

CORRELATION BETWEEN PAIN INTENSITY AND SLEEP QUALITY AMONG PATIENTS WITH GASTRITIS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Gastritis is a gastrointestinal disorder that commonly causes epigastric pain, which may impair patients' sleep quality. Uncontrolled pain can lead to sleep disturbances that potentially delay the healing process of the gastric mucosa. This study aimed to determine the relationship between pain intensity and sleep quality among patients with gastritis in the inpatient ward of RSI Sakinah Mojokerto. A quantitative correlational study with a cross-sectional design was conducted. The study population consisted of 82 patients, and 32 respondents were selected using purposive sampling. Pain intensity was assessed using the Numeric Rating Scale (NRS), while sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using the Spearman's rank correlation test. The results showed that most respondents experienced moderate pain (53.1%) and poor sleep quality (68.8%). A significant positive correlation was found between pain intensity and sleep quality ($p < 0.001$; $r = 0.662$). It was concluded that higher pain intensity was associated with poorer sleep quality among patients with gastritis. Therefore, optimal pain management is essential to improve sleep quality and promote patient recovery.

Keywords: *Gastritis, Pain Intensity, Sleep Quality*

INTRODUCTION

Gastritis is an inflammatory condition of the gastric mucosa characterized by epigastric pain of varying intensity, ranging from mild to severe, and may become chronic if left untreated. Clinical observations indicate that many patients with gastritis experience sleep-related complaints, including insomnia, nocturnal awakenings, and excessive daytime sleepiness due to inadequately managed gastric pain (Rahmadani et al., 2026). Pain associated with gastritis results from inflammation of the gastric mucosa and has the potential to impair sleep quality. Sleep quality is a fundamental component of the overall healing process, including the regeneration of the gastric mucosa (Cantay, 2022). Consequently, poor sleep quality may lead to mood disturbances, headaches, fatigue, impaired concentration, and an increased risk of complications such as peptic ulcer disease among patients with gastritis (Rahmadani et al., 2026).

Globally, gastritis remains one of the most persistent gastrointestinal health problems, affecting millions of people each year. According to the World Health Organization (WHO), the prevalence of gastritis is relatively high in several countries and may exceed 50% of the population in developing nations (WHO, 2022).

In Indonesia, the 2018 Basic Health Research (Riskesdas) reported that the prevalence of gastric disorders, including gastritis, ranged from 10% to 15% of the population. Data from the 2022 Indonesian Health Survey (SKI) indicated an increase in prevalence to approximately 12%–18% (Kementrian Kesehatan RI, 2020). In East Java Province, the prevalence of gastritis in 2022 was estimated at 15%–20%, with hospitals reporting approximately 50,000–70,000 cases annually. In Mojokerto City, the prevalence was estimated at 12%–15% of the population (Mojokerto, 2024). Furthermore, sleep

disturbances caused by physical conditions, including pain, are estimated to affect 40%–50% of hospitalized patients (Looveren et al., 2021).

A preliminary observational study conducted at RSI Sakinah Mojokerto on February 28, 2026, found an average of 380 patients presenting with epigastric pain during the previous three months. Interviews with five patients revealed that three respondents reported recurrent or worsening epigastric pain during the night, resulting in difficulty initiating sleep and frequent nocturnal awakenings. In contrast, two respondents who experienced similar pain intensity were still able to maintain relatively stable sleep patterns.

The pathological process begins with damage to the gastric mucosal lining caused by intrinsic or extrinsic factors, which trigger an acute inflammatory response. This inflammatory process stimulates the release of chemical mediators such as prostaglandins and cytokines that activate nociceptors in the epigastric region (Nurjanah et al., 2024). During the daytime, pain may be partially distracted by daily activities; however, its impact becomes more pronounced at night. Physiologically, gastric acid secretion continues even when the stomach is empty. Contact between gastric acid and inflamed mucosal tissue generates persistent nociceptive signals that are transmitted to the central nervous system. These pain signals stimulate the release of cortisol and adrenaline, increasing physiological arousal and preventing the brain from entering a normal sleep state. Consequently, patients often experience prolonged sleep latency. Even after falling asleep, recurrent episodes of epigastric pain frequently cause sudden awakenings, disrupting the normal progression of sleep from light sleep to deep sleep stages (Indahsari, Friska Putri & Mustikarani, 2020).

As a result of persistent pain, patients often fail to achieve Stage 3 Non-Rapid Eye Movement (NREM) sleep, which is essential for physical recovery and tissue repair. Insufficient deep sleep limits optimal regeneration of the gastric mucosa during rest. Consequently, patients may experience impaired cognitive function, difficulty concentrating, excessive daytime sleepiness, severe fatigue, and a lower pain threshold. Toward early morning, gastric pain frequently intensifies because the stomach remains empty for an extended period. This condition creates a vicious cycle in which sleep deprivation exacerbates systemic stress, delays mucosal healing, and worsens gastritis symptoms (Santos, 2024). Therefore, understanding the progression from gastric pain to sleep disturbance is essential for determining the optimal timing of nursing interventions (Angelica, 2022).

