

Stress Level and Migraine Occurrence Among Nursing Students During Thesis Writing

Dinda Kezyah Tesalonika Mananoru, Nova Lina Langingi
Universitas. Klabat
32410049@student.unklab.ac.id

Abstract –Stress is a prevalent health concern among nursing students, particularly during the thesis writing process. One of its potential consequences is migraine, which can negatively affect academic performance and quality of life. This study aimed to examine the relationship between stress levels and migraine occurrence among nursing students engaged in thesis writing. A quantitative, correlational design was employed and the study used total sampling, involving 93 nursing students enrolled in Thesis I and Thesis II courses at Universitas Klabat. Data were collected through a structured questionnaire distributed via Google Forms and analyzed using Spearman's Rho correlation test. The mean stress score was 2.46 (SD = 0.56), indicating that most students experienced mild stress. Of the 17 stress-related indicators, 10 reflected predominance of mild stress. Regarding migraine occurrence, 74 students (79.6%) did not report migraines, while 19 students (20.4%) experienced them. Statistical analysis demonstrated a significant positive relationship between stress and migraine occurrence ($p = 0.000$), with a correlation coefficient of $r = 0.578$, suggesting a moderate positive correlation. Stress levels are significantly associated with the likelihood of migraines among nursing students, with higher stress increasing the potential for migraine occurrence. These findings highlight the need for targeted stress-management interventions to reduce health risks and support student well-being. Future studies should explore additional contributing factors to stress beyond thesis-related demands.

Keywords: Stress; Migraine; Nursing students; Thesis writing

I. INTRODUCTION

A thesis is a major academic requirement that students must complete in order to graduate from university (Candra & Mislana, 2022). However, the process of thesis writing is often accompanied by multiple challenges, such as identifying research topics, conducting literature searches, determining appropriate methodologies, facing anxiety during consultations with supervisors, and managing limited financial and time resources (Beautiful, 2022). These challenges frequently contribute to heightened stress levels, which in turn may lead to health consequences, including migraines (Helpiyani et al., 2019).

Migraine is a complex neurological disorder with a genetic basis, characterized by recurrent episodes of moderate to severe headaches, most often unilateral, and frequently accompanied by symptoms such as nausea, photophobia, and phonophobia (Ruschel & De Jesus, 2023). Migraines can be categorized as migraine without aura, migraine with aura, and migraine aura without headache, each distinguished by varying symptoms such as visual disturbances, neck stiffness, and sensory changes (Directorate of Prevention and Control of Non-Communicable Diseases, 2018). Attacks may last from 4 to 72 hours, and the pain is often exacerbated by physical activity due to neurovascular changes, including serotonin-mediated

vasoconstriction followed by vasodilation (Savitri et al., 2019). Both genetic and environmental factors contribute to migraine occurrence, with stress consistently identified as a major environmental trigger (Aulia, 2021). Several studies have documented the prevalence of migraines among students. For example, a study in India reported that 85% of university students experienced migraines (Menon & Remadevi, 2021), while research in China found that 67.5% of students had at least one migraine episode per month (Xie et al., 2022). In Indonesia, a study at STIKES Bina Sehat Mojokerto reported that among students preparing theses, 35.2% experienced migraines, while 59.4% suffered tension-type headaches (Ramadan, 2022).

Stress itself is defined as a physical or emotional reaction to external demands requiring adaptation (Ministry of Health, 2020). According to Setiawati et al. (2022) stress represents a patterned response to internal or external stressors and may have both positive and negative impacts. While manageable stress can motivate individuals to solve problems, persistent or severe stress has adverse consequences, such as headaches, fatigue, hypertension, forgetfulness, and emotional instability. Thesis-writing students are particularly vulnerable to stress due to academic workload, difficulty in identifying research topics, inadequate sleep, and anxiety during supervisory meetings (Helpiyani et al., 2019). Prolonged stress not only disrupts academic performance but also exacerbates the risk of primary headaches, including migraines (Ramadhan et al., 2022)

Global data indicate that stress affects more than 350 million individuals, ranking fourth among worldwide health problems according to the World Health Organization (WHO). The prevalence of stress among students has been reported to range from 38% to 71% globally, 39.6% to 61.3% in Asia, and 36.7% to 71.6% in Indonesia (Ambarwati et al., 2019). A local study among nursing students at the University of Riau found that 91.8% experienced moderate stress and 4.1% severe stress during thesis preparation (Rahmah et al., 2022). Research also supports a significant association between stress and migraine occurrence, with higher stress levels linked to increased frequency and severity of migraine attacks Amelia (2019). Preliminary interviews conducted with 15 nursing students preparing theses at Universitas Klatat further revealed that all participants experienced migraine episodes associated with stress.

