

Sleep Quality and Asthenopia Among Nursing Students

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ABSTRACT

Background: Asthenopia, or eye fatigue, is a condition caused by excessive strain on the eye muscles, particularly during prolonged near-vision activities such as reading or using digital devices. Poor sleep quality may contribute to visual fatigue by impairing physiological recovery and concentration. However, evidence regarding the relationship between sleep quality and asthenopia among nursing students remains inconsistent.

Objective: This study aimed to examine the relationship between sleep quality and the incidence of asthenopia among nursing students at the Denpasar Ministry of Health Polytechnic.

Methods: This study employed an analytical observational design with a cross-sectional approach. A total of 115 nursing students were recruited using a non-probability total sampling technique. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), while asthenopia was measured using the Visual Fatigue Index questionnaire. Data were analyzed using the chi-square test with a significance level of $p < 0.05$.

Results: The analysis revealed no statistically significant relationship between sleep quality and the incidence of asthenopia among nursing students ($p = 0.605$). This finding indicates that variations in sleep quality were not significantly associated with the occurrence of asthenopia in the study population.

Conclusion: There is no significant relationship between sleep quality and asthenopia among nursing students at the Denpasar Ministry of Health Polytechnic. These findings suggest that factors other than sleep quality may play a more dominant role in the development of asthenopia. Nevertheless, promoting good sleep quality remains important for maintaining overall health and well-being among nursing students.

Keywords: Sleep Quality; Asthenopia; Nursing Students; Eye Fatigue; Sleep Disorders

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INTRODUCTION

Sleep is a fundamental physiological process essential for maintaining physical health, cognitive performance, and psychosocial functioning. Adequate sleep plays a vital role in restoring energy, regulating metabolic processes, and supporting biopsychosocial adaptation (Aqmarina Sabila & Kartadinata, 2020). According to Henderson's theory of basic human needs, sleep and rest are core components required to maintain health and well-being (Ratnaningtyas & Fitriani, 2019). However, sleep requirements vary across the lifespan, and adolescents and young adults often experience insufficient or poor-quality sleep due to academic

demands, lifestyle factors, and increased engagement in social and digital activities (Milayanti, 2020).

Globally, poor sleep quality has become a growing public health concern among students and young adults. Inadequate sleep is associated with daytime sleepiness, impaired concentration, reduced academic performance, and physical fatigue. Prolonged sleep deprivation may also contribute to musculoskeletal complaints, visual discomfort, and reduced quality of life. One health problem that has received increasing attention in relation to sleep quality is asthenopia, commonly referred to as eye strain.

Asthenopia is a cluster of symptoms involving visual, ocular, and musculoskeletal discomfort,

including dry eyes, blurred vision, eye fatigue, headaches, and difficulty focusing. It is often associated with prolonged near-vision tasks, particularly the use of digital devices such as computers, tablets, and smartphones. This condition is also known as Computer Vision Syndrome (CVS) or Digital Eye Strain (DES) (Upiek Rachimah Rachim, 2023).

At the global level, the prevalence of asthenopia is reported to range from 40% to 90%, indicating a substantial public health burden (WHO, 2018). High prevalence rates among students have been reported in several countries, including China (53%), Egypt (86%), and Iran, where prevalence increased from 49.4% to 70.9% (Sawaya, 2020). In Indonesia, the prevalence of asthenopia was reported at 69.7% in 2018 (Fernanda & Amalia, 2018). Although national data after 2021 remain limited, regional studies have demonstrated alarmingly high prevalence, such as 83.7% among adolescents in West Jakarta (Wayan, 2022).

Poor sleep quality has been identified as a potential contributing factor to asthenopia. Irregular sleep patterns and insufficient rest may impair ocular muscle recovery, reduce tear film stability, and exacerbate visual fatigue. Although asthenopia can occur at any age, young adults and students are particularly vulnerable due to prolonged screen exposure combined with inadequate sleep (Pratama et al., 2021).

Several previous studies have examined sleep quality and visual complaints separately; however, research specifically exploring the relationship between sleep quality and asthenopia among nursing students remains limited, particularly in the Indonesian context. Nursing students represent a high-risk group due to intensive academic workloads,

clinical practice demands, and extensive use of digital learning platforms. To date, few studies have focused on this population within health education institutions, including the Denpasar Ministry of Health Polytechnic.