Nurses play a crucial role in educating patients about pain management and sleep improvement through integrated non-pharmacological interventions. These interventions complement pharmacological therapy by improving patients' ability to manage their symptoms independently. Deep-breathing relaxation exercises are considered an effective strategy for reducing pain by stimulating the parasympathetic nervous system and suppressing the release of stress hormones associated with pain responses (Junaidi et al., 2025). In addition, sleeping in the left lateral position is recommended to reduce gastric reflux during sleep, while elevating the head and shoulders with an additional pillow may help alleviate epigastric discomfort (Simadibrata et al., 2023). Patients are also advised to avoid trigger foods and caffeinated beverages for at least three hours before bedtime and to maintain a consistent sleep schedule to stabilize circadian rhythms (Elyta, 2021).

This study was designed to evaluate sleep quality using a clinically validated instrument and to determine the statistical relationship between pain intensity and sleep

quality among patients with gastritis. Understanding this relationship is expected to provide evidence regarding the extent to which epigastric pain affects restorative sleep and to support the development of evidence-based nursing interventions. Therefore, this study aimed to examine the relationship between pain intensity and sleep quality among hospitalized patients with gastritis at RSI Sakinah Mojokerto. Specifically, the study sought to identify patients' pain intensity, assess their sleep quality, and analyze the relationship between these two variables. The findings are expected to contribute to the advancement of nursing science, enhance patients' understanding of the importance of pain management, support healthcare professionals in providing comprehensive nursing care, and serve as a reference for improving the quality of healthcare services for patients with gastritis.

METHOD

This study employed a quantitative correlational design with a cross-sectional approach to examine the relationship between pain intensity and sleep quality among hospitalized patients with gastritis. The study was conducted in the inpatient ward of RSI Sakinah Mojokerto from April to May 2026. The study population consisted of 82 patients diagnosed with gastritis, of whom 32 respondents were selected using purposive sampling based on predetermined inclusion and exclusion criteria.

The inclusion criteria were patients aged 18 years or older, experiencing epigastric pain, fully conscious (*compos mentis*), able to communicate effectively, and willing to participate by providing written informed consent. Patients with incomplete questionnaire responses or a diagnosis of heart failure complications were excluded from the study. Pain intensity was assessed using the *Numeric Rating Scale* (NRS), with scores ranging from 0 to 10, while sleep quality was evaluated using the *Pittsburgh Sleep Quality Index* (PSQI), in which a global score greater than 5 indicates poor sleep quality. Data were analyzed using descriptive statistics and Spearman's rank correlation test to determine the relationship between pain intensity and sleep quality, with statistical significance set at $p < 0.05$.

This study was approved by the Health Research Ethics Committee of Universitas Bina Sehat PPNI Mojokerto No.105/KEP/UBS-PPNI//IV/2026. Ethical principles, including informed consent, confidentiality, anonymity, and beneficence, were strictly observed throughout the study. All participant information was kept confidential and used exclusively for research purposes.

FINDING AND DISCUSSION

RESEARCH RESULT

1. General data

a. Characteristics of Respondents Based on Age, Gender, Education, Occupation, Length of Suffering and Frequency

Table 1 Frequency Distribution of Respondents Based on General Data at the Inpatient Unit of Sakinah Islamic Hospital, Mojokerto in 2026

No	General Data	Frekuensi	Presentase (%)
1.	Age		
	Early Adulthood (26-35 years)	7	21,9
	Late Adulthood (36-45 years)	6	18,8
	Early Elderly (46-55 years)	5	15,6
	Late Elderly (56-65 years)	10	31,3
	Older Adults (≥ 65 years)	4	12,5
2.	Gender		
	Male	11	34,4
	Female	21	65,6
3.	Education		
	Elementary School	1	3,1
	Junior High School	5	15,6
	Senior High School	16	50,0
	College	4	12,5
4.	Employment Status		
	Employed	12	37,5
	Unemployed	20	62,5
5.	Duration of Gastritis		
	<6 Months	7	21,9
	>6 Months	25	78,1
	Total	32	100.0

Source: *Primary Data, 2026*

Table 1 shows that among the 32 respondents, the largest age group was 56–65 years (31.3%). Most participants were female (65.6%), had completed senior high school education (50.0%), and were unemployed (62.5%). In addition, the majority of respondents had been diagnosed with gastritis for more than six months (78.1%).

2. Data Khusus

a. Pain Intensity in Gastritis Patients in the Inpatient Care Unit at Sakinah Islamic Hospital, Mojokerto

Table 2 Frequency Distribution of Respondents Based on Pain Intensity of Gastritis Patients in Inpatient Care at Sakinah Islamic Hospital, Mojokerto in 2026

Pain Intensity Category	Frekuensi (n)	Persentase (%)
No Pain	6	18,8
Mild Pain	8	25,0
Moderate Pain	17	53,1
Severe Pain	1	3,1
Total	32	100.0

Source: Primary Data, 2026.