Although prior studies have explored the relationship between stress and migraine among university students, most of these investigations were conducted among medical students or general student populations. Limited evidence exists specifically addressing nursing students, who face unique academic and clinical demands that may predispose them to higher stress levels. Furthermore, there is a lack of research focusing on nursing students in Indonesia, particularly those preparing theses, despite their heightened vulnerability to stress-related health issues. Addressing this gap is essential for developing targeted interventions to reduce stress and prevent migraines in this population. The followings are the main research question of the study:

1. What is the extent of stress levels among nursing students during thesis writing?
2. What is the occurrence of migraines among nursing students during thesis writing?
3. Is there a significant relationship between stress levels and migraine occurrence among nursing students?

This study aims to examine the relationship between stress levels and migraine occurrence among nursing students during thesis writing at Universitas Klatat. The target population consists of students enrolled in Thesis I and Thesis II courses in the Faculty of Nursing during the 2023/2024 academic year.

II. LITERATURE REVIEW

Migraine is a recurrent headache that occurs within 4-72 hours; the pain is more severe when engaging in regular physical activity (Elviana, 2020). The National Library of Medicine (2023) states that a migraine is a headache that throbs and is typically felt on one side of the head. Etiology of migraine according to Orlando (2023) It is divided into four: first, migraines occur because they are caused by genetics, and in sick relatives there is a risk factor for migraine three times greater than in non-sick relatives, but it is not known precisely which loci and genes are involved in its pathogenesis as it may be based on more than one genetic source with different genome locations and work in tandem with environmental factors so that individuals are more susceptible to Experiencing it, both migraine hemiplegia can occur in one family periodically, namely from one individual as the first family member who suffers from migraine hemiplegia, the third melas is mitochondrial encephalomyopathy syndrome, lactic acidosis, this is a multisystemic disorder inherited from the mother so that it can cause recurrent migraines, and the four triggers that cause migraines include Stress, hormonal changes during menstruation, skipping meals, lack of sleep, perfume-like odors, light exposure, and alcohol consumption.

In several studies conducted, it has been proven that there are risk factors for migraine, namely age, gender, and a history of migraines. The triggering factors of migraine are obesity, irregular sleep patterns, depression, anxiety, Stress, menstruation, and smoking (Wijaya et al., 2019). Other factors can cause migraines namely Stress, sleep disturbances, certain foods made from dairy products such as (cheese, yogurt, chocolate), artificial sweeteners, and MSG, from several studies also prove that alcohol and caffeine can cause migraines, weather affected by changes in air pressure, temperature, and humidity, menstruation, emotions (anxiety, tension, depression), migraines are also caused by changing diet, visual stimulus, loud noises, bright and flashing lights, pungent odors such as perfumes, gases, paints, and fuels (Susanti, 2021). Migraines can cause complications if not treated immediately, so according to the Ministry of Health (2022), Migraine complications include interference with daily activities, depression or anxiety, sleep disturbances, and excessive use of analgesics to reduce pain, and if consumed excessively, they can cause side effects and problems with body health.

Stress can affect everyone and is a genuine condition experienced by students, among others (Merry & Mamahit, 2020). Stress can be defined as worry or mental tension resulting from a challenging situation or event. Stress is a natural human response that drives us to overcome challenges and threats (WHO, 2023). In addition, Stubberud et al. (2021) define Stress as an organism's perception and response to stressors, which includes the body's physiological and psychosocial response to physical and psychological threats, challenges, or obstacles. Two factors affect the level of Stress in students when compiling a thesis according to Dwiputri et al. (2023) namely biological factors influenced by genetics from parents who have experienced mental disorders, disturbed sleep patterns or insomnia, and disturbed diets, then psychological factors such as perception (memory, motivation), feelings and emotions

(guilt, anxiety, worry, fear, anger, sadness), conflicts that cannot be overcome, and unpreparedness to face change).

