially through the activation of sympathetic nerves and the accumulation of uremic toxins that slow down intestinal motility. Conversely, constipation also decreases sleep comfort, creating a cycle that has an effect on a decrease in quality of life. Through bivariate analysis, a statistically significant relationship was shown between sleep quality and constipation with a $p <$ value of 0.001.

Therefore, in nursing practice, a holistic approach is essential. The treatment of chronic *kidney disease* (CKD) patients is not enough to focus only on kidney function, but also to pay attention to aspects of sleep and the digestive system. Non-pharmacological interventions such as sleep hygiene education, relaxation techniques, and nutritional regulation deserve to be considered as complementary strategies to improve the overall quality of life of patients. The study also advises health workers and health care institutions to start considering evaluating

sleep quality and constipation symptoms as part of routine screening in *chronic kidney disease* (CKD) patients. It is hoped that the results of this study can be a starting point for the development of more comprehensive and evidence-based interventions in an effort to improve the welfare of *chronic kidney disease* (CKD) patients in Indonesia.

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