Table 2 shows that of the 32 respondents, the majority experienced moderate pain, accounting for 17 respondents (53.1%). This was followed by mild pain, reported by 8 respondents (25.0%). Six respondents (18.8%) reported no pain, while only one respondent (3.1%) experienced severe pain.

b. Sleep Quality in Gastritis Patients in the Inpatient Care Unit of Sakinah Islamic Hospital, Mojokerto

Table 3 Frequency Distribution of Respondents Based on Pain Intensity of Gastritis Patients in Inpatient Care at Sakinah Islamic Hospital, Mojokerto in 2026

Sleep Quality	Frekuensi	Persentase (%)
Good	10	31,3
Poor	22	68,8
Total	32	100.0

Source: Primary Data, 2026.

Table 3 shows that among the 32 respondents, the majority had poor sleep quality, with 22 respondents (68.8%). In contrast, good sleep quality was reported by 10 respondents (31.3%).

c. **Cross Tabulation of the Relationship between Pain Intensity and Sleep Quality**
Table 4 Cross Tabulations of the Relationship between Pain Intensity and Sleep Quality in Gastritis Patients Inpatients at RSI Sakinah Mojokerto in 2026

Pain Intensity	Good Sleep Quality				Total		Nilai r Spearman Rho	p-value
	Good		Poor		N	%	0,662	0,000
	n	%	n	%				
No Pain	5	83,8	1	16,7	6	100,0		
Mild Pain	4	50,0	4	50,0	8	100,0		
Moderate Pain	1	5,9	16	94,1	17	100,0		
Severe Pain	0	0,0	1	100,0	1	100,0		
Total	10	31,3	22	68,8	32	100,0		

Source: Primary Data, 2026.

Table 4 demonstrates that the majority of respondents with moderate pain had poor sleep quality (16 respondents; 94.1%), whereas respondents with mild pain or no pain were more likely to report good sleep quality. Only one respondent with moderate pain reported good sleep quality, while the single respondent with severe pain experienced poor sleep quality.

Spearman's rank correlation analysis revealed a statistically significant positive correlation between pain intensity and sleep quality ($r = 0.662$, $p < 0.001$). The correlation coefficient indicates a strong positive relationship, suggesting that higher pain intensity was associated with poorer sleep quality among patients with gastritis. Conversely, lower pain intensity was associated with better sleep quality.

DISCUSSION

1. Pain Intensity in Gastritis Patients in the Inpatient Care Unit of Sakinah Islamic Hospital, Mojokerto

The findings of this study showed that among the 32 respondents, the majority experienced moderate pain, accounting for 17 respondents (53.1%). In contrast, 8 respondents (25.0%) reported mild pain, 6 respondents (18.8%) reported no pain, and only 1 respondent (3.1%) experienced severe pain. According to Guyton and Hall (2014), gastritis-related pain is classified as acute visceral pain caused by physiological tissue injury resulting from inflammation of the gastric mucosa. Continuous irritation of the eroded gastric mucosa by hydrochloric acid stimulates free nerve endings (nociceptors) within the mucosal layer. These nociceptive impulses are transmitted through afferent nerve fibers to the central nervous system, where they are perceived as burning, aching, or squeezing pain in the epigastric region (Prince & Wilson, 2012). These findings are consistent with the study conducted by (Musdalifa, 2025), which reported that patients with chronic gastritis experiencing acute exacerbations

predominantly presented with moderate pain due to recurrent inflammation of the gastric mucosa.

The researchers suggest that the predominance of moderate pain observed in this study is attributable to persistent irritation of the gastric mucosa caused by continuous exposure to gastric acid, resulting in nociceptor activation and transmission of pain impulses to the central nervous system. Consequently, patients experience epigastric discomfort characterized by burning, aching, or squeezing sensations. Furthermore, the predominance of moderate pain may reflect the clinical characteristics of patients with recurrent gastritis, in whom repeated inflammatory episodes produce clinically significant discomfort while remaining tolerable for most individuals. The presence of respondents with mild pain, no pain, and severe pain also indicates that pain perception is highly individualized and influenced by the severity of inflammation, individual pain thresholds, coping mechanisms, and various physiological and psychological factors. Therefore, pain intensity in patients with gastritis should be considered a complex manifestation of gastric inflammation that is influenced by both pathological processes and individual responses to pain.

Another factor that may influence pain intensity is age. In the present study, most respondents were aged 56–65 years, accounting for 10 respondents (31.3%). According to Potter and Perry (2021), age is an important determinant of both pain intensity and pain perception. As individuals age, physiological and neurological changes occur, particularly within the nervous system, which may alter pain transmission and responses to painful stimuli. Among younger adults, pain perception is influenced by physical condition, previous experiences, stress, and relatively well-developed coping mechanisms, resulting in greater pain tolerance. In older adults, however, aging is associated with a reduction in nerve fiber density, slower nerve conduction velocity, decreased nociceptor sensitivity, and alterations in central pain modulation, all of which affect pain threshold and pain tolerance. Although pain transmission tends to be slower in older individuals, pain is often more persistent because of reduced physiological adaptability, declining organ function, diminished coping capacity, and the presence of comorbidities. These conditions may increase the likelihood of persistent pain associated with gastric mucosal inflammation, thereby affecting patients' comfort, daily activities, and sleep quality. These findings are consistent with those reported by (Lautenbacher, 2017), who demonstrated that aging is associated with alterations in pain perception, including increased pain thresholds and changes in sensitivity to painful stimuli. Consequently, age plays an important role in determining the intensity of pain experienced by individuals. As people grow older, the combined effects of physiological and psychological changes influence how pain is perceived, interpreted, and managed.