This study addresses the gap by examining the relationship between sleep quality and the incidence of asthenopia among nursing students in a health education setting. Therefore, this study aims to analyze the relationship between sleep quality and the incidence of asthenopia among nursing students at the Denpasar Ministry of Health Polytechnic in 2024.

METHODS

This study employed a quantitative research approach with an analytical observational design. A cross-sectional correlational method was used to examine the relationship between sleep quality as the independent variable and the incidence of asthenopia as the dependent variable. Data on exposure and outcome variables were collected simultaneously at a single point in time. The study population consisted of all nursing students enrolled at the Denpasar Ministry of Health Polytechnic, totaling 115 students. A non-probability sampling technique with a total sampling approach was applied, resulting in a sample size of 115 participants. Data were collected using structured questionnaires to assess sleep quality and asthenopia symptoms. The collected data were processed and analyzed using SPSS software. Univariate analysis was conducted to describe the characteristics of respondents and study variables, while bivariate analysis was performed to examine the relationship between sleep quality and asthenopia.

RESULTS

Characteristics of respondents in the study are as follows:

Table 1. Characteristics of Respondents (n = 115)

Category	N	%
Gender		
Male	10	8.7
Female	105	91.3
Age		
21 years	107	93.0
22 years	8	7.0
Health History		
No history of illness	104	87.8
History of illness	14	12.2
Eye Health History		
No	109	94.8
Yes	6	5.2
Sleep Environment		
Never disturbed	30	26.1
Infrequently disturbed	72	62.6
Often disturbed	13	11.3

A total of 115 nursing students from the Denpasar Ministry of Health Polytechnic

participated in this study. As shown in **Table 1**, the majority of respondents were female, accounting for 105 students (91.3%), while male students comprised 10 respondents (8.7%). Most respondents were 21 years old, with 107 students (93.0%), and the remaining respondents were aged 22–23 years (7.0%).

Regarding health history, most respondents reported no prior history of illness, totaling 104

students (87.8%), while 14 students (12.2%) reported having a history of illness. In terms of eye health history, the majority of respondents did not report eye problems or the use of corrective lenses, amounting to 109 students (94.8%), whereas only 6 students (5.2%) reported a history of eye health problems. These findings indicate that the study population was predominantly young, female, and generally healthy.

Table 2. Descriptive Distribution of Main Variables (n=115)

Category	N	%
Sleep Quality		
Good	9	7.8
Poor	106	92.2
Asthenopia		
Yes	95	82.6
No	20	17.4

The descriptive analysis of the main study variables is presented in **Table 2**. The results showed that most respondents had poor sleep quality, with 106 students (92.2%) classified in the poor sleep quality category, while only 9 students (7.8%) reported good sleep quality.

Furthermore, the incidence of asthenopia was found to be high among the respondents. A total of 95

students (82.6%) reported experiencing symptoms of asthenopia, whereas only 20 students (17.4%) did not report asthenopia symptoms. These findings suggest that poor sleep quality and asthenopia are common conditions among nursing students in this study setting.

Table 3. Association Between Sleep Quality and Asthenopia (n=115)

Sleep Quality	Asthenopia	No Asthenopia	Total	p-value
Good	8 (7%)	1 (0.9%)	9	
Poor	87 (75.7%)	19 (16.5%)	106	
Total	95 (82.6%)	20 (17.4%)	115	0.605

The relationship between sleep quality and the incidence of asthenopia is presented in **Table 3**. Among respondents with poor sleep quality, the majority experienced asthenopia, accounting for 87 students (75.7%), while 19 students (16.5%) with poor sleep quality did not experience asthenopia. In contrast, among respondents with good sleep quality, 8 students (7.0%) experienced asthenopia, and only 1 student (0.9%) did not report asthenopia.

Bivariate analysis using the Pearson chi-square test showed no statistically significant relationship between sleep quality and the incidence of asthenopia ($p = 0.605$). This result indicates that sleep quality was not significantly associated with asthenopia among nursing students in this study.