Stress symptoms are categorized into three main areas: physical, mental, and behavioral symptoms. The physical symptoms of Stress are reactions caused by individuals, namely physically and emotionally, and when there is a change in the environment, individuals are required to adjust (Purwanti, 2022). Stressed people have headaches; muscle or other body parts pain (Mayo Clinic, 2021; National Health Service, 2022; WHO, 2023), chest pain, sexual problems (Mayo Clinic, 2021; National Health Service, 2022), difficulty sleeping (Mayo Clinic, 2021; WHO, 2023), tired, abdominal pain, and easy pain (Mayo Clinic, 2021), loss of appetite (WHO, 2023), stomach problems, and palpitations (National Health Service, 2022). Mental symptoms, Stress is a mental health problem that is susceptible to being experienced by every individual, and Stress causes various symptoms; therefore, many individuals are looking for ways to overcome the Stress they are experiencing (Gurning, 2023). People who are stressed will experience anxiety (Mayo Clinic, 2021; National Health Service, 2022; World Health Organization, 2023); depression (Mayo Clinic, 2021; World Health Organization, 2023); difficulty concentrating (Mayo Clinic, 2021; National Health Service, 2022); restlessness, lack of motivation, feeling overwhelmed, sad (Mayo Clinic, 2021); struggling to make decisions, feeling overwhelmed, and forgetfulness (National Health Service, 2022). Symptoms of stressful behaviour are conditions experienced by individuals, including excessive Stress, which is often emotional or mental. Stress can not only affect the psychological health of the individual, but it can also cause behavioral changes and impact the individual's physical health (Ministry of Health, 2018). People who are stressed will experience behavioral changes such as: alcohol use or alcohol use as well as smoking (Mayo Clinic, 2021; National Health Service, 2022; World Health Organization, 2023); Easily offended, avoiding friends (Mayo Clinic, 2021; National Health Service, 2022); overeating, (Mayo Clinic, 2021) lack or most sleep, (National Health Service, 2022). According to Firmawati et al. (2023), Stress can be categorized into three types. The first is mild Stress, which can be shown through physical conditions such as getting tired easily and being unable to relax. However, this Stress can gradually disappear if a solution that causes Stress is found. Moderate Stress can be observed in the body's weakened response, decreased concentration, and impaired memory. Stress can cause disorders in the digestive system, including increased heart rate, shortness of breath, and trembling. This stress level can escalate from mild to severe if left untreated.

In a study conducted by Dave et al. (2021), it was found that there was a relationship between stress levels and the occurrence of migraine headaches in medical students which proved that stress level and gender had a relationship with migraine headache with results ($p < 0.05$), the second study conducted by Octa, Akhmad, Woro, and Ani on the relationship between Stress and the occurrence of migraine in medical students of Malahayati University found that out of 60 students, 29 were in the normal stress category while those who experienced migraines were 31 students and found that based on the spearman test, $P < 0.000$ ($P < 0.05$) was obtained which showed that there was a relationship between Stress and the occurrence of migraines (Setiawati et al., 2022).

III. MATERIALS AND METHODS

This study employed a quantitative–correlational design to examine the relationship between stress levels and the occurrence of migraines among nursing students engaged in thesis writing.

The study population consisted of 94 nursing students officially registered in the Universitas Klabat Information System for the 2023/2024 academic year. A population-based sampling approach was applied, in which 93 students agreed to participate and completed the online questionnaire, while one student declined. The inclusion criteria were nursing students enrolled in Thesis I or Thesis II courses. The exclusion criteria were students who refused to provide informed consent or declined to complete the research questionnaire.

Two instruments were used in this study. Stress levels were measured using a self-constructed questionnaire consisting of 17 items rated on a four-point Likert scale (1 = strongly disagree to 4 = strongly agree), where higher scores indicated higher stress. The instrument demonstrated acceptable validity (Content Validity Index = 0.81) and strong internal consistency reliability (Cronbach's $\alpha = 0.901$).

Migraine occurrence was assessed using the Migraine Screen Questionnaire (MS-Q) developed by Láinez et al. (2010). The MS-Q demonstrated strong reliability (Kappa coefficients = 0.82 and 0.84) and validity indices, including sensitivity (0.82), specificity (0.97), positive predictive value (0.90), negative predictive value (0.94), positive prevalence ratio (27.66), and negative prevalence ratio (0.18). Higher scores indicated a greater likelihood of migraine.

Data were collected between January to March 2024 through a structured questionnaire distributed via Google Forms. Prior to data collection, participants were informed about the purpose and procedures of the study, and electronic informed consent was obtained. Participation was voluntary, and students were assured of anonymity and confidentiality.

All responses were coded automatically and analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics (mean and standard deviation) were used to describe stress levels, while frequencies and percentages were applied to migraine occurrence. The relationship between stress and migraine occurrence was tested using Spearman's Rho correlation, a non-parametric test appropriate for non-normally distributed data. A p-value ≤ 0.05 was considered statistically significant.