The researchers believe that pain perception among older adults is influenced not only by biological changes but also by psychological factors and previous life experiences. Older individuals often have greater experience coping with painful conditions, which may contribute to improved pain tolerance in some cases. However, the presence of comorbidities, psychological stress, fatigue, and reduced adaptive capacity may conversely increase pain perception. In patients with gastritis, late older adults are also more likely to experience age-related declines in digestive function, delayed gastric emptying, and increased gastric mucosal sensitivity to irritation, all of

which may exacerbate epigastric pain. Therefore, the researchers conclude that increasing age influences pain intensity through a complex interaction of physiological alterations, psychological factors, and overall health status. The researchers believe that pain in older adults is influenced not only by biological changes but also by psychological factors and previous life experiences. Older individuals generally have greater experience coping with various painful conditions, enabling some of them to develop better pain tolerance. However, under certain circumstances, the presence of comorbidities, psychological stress, fatigue, and reduced adaptive capacity may instead increase pain perception. In addition, patients with gastritis in the late older adult age group are more likely to experience age-related declines in digestive function, delayed gastric emptying, and increased sensitivity of the gastric mucosa to irritation, all of which may exacerbate epigastric pain. Therefore, the researchers conclude that increasing age influences pain intensity through a complex interaction between physiological changes, psychological conditions, and overall health status.

Another factor associated with pain intensity is sex. The findings showed that the majority of respondents were female (21 respondents; 65.6%). According to Prince and Wilson (2012), sex is an important determinant of pain intensity. Biologically, women tend to have lower pain thresholds and lower pain tolerance because fluctuations in estrogen and progesterone levels increase the sensitivity of visceral nociceptive receptors in internal organs, including the stomach. In addition to neuroendocrine mechanisms, Smeltzer and Bare (2013) suggested that psychosocial and cultural stereotypes also contribute to differences in pain expression. Men are generally more likely to adopt a stoic attitude and suppress pain expression to maintain self-image, whereas women are more likely to openly communicate physical discomfort and seek healthcare assistance. These findings are supported by (Cantay, 2022), who reported that female patients with gastrointestinal disorders exhibited significantly higher symptom severity, greater observable pain behaviors, and increased discomfort, partly because they were more susceptible to hospitalization-related stress, which may stimulate excessive gastric acid secretion.

The researchers believe that the predominance of female respondents in this study may have contributed to the relatively high pain intensity observed among patients with gastritis. From a biological perspective, women exhibit greater sensitivity to painful stimuli because of hormonal influences, whereas psychologically they are generally more willing to express pain than men. Furthermore, stress associated with hospitalization may increase gastric acid secretion, thereby aggravating gastric mucosal inflammation and intensifying pain. Therefore, sex should be considered an important factor during the assessment and management of pain in patients with gastritis.

Educational level is another factor that may influence pain intensity. The respondents in this study had diverse educational backgrounds, with the majority having completed senior high school (16 respondents; 50.0%). This was followed by junior high school graduates (5 respondents; 15.6%), respondents with higher education (4 respondents; 12.5%), and one respondent (3.1%) whose highest educational attainment was elementary school. According to Kozier et al. (2010), educational level is a social determinant that influences an individual's perception of and response to pain. Individuals with higher educational attainment generally possess better knowledge

regarding their disease, the causes of pain, and effective pain management strategies, enabling them to develop more adaptive coping mechanisms. Adequate knowledge also helps individuals recognize pain as part of the disease process or treatment, thereby reducing anxiety associated with pain. The researchers suggest that educational level plays a significant role in shaping patients' responses to pain. Differences in educational attainment may lead to variations in understanding, interpreting, and managing pain. Respondents with higher levels of education are generally better able to access health information, understand their medical condition, and implement adaptive coping strategies such as relaxation techniques, distraction, and adherence to prescribed treatment. Conversely, individuals with lower educational attainment may have limited understanding of the disease process and pain management, potentially increasing anxiety and amplifying pain perception. Therefore, patient education provided by healthcare professionals is essential to bridge these knowledge gaps and ensure that all patients, regardless of educational background, are able to manage pain more effectively.

Employment status may also influence pain intensity. In this study, the majority of respondents were unemployed (20 respondents; 62.5%). According to (Melzack, 1965) biopsychosocial model of pain, employment represents a social factor that affects both psychological and physiological well-being. Physically demanding, monotonous, or highly stressful occupations may increase fatigue and stress, thereby amplifying pain perception. Conversely, stable employment with manageable levels of stress may promote more effective coping and reduce perceived pain intensity. High levels of occupational stress may facilitate pain transmission through the mechanisms described in the Gate Control Theory, resulting in greater pain intensity. The researchers believe that employment status influences pain intensity primarily through its effects on psychological well-being and stress management. Respondents who were unemployed may have experienced additional psychological burdens, including concerns about their health condition and financial situation during hospitalization, which could increase pain perception. In contrast, individuals with stable employment may possess better coping resources that enable them to regulate pain more effectively. Therefore, employment status should be considered during the assessment of pain among patients with gastritis.