DISCUSSION

This study examined sleep quality, the incidence of asthenopia, and the relationship between the two variables among nursing students at the Denpasar Health Polytechnic. The findings indicate that the majority of students experienced poor sleep quality

and a high prevalence of asthenopia. However, statistical analysis revealed no significant association between sleep quality and the incidence of asthenopia.

Poor sleep quality among nursing students is a common finding in higher education settings, particularly among students with intensive academic demands. Nursing students are required to balance theoretical learning, clinical practice, and academic assignments, which may lead to irregular sleep schedules, increased fatigue, and psychological stress. These conditions can negatively affect overall well-being and cognitive functioning, including concentration and alertness during learning activities. Similar patterns of poor sleep quality among nursing students have been reported in previous studies, suggesting that inadequate sleep is a persistent issue in this population (Warta, 2023).

The high prevalence of asthenopia observed in this study reflects the growing burden of digital eye strain among students. Asthenopia is commonly associated with prolonged use of digital devices such

as smartphones, laptops, and computers, which are integral to academic activities. Extended screen time, improper viewing distance, poor lighting conditions, and limited rest breaks may contribute to visual fatigue and ocular discomfort. Previous studies have consistently shown that students who frequently engage in digital device use are at increased risk of developing asthenopia-related symptoms, including eye strain, blurred vision, dry eyes, and headaches (Fernanda & Amalia, 2018; Yunita et al., 2023).

Despite the high prevalence of both poor sleep quality and asthenopia, this study did not find a significant relationship between the two variables. This finding suggests that while poor sleep quality may contribute to general fatigue and reduced well-being, it may not directly influence the occurrence of asthenopia among nursing students. Asthenopia appears to be more strongly associated with visual and environmental factors, such as screen exposure duration, ergonomic conditions, and refractive status, rather than sleep quality alone. This result aligns with the notion that eye fatigue is a multifactorial condition influenced by a combination of behavioral, environmental, and visual factors.

The absence of a significant association underscores the importance of adopting a holistic approach to eye health among students. While improving sleep quality remains essential for physical and mental health, targeted strategies addressing digital device use, visual ergonomics, and rest breaks may be more effective in reducing the risk of asthenopia. Educational interventions that promote healthy screen habits and eye care practices may therefore play a crucial role in preventing visual discomfort among nursing students.

Implications

The findings suggest that interventions aimed at reducing asthenopia among nursing students should focus on ergonomic practices, responsible digital device use, and visual health education rather than solely on improving sleep quality. Academic institutions may consider incorporating eye health promotion and digital ergonomics into student health programs.

Limitations and Recommendations

This study used a cross-sectional design, which limits causal interpretation. Data were collected using self-reported questionnaires, which may be subject to response bias. Additionally, other factors influencing asthenopia, such as screen time duration, refractive errors, and lighting conditions, were not examined. Future studies are recommended to include additional visual and environmental variables and to use longitudinal or experimental designs. Educational institutions are encouraged to promote balanced screen use, regular eye rest, and ergonomic practices to support students' visual health and overall well-being.

CONCLUSIONS

This study concludes that there is no significant relationship between sleep quality and the incidence of asthenopia among nursing students at the Denpasar Ministry of Health Polytechnic. Although poor sleep quality and asthenopia were both prevalent, sleep quality did not appear to significantly influence the occurrence of asthenopia. These findings indicate that asthenopia among students is likely influenced by other dominant factors, particularly prolonged digital device use and visual ergonomics. Therefore, efforts to prevent asthenopia should adopt a comprehensive approach that addresses behavioral, environmental, and visual factors, rather than focusing solely on sleep quality.

Declaration of Interest

This research publication aims to provide new insight information on sleep quality with asthenopia incidence in students, so that readers can better understand how to get enough and quality sleep. and prevent asthenopia with the management and prevention of this condition through a more holistic and integrated approach.

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Authors' Contributions

All authors collaborate with each other in a series of research, article writing and also the improvement process.

Data Availability

All data utilized in this study, including raw data, analyzed datasets, and supporting documents, are available from the corresponding author upon reasonable request.

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