This study received approval from panel review with the official number letter of 117.2/UK/FKEP/SPM/III/2024. All participants provided informed consent before completing the questionnaire. Participation was voluntary, with the right to withdraw at any time without consequences. Data confidentiality was strictly maintained, and responses were used solely for research purposes.

IV. RESULTS AND DISCUSSION

Table 1 presents the distribution of stress symptoms across three domains: physical, mental, behavioral and also the migraine occurrences with the correlation between the two variables.

Table 1. Stress Level and Migraine Occurrences Data Analyses (N=93)

Item Variable	M/f	SD/%	P	r	Category
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Overall Stress	2,4598	0,55724			Mild Stress
Headache	2,57	0,865			Mild Stress
Muscle Pain	2,55	0,903			Mild Stress
Chest Pain	1,88	0,858			Mild Stress
Decrease appetite	2,30	0,831			Mild Stress
Palpitation	2,08	0,992			Mild Stress
Fatigue	3,28	0,839			Heavy Stress
Epigastric Pain	2,15	1,032			Mild Stress
Total Physical Symptoms	2,40	0,618			Mild Stress
Anxious	2,74	0,954			Moderate Stress
Difficulty concentrating	2,65	0,893			Moderate Stress
Restless	2,62	0,966			Moderate Stress
Lack of motivation	2,32	0,980			Mild Stress
Difficulty in making decision	2,31	0,909			Mild Stress
Forget easily	2,82	0,859			Moderate Stress
Total Mental Symptoms	2,58	0,711			Mild Stress
Irritability	2,32	0,946			Mild Stress
Avoiding friends	1,83	0,928			Mild Stress
Hypersomnia	2,71	1,006			Moderate Stress
Procrastinating	2,69	0,921			Moderate Stress
Total Behavioural Symptoms	2,39	0,650			Mild Stress
Migraine Occurrence					Mostly no migraine
Unlikely migraine	74	79,6%			
Likely migraine	19	20,4%			
Correlation between Stress Level and Migraine Occurrence			0,001	0,578	Statistically Significant

Legend: M=mean; SD=standard deviation; f=frequency; %=percentage; r=correlation; p=significant value

Overall, the assessment of stress symptoms among nursing students preparing theses indicated that most symptoms fell within the mild stress category across physical, mental, and behavioral domains. In the physical domain, fatigue was the most prominent symptom, reaching the severe stress category (M = 3.28, SD = 0.839), while other symptoms—including chest pain, palpitations, epigastric pain, reduced appetite, muscle pain, and headaches—remained mild (M = 1.88–2.57). In the mental domain, symptoms such as forgetfulness, anxiety, difficulty concentrating, and frequent worry were moderate (M = 2.62–2.82), whereas decision-making difficulties and lack of motivation were mild (M = 2.31–2.32). For the behavioral domain, most participants reported mild stress in irritability and social withdrawal (M = 1.83–2.32), while procrastination and excessive sleep were moderate (M = 2.69–2.71). The overall mean scores for physical, mental, and behavioral stress symptoms were 2.40 (SD = 0.618), 2.58 (SD = 0.711), and 2.39 (SD = 0.650), respectively, indicating that the general stress level among participants was mild, with specific symptoms—particularly fatigue and cognitive or behavioral challenges—being more pronounced.

The analysis of stress symptoms among participants revealed that, overall, nursing students experienced mild stress across physical, mental, and behavioral domains. Within physical symptoms, fatigue was the most pronounced, with a mean score of 3.28 (SD = 0.839), falling into the severe stress category, whereas other symptoms such as chest pain, palpitations, epigastric pain, reduced appetite, muscle pain, and headaches were reported at mild levels (M = 1.88–2.57). Mental symptoms followed a similar pattern: forgetfulness, anxiety, difficulty concentrating, and frequent worry were reported at moderate levels (M = 2.62–2.82), while difficulty making decisions and lack of motivation remained in the mild stress range (M = 2.31–2.32). Behavioral symptoms were generally mild, including irritability and social withdrawal (M = 1.83–2.32), although procrastination and excessive sleep reached moderate

stress levels ($M = 2.69\text{--}2.71$). These findings suggest that while most nursing students experience only mild stress, specific symptoms—particularly fatigue, certain cognitive difficulties, and maladaptive behaviors—are more pronounced and may warrant targeted interventions to prevent escalation.