The duration of gastritis was another factor associated with pain intensity. Most respondents had experienced gastritis for more than six months (25 respondents; 78.1%). According to Guyton and Hall (2022), disease duration is associated with the severity of gastric mucosal inflammation, recurrence frequency, and patients' physiological and psychological adaptation to pain. In patients with gastritis lasting less than six months, inflammation is generally in the acute or subacute phase. Ongoing irritation of the gastric mucosa by hydrochloric acid stimulates the release of inflammatory mediators, including histamine, prostaglandins, and pro-inflammatory cytokines. These mediators activate nociceptors in the gastric wall, producing sharper and more intense epigastric pain. Acute inflammation also increases the sensitivity of peripheral nerve endings to chemical and mechanical stimuli, thereby lowering the pain threshold. In contrast, patients with gastritis lasting more than six months often experience chronic inflammation that may result in structural changes to the gastric mucosa, including mucosal atrophy, recurrent erosion, and visceral hypersensitivity, all of which contribute to chronic pain. This mechanism is consistent with the concept of visceral pain

sensitization, whereby prolonged inflammation induces both peripheral and central sensitization, making the nervous system increasingly responsive to painful stimuli. Nevertheless, some patients with long-standing gastritis may develop adaptation or habituation to pain, leading them to report lower pain intensity despite the persistence of pathological changes. These findings are consistent with those reported by (Li et al., 2018), who found that longer disease duration in patients with gastrointestinal disorders was associated with increased somatic symptoms, including abdominal pain, recurrent inflammation, stress, and sleep disturbances.

The researchers conclude that the duration of gastritis contributes substantially to the pain intensity experienced by patients. In individuals with gastritis lasting longer than six months, recurrent inflammation may produce structural alterations in the gastric mucosa and increase nervous system sensitivity to painful stimuli, resulting in persistent pain. Although some patients gradually adapt to chronic pain over time, ongoing inflammation continues to have the potential to maintain or even exacerbate pain symptoms. Therefore, disease duration should be considered an important factor in the assessment and management of pain among patients with gastritis.

2. Sleep Quality in Gastritis Patients in the Inpatient Care Unit of Sakinah Islamic Hospital, Mojokerto

Based on the assessment of sleep quality using the *Pittsburgh Sleep Quality Index* (PSQI), the results showed that the majority of respondents admitted to the inpatient ward of RSI Sakinah Mojokerto had poor sleep quality, accounting for 22 respondents (68.8%). In contrast, only 10 respondents (31.3%) demonstrated good sleep quality. According to Buysse et al. (1989), sleep quality refers to a condition in which sleep results in a feeling of refreshment upon awakening and encompasses several dimensions, including subjective sleep quality, sleep latency, sleep efficiency, and the absence of sleep disturbances. Among hospitalized patients, sleep architecture is frequently disrupted by the unfamiliar hospital environment, routine medical procedures, and physical discomfort associated with illness (Potter & Perry, 2021).

Based on these findings and the supporting literature, the researchers suggest that the high proportion of respondents with poor sleep quality indicates that hospitalized patients with gastritis are at considerable risk of experiencing sleep disturbances resulting from a combination of physiological and environmental factors. Gastric pain, physical discomfort during hospitalization, and environmental conditions such as noise, excessive lighting, and nighttime medical interventions are likely to disrupt normal sleep architecture. These disturbances may adversely affect multiple components of sleep quality, including subjective sleep satisfaction, sleep latency, sleep efficiency, and the frequency of nocturnal awakenings, resulting in less restorative sleep. Therefore, poor sleep quality among hospitalized patients with gastritis should be considered a multidimensional condition influenced not only by the underlying disease but also by psychological and environmental factors that collectively reduce the quality of rest.

Regarding the subjective sleep quality component, respondents did not consistently obtain high PSQI scores. Among those with mild and moderate pain intensity, most respondents received scores of 1 or 2, indicating fairly good or fairly poor subjective sleep quality, whereas the single respondent with severe pain received a score of 3, reflecting very poor subjective sleep quality. According to Buysse et al. (1989),

subjective sleep quality refers to an individual's overall perception of the quality of their sleep, including the extent to which sleep is perceived as satisfying, restful, restorative, or disturbed. This component is inherently subjective because it reflects personal experience rather than objective measures such as sleep duration or physiological assessments. Within the PSQI, subjective sleep quality constitutes the first component used to evaluate an individual's overall perception of sleep, ranging from "very good" to "very poor." These findings are consistent with those reported by Buysse (1988), who demonstrated that subjective sleep quality is closely associated with sleep satisfaction, sleep latency, sleep efficiency, and nighttime sleep disturbances. Consequently, subjective sleep quality is not only one dimension of sleep assessment but also an important determinant of an individual's overall evaluation of sleep quality.

The researchers believe that respondents' perceptions of their sleep quality were influenced by pain intensity, although this relationship was not always direct. Individuals experiencing mild to moderate pain were still able to perceive their sleep quality as either fairly good or fairly poor, suggesting that factors such as adaptive capacity, coping strategies, and pain tolerance also influenced their evaluations. In contrast, the respondent with severe pain reported poorer subjective sleep quality, indicating that greater pain intensity may increase physical discomfort, physiological arousal, and difficulty maintaining restorative sleep. Therefore, the researchers conclude that higher pain intensity among patients with gastritis tends to be associated with poorer subjective sleep quality, although physiological, psychological, and environmental factors also contribute to overall sleep perception.

With respect to sleep latency, respondents likewise did not consistently demonstrate high PSQI scores. Most participants with mild and moderate pain received scores of 1 or 2, indicating that they required approximately 16–30 minutes or 31–60 minutes, respectively, to fall asleep. According to Buysse et al. (1989), sleep latency refers to the time required to transition from attempting to sleep to actually falling asleep. It is one of the seven principal components of the PSQI used to evaluate sleep quality. Longer sleep latency is generally associated with poorer sleep quality. Under normal conditions, healthy adults typically fall asleep within 10–20 minutes, whereas sleep latency exceeding 30 minutes is commonly associated with insomnia or other sleep disorders. Physiologically, sleep latency is regulated by the balance between sympathetic and parasympathetic nervous system activity. Potter and Perry (2021) explained that factors increasing sympathetic nervous system activation, including pain, stress, anxiety, environmental noise, and electronic device use before bedtime, maintain a state of physiological arousal that delays the transition from wakefulness to sleep. The researchers suggest that the prolonged sleep latency observed among respondents reflects disruption of the normal transition from wakefulness to sleep. Participants with mild to moderate pain who required between 16 and 60 minutes to fall asleep demonstrate that even moderate levels of pain may produce sufficient discomfort to interfere with relaxation and delay sleep onset. Furthermore, prolonged sleep latency is likely influenced not only by pain but also by psychological stress, anxiety, the unfamiliar and disruptive hospital environment, and pre-sleep exposure to electronic devices, all of which may increase physiological arousal. Therefore, the researchers conclude that longer sleep latency among patients with gastritis is associated with poorer

sleep quality because it reduces effective sleep duration and interferes with restorative sleep.

Regarding the sleep duration component, most respondents obtained PSQI scores of 1 and 2, indicating that they slept approximately 5–7 hours per night. According to Borbély's Two-Process Model of Sleep Regulation (Alexander, 2016), sleep duration is regulated by two primary mechanisms: the homeostatic process (Process S) and the circadian process (Process C). Sleep duration is directly associated with the homeostatic process, whereby the longer an individual remains awake, the greater the physiological need for sleep. When sleep duration is insufficient, homeostatic balance is disrupted, leading to reduced sleep quality characterized by fragmented sleep, frequent awakenings, and excessive daytime fatigue. Furthermore, chronic sleep deprivation may progressively impair overall sleep quality by increasing physiological arousal and reducing sleep efficiency. The researchers suggest that the respondents' average sleep duration of 5–7 hours represents the lower limit of recommended sleep requirements and may not be sufficient to fully satisfy physiological recovery needs. Although this duration may appear adequate for some individuals, restorative sleep depends not only on the total hours slept but also on sleep continuity and depth. Consequently, respondents may experience daytime fatigue, frequent nocturnal awakenings, and reduced daily functioning. Therefore, the researchers conclude that sleep duration is an essential determinant of overall sleep quality and should be considered an important target for interventions aimed at improving sleep among patients with gastritis.

Regarding the sleep disturbances component, most respondents reported experiencing nighttime pain and nocturia, with PSQI scores of 1 and 2, indicating that these disturbances occurred either occasionally or frequently. According to the Pittsburgh Sleep Quality Index (PSQI) developed by Buysse (1988), sleep disturbances encompass various factors that interrupt sleep during the night, including pain and nocturia. These disturbances increase sleep fragmentation, thereby reducing overall sleep quality because normal sleep cycles are repeatedly interrupted. Similarly, the Two-Process Model of Sleep Regulation (Alexander, 2016) proposes that nocturnal pain and the urge to urinate reactivate the body's arousal system, preventing the homeostatic sleep drive (Process S) from functioning optimally. As a result, individuals awaken more frequently during the night and experience difficulty maintaining deep, restorative sleep. The researchers believe that nighttime pain and nocturia were important contributors to the poor sleep quality observed among the respondents. These conditions indicate that sleep was repeatedly interrupted by internal physiological stimuli rather than occurring continuously throughout the night, leading to fragmented sleep architecture. Within the PSQI framework, these disturbances directly increase sleep disturbance scores and reflect poorer overall sleep quality. Furthermore, based on the Two-Process Model of Sleep Regulation, repeated nocturnal awakenings activate the arousal system, preventing patients from reaching restorative stages of sleep. Therefore, the researchers conclude that the more frequently patients experience nighttime pain and nocturia, the greater the likelihood of reduced sleep quality due to impaired sleep continuity and decreased sleep efficiency.