Research by Rimania et al. (2023) reported that final-year students experienced stress with a mean score of 72.69 ($SD = 7.533$). Similarly, Indarwati (2018) found that most final-year students experienced mild stress while preparing their theses. Specifically, mild physical stress symptoms were observed in 48 students (88.9%), severe in six students (11.1%); mild psychological symptoms in 46 students (85.2%), severe in eight students (14.8%); and mild behavioral symptoms in 50 students (92.6%), severe in four students (7.4%). Overall, the majority of students (88.9%) experienced light stress, indicating that thesis preparation predominantly induces mild stress levels. Stress in students is often linked to difficulties in fulfilling academic obligations, such as delays in thesis completion, and is influenced by external pressures associated with research tasks (Gamayanti et al., 2018). Thesis preparation can generate stress manifesting in physical, psychological, and behavioral symptoms, due to academic demands and workload.

The current study supports these findings, showing that most level IV nursing students—who primarily focus on data collection, drawing conclusions, and making recommendations—experience mild stress. Out of 17 stress indicators, 10 fell within the mild category, confirming that mild stress is the predominant level among students compiling theses. Challenges such as selecting a title, writing the problem background, sourcing references, and analyzing data contribute to stress (Beautiful, 2022). While stress can have positive effects, such as enhancing motivation, work efficiency, and adaptation, excessive stress may lead to biological, psychological, and social problems (Nur & Mugi, 2021). In the present study, nursing students exhibited mild stress, characterized by fatigue and difficulty relaxing, which can be mitigated if the underlying stressors are addressed (Firmawati et al. (2023).

Moreover, based on Table 1, of the 93 nursing student participants, 74 students (79.6%) were classified as unlikely to experience migraines, while 19 students (20.4%) were classified as likely to experience migraines, indicating that the majority of nursing students are not at risk for migraines. These findings are consistent with Aulia (2022), who reported that among 142 students, 76 students (53.5%) did not experience migraines, whereas 66 students (46.5%) did.

According to the National Library of Medicine (2023), migraines are characterized by throbbing, unilateral headaches. Migraine attacks occur due to vasoconstriction of cerebral blood vessels, triggered by increased serotonin levels, which subsequently leads to vasodilation and pain (Savitri et al., 2019). In the absence of such vascular changes, individuals do not experience migraine symptoms.

The Migraine Screen Questionnaire (MS-Q) by Láinez et al. (2010) revealed that most nursing students did not report migraine symptoms. Specifically, the majority answered “no” to experiencing frequent headaches, headaches lasting more than four, and nausea associated with headaches.

Lastly, table 1 shows a $p\text{-value of } 0.001 \leq 0.05$, indicating a statistically significant relationship between stress and migraine occurrence. The correlation coefficient was $r = 0.578$, reflecting a moderate, positive association; as stress levels increased, the likelihood of experiencing migraines also increased.

Stress can impair an individual's ability to cope with daily demands, often manifesting as headaches or migraines. This study demonstrated that nursing students preparing theses experienced mild stress across physical, psychological, and behavioral domains, supporting Neuman's theory that individuals who can anticipate and manage stressors are less likely to develop adverse health outcomes, such as migraines (Lestari & Ramadhaniyati, 2018). These findings align with Setiawati et al. (2022), who also reported a significant relationship between stress and migraine ($p < 0.05$). However, while the present study identified a positive correlation, Setiawati et al., 2022 reported a negative correlation ($r = -0.746$), suggesting that higher stress was associated with lower migraine occurrence in their sample.

V. CONCLUSION

This study concludes that nursing students at Universitas Klabat preparing their theses predominantly experience mild stress, and the majority are unlikely to experience migraines. The findings also indicate a significant positive relationship between stress and migraine occurrence, with a moderate correlation coefficient. This suggests that as students' stress levels increase during thesis preparation, their likelihood of experiencing migraines also rises.

Thesis preparation exposes students to multiple stressors, manifesting in physical, psychological, and behavioral symptoms. These findings highlight the importance of maintaining both physical and mental health during this critical academic period.

A limitation of this study was the exclusion of one participant who declined to provide informed consent, which slightly reduced the sample size.

Based on the results, several recommendations are proposed. For students, it is essential to implement stress-management strategies to prevent stress escalation and reduce the risk of migraines. For educational institutions, particularly the Faculty of Nursing, promoting awareness of mental health and providing guidance or support programs may help students manage stress more effectively. Finally, future research is encouraged to explore additional factors contributing to stress among nursing students beyond thesis preparation, in order to develop more comprehensive interventions.

AUTHORS' CONTRIBUTIONS

Dinda worked on conceptualization, methodology, investigation, data analysis, and writing (original draft) for the research article, as well as the final manuscript. Nova Supervised and contributed to searching for some references, data analysis, and revision.

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