One of the primary factors contributing to poor sleep quality was pain intensity. The findings demonstrated that among respondents reporting no pain, only one respondent

(16.7%) experienced poor sleep quality. In the mild pain category, four respondents (50.0%) reported poor sleep quality, whereas 16 respondents (94.1%) with moderate pain experienced poor sleep quality. The single respondent with severe pain (100.0%) also reported poor sleep quality. According to Potter and Perry (2021), physical pain is one of the principal physiological factors capable of disrupting sleep quality. Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Physiologically, pain activates the sympathetic nervous system, increasing physiological arousal and maintaining the body in a state of alertness that interferes with the relaxation necessary for sleep initiation and maintenance. Pain also stimulates the release of stress hormones, including cortisol and adrenaline, which inhibit parasympathetic nervous system activity essential for restorative sleep. Furthermore, the Sleep–Pain Vicious Cycle proposed by Roehrs and Roth (2005) describes a bidirectional relationship between pain and sleep disturbance. Pain contributes to insomnia, frequent nocturnal awakenings, and poor sleep quality, whereas insufficient sleep increases pain sensitivity the following day by lowering the pain threshold and impairing central pain modulation mechanisms.

The researchers conclude that increasing pain intensity among patients with gastritis is associated with a greater risk of poor sleep quality. Pain resulting from gastric mucosal inflammation maintains the body in a heightened state of physiological arousal, making it more difficult for patients to initiate sleep, remain asleep throughout the night, and achieve restorative sleep. Consequently, pain affects not only physical comfort but also the overall sleep process. Effective pain management should therefore be considered a fundamental strategy for improving sleep quality and promoting recovery among hospitalized patients with gastritis.

3. The Relationship Between Pain Intensity and Sleep Quality in Inpatient Care at Sakinah Mojokerto Hospital

Based on the cross-tabulation analysis, a clear clinical pattern was identified in which increasing pain intensity was associated with progressively poorer sleep quality. Among respondents reporting no pain, the majority demonstrated good sleep quality (5 respondents; 83.3%), whereas only one respondent (16.7%) experienced poor sleep quality. In the mild pain category, sleep quality was equally distributed between good and poor sleep quality, with four respondents (50.0%) in each category. However, as pain intensity increased to the moderate pain category, the proportion of respondents with poor sleep quality increased markedly to 16 respondents (94.1%), while only one respondent (5.9%) maintained good sleep quality. Furthermore, the only respondent with severe pain (100.0%) experienced poor sleep quality. The association between pain intensity and sleep quality was confirmed by the Spearman's rho correlation test (Table 4.4), which yielded a p-value of 0.000 ($p < 0.05$), indicating that the null hypothesis was rejected and the alternative hypothesis was accepted. The correlation coefficient ($r = 0.662$) demonstrated a strong positive correlation, confirming that higher pain intensity was significantly associated with poorer sleep quality among patients with gastritis.

These findings are consistent with the study conducted by (Cantay, 2022), which reported that individuals with poor sleep quality had a 6.935-fold greater risk of developing gastritis compared with those who reported good sleep quality. This relationship is explained by a bidirectional pathophysiological mechanism, commonly

referred to as the sleep–pain vicious cycle. When epigastric pain reaches moderate to severe intensity, nociceptive impulses are transmitted extensively to the cerebral cortex through the *reticular activating system* (RAS). Activation of the RAS promotes wakefulness, suppresses melatonin secretion, and disrupts normal sleep architecture, particularly the deep sleep stage that is essential for physiological recovery. Consequently, patients experience frequent nocturnal awakenings and repeatedly adjust their sleeping position to reduce abdominal discomfort. Sleep deprivation subsequently impairs the production of protective physiological mediators and lowers the pain threshold, thereby increasing pain sensitivity and further intensifying the perception of pain.

The strong correlation coefficient ($r = 0.662$) observed in this study provides further evidence supporting the existence of the sleep–pain vicious cycle among patients with gastritis at RSI Sakinah Mojokerto. Poorly controlled epigastric pain disrupts nighttime sleep, while inadequate sleep further amplifies pain sensitivity on the following day. Therefore, nursing interventions for hospitalized patients with gastritis should extend beyond pharmacological acid-suppressive therapy and incorporate comprehensive sleep-promoting strategies. These interventions may include relaxation techniques, positioning patients in the left lateral decubitus position to reduce gastric reflux, and creating a quiet, comfortable hospital environment that facilitates restorative sleep and promotes recovery.

The researchers interpret the strong correlation observed in this study as empirical evidence that gastric pain is one of the principal determinants of impaired sleep among patients with gastritis. The cross-tabulation findings demonstrate that patients are unlikely to achieve restorative sleep while experiencing persistent epigastric pain. These findings emphasize the importance of effective pain management as an essential component of improving sleep quality during hospitalization.

Although the majority of respondents with moderate pain experienced poor sleep quality, the cross-tabulation analysis revealed that one respondent (5.9%) with moderate pain maintained good sleep quality. This finding suggests that the relationship between pain intensity and sleep quality is not absolute and may be influenced by other factors, including educational level. According to Kozier et al. (2010), individuals with higher educational attainment generally possess more effective psychological coping mechanisms and problem-focused coping strategies when confronted with physical stressors. They also tend to have greater access to health-related information regarding disease management, making them less susceptible to hospitalization-related anxiety, which may otherwise contribute to sleep disturbances. The researchers therefore suggest that the respondent who maintained good sleep quality despite experiencing moderate pain may have benefited from more effective cognitive and psychological coping strategies. Higher educational attainment may enhance an individual's understanding of the disease process and promote adaptive responses to pain and hospitalization. Improved health literacy may also reduce anxiety and physiological stress responses that interfere with sleep initiation and maintenance. Consequently, the researchers conclude that cognitive and psychological factors, particularly knowledge and coping ability associated with educational level, may serve as protective factors that enable some patients to maintain satisfactory sleep quality despite experiencing moderate pain.

The study also identified four respondents (50.0%) with mild pain who nevertheless experienced poor sleep quality. This finding may be explained by one of the components assessed in the Pittsburgh Sleep Quality Index (PSQI), namely sleep latency, which measures the amount of time required to fall asleep. Among these four respondents, prolonged sleep latency was primarily attributed to the habit of using mobile phones before bedtime. According to Potter and Perry (2021), frequent use of electronic devices before sleep suppresses melatonin secretion due to exposure to blue light emitted from digital screens, thereby prolonging sleep latency. This mechanism is consistent with the Circadian Rhythm Disruption Theory, which explains that artificial light exposure during the evening interferes with the body's circadian rhythm and negatively affects sleep quality. Similarly, (Charles A., 2013) reported that exposure to light from electronic devices at night delays sleep onset and reduces sleep efficiency. The researchers suggest that poor sleep quality among respondents with mild pain was not solely attributable to pain intensity but was also influenced by pre-sleep mobile phone use. Blue light exposure inhibits melatonin production, delays sleep initiation, and subsequently impairs overall sleep quality. These findings indicate that, in addition to effective pain management, improving bedtime habits should be considered an important strategy for enhancing sleep quality among patients with gastritis.

Furthermore, the study identified one respondent (16.7%) who reported no pain but nevertheless experienced poor sleep quality. This finding may be explained by several contributing factors, particularly age. According to Potter and Perry (2021), advancing age is associated with physiological changes, including reduced melatonin secretion, decreased duration of deep sleep, and increased frequency of nocturnal awakenings. Based on these findings, the researchers suggest that poor sleep quality in the absence of pain demonstrates that sleep quality is influenced not only by pain intensity but also by physiological and psychological factors, including aging. Age-related reductions in melatonin production, diminished deep sleep, and increased nighttime awakenings may impair sleep quality despite the absence of pain. These physiological changes indicate that the natural aging process affects sleep regulation and reduces sleep efficiency. Therefore, the researchers conclude that age should be considered an important variable influencing sleep quality and that comprehensive sleep assessments should include multidimensional factors beyond pain intensity alone.

The study also found one respondent (100.0%) who experienced severe pain accompanied by poor sleep quality. This finding suggests that, in addition to gastric inflammation, several respondent characteristics may have contributed to the severity of pain, including advanced age, female sex, and a history of gastritis lasting more than six months. According to Potter and Perry (2021), pain intensity is influenced by numerous factors, including age, sex, previous pain experiences, psychological condition, and individual coping mechanisms. Older adults experience physiological and neurological changes characterized by reduced nervous system function and diminished adaptive capacity, resulting in more persistent pain. In addition, women generally exhibit greater pain sensitivity than men because fluctuations in estrogen and progesterone enhance nociceptor responsiveness to painful stimuli. According to Guyton and Hall (2022), gastritis persisting for more than six months may lead to chronic inflammation, resulting in both peripheral and central sensitization, which increases the responsiveness of the

nervous system to nociceptive stimulation. The researchers therefore conclude that severe pain experienced by this respondent was influenced not only by gastric mucosal inflammation but also by age, sex, and prolonged disease duration. These interacting factors likely intensified pain perception, making it difficult for the patient to achieve comfortable and restorative sleep, thereby contributing to poor sleep quality.

CONCLUSION

Based on the findings of this study involving 32 hospitalized patients with gastritis at RSI Sakinah Mojokerto, the majority of respondents experienced moderate pain intensity (53.1%) and poor sleep quality (68.8%). Spearman's rank correlation analysis demonstrated a significant positive relationship between pain intensity and sleep quality ($p < 0.001$; $r = 0.662$), indicating a strong correlation. These findings suggest that higher pain intensity is associated with poorer sleep quality among hospitalized patients with gastritis.

Based on these results, hospitals and nursing professionals are encouraged to optimize pain management by combining pharmacological treatment with non-pharmacological interventions, including deep breathing relaxation, warm compress therapy, and guided imagery, while also conducting comprehensive assessments of patients' sleep quality. Future research is recommended to evaluate the effectiveness of non-pharmacological interventions, such as warm compresses, deep breathing exercises, and acupressure, in reducing pain intensity and improving sleep quality among patients with gastritis.

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