

Review Article



Sleep Quality and Nutritional Status Among Indonesian Children and Adolescents: A Systematic Review

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ABSTRACT

Background: Nutritional status is the result of an individual's nutrient intake and requirements. In Indonesia, issues related to children's nutritional status remain a major problem. The relationship between these two variables is mediated by two important hormones involved in appetite regulation: leptin and ghrelin. In a cohort study, results showed a relationship between leptin levels and sleep quality. Although global studies have demonstrated a relationship between these two variables, studies in Indonesia have yielded mixed results. Therefore, this systematic review aims to systematically synthesize the evidence regarding the relationship between sleep quality and nutritional status in children in Indonesia.

Method: This literature review was conducted in March 2026. The databases used for the literature review were Google Scholar, PubMed, ScienceDirect, and Garuda, with periode 2021-2026 publication year. The search strategy used the keywords: ("sleep quality") AND ("nutritional status") AND ("children") AND ("Indonesia"), including equivalent Indonesian terms. Article selection was conducted in accordance with the PRISMA guidelines.

Results: Eleven studies were included in the literature review. The sample size for each study ranged from 52 to 221 participants. Eight studies showed a significant association between sleep quality and nutritional status, while three studies showed no significant association.

Conclusion: The findings of this review confirm that sleep quality is not the sole factor determining nutritional status. Therefore, intervention efforts to improve the nutritional status of children and adolescents must be comprehensive, focusing not only on improving sleep quality but also on improving dietary habits, increasing physical activity, and regulating social media use.

Keywords: Sleep quality; Nutritional status; Children; Indonesia

INTRODUCTION

Nutritional status is the result of an individual's nutrient intake and requirements.^{1,2} For children, nutritional status plays a vital role as it is linked to cognitive development, health, and life expectancy.^{3,4} Nutritional status is classified into several categories: obese, overweight, normal, moderately underweight, severely underweight, stunting, and wasting.^{5,6} In Indonesia, issues related to children's nutritional status remain a major problem. In 2018, children with obesity or overweight accounted for approximately 20%⁷ and wasting at 7.2%.⁸ As for the prevalence of stunting, it was reported to be 21.5% in 2023. This occurs in the population aged 5 years and younger.⁹

Of course, children's nutritional status is influenced by many factors. One factor associated with nutritional status is sleep quality.¹⁰ The relationship between these two variables is mediated by two important hormones involved in appetite regulation: leptin and ghrelin. Leptin is a hormone that signals satiety, while ghrelin is a hormone that triggers hunger.¹¹ In a cohort study, results showed a relationship between leptin levels and sleep quality.¹² Furthermore, a meta-analysis indicated a relationship between ghrelin levels and sleep quality.¹³ This mechanism subsequently influences an individual's eating behavior, which in turn impacts their nutritional status.¹¹

Although global studies have demonstrated a relationship between these two variables, studies in Indonesia have yielded mixed results. A study by Zahwa et al. (2026) found no significant association between sleep quality and nutritional status.¹⁴ However, a study by Simpatik et al. (2023) revealed a significant association between the two variables.¹⁵ These differing results may be attributed, in part, to variations in sample characteristics. The wide range of findings on the relationship between these two variables across studies conducted in Indonesia underscores the need for a comprehensive synthesis of the evidence. Therefore, this systematic review aims to synthesize evidence on the relationship between sleep quality and nutritional status among children in Indonesia.

METHOD

This study is a systematic literature review that identifies and analyzes research on the relationship between sleep quality and nutritional status in children. The article search was conducted using the PIO (Population, Intervention/Exposure, Outcome) framework, specifically: Population—children aged 0–19 years; Intervention/Exposure—poor sleep quality; and Outcome—nutritional status (BMI-for-age or growth and development). The literature search was conducted on 1 March 2026 using four databases—Google Scholar, PubMed, ScienceDirect, and Garuda (Table 1)—covering the time period 2021–2026. The search process used a combination of predetermined keywords and Boolean operators (AND, OR). The search was not limited to a specific publication timeframe to obtain more comprehensive evidence. Searches were performed within the title, abstract, and keyword fields whenever available.

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies. Two reviewers independently assessed each

article. Without a risk-of-bias assessment, the quality of the evidence cannot be determined.

Table 1. Database and Keywords Used

Database	Keyword
Google Scholar	"sleep quality" AND "nutritional status" AND "children" AND "indonesia"
Pubmed	("sleep quality" OR "kualitas tidur") AND ("nutritional status" OR "status gizi") AND ("children" OR "anak" OR "adolescents" OR "remaja") AND ("Indonesia")
Science direct	("sleep quality" OR "kualitas tidur") AND ("nutritional status" OR "status gizi") AND ("children" OR "anak" OR "adolescents" OR "remaja") AND ("Indonesia")
Garuda	"kualitas tidur" DAN "status gizi" DAN "anak"

The inclusion criteria for this study were full-text articles examining the relationship between sleep quality and nutritional status in children aged 0–19 years; original articles with quantitative research designs such as cross-sectional, case-control, or cohort studies; and articles written in Indonesian or English. Meanwhile, exclusion criteria included grey literature, conference abstracts, letters to the editor, review articles, articles not fully accessible, articles with reversed variable direction (nutritional status as the independent variable and sleep quality as the dependent variable), and articles using non-anthropometric nutritional status as the sole dependent variable.

The article selection process was conducted in stages and reported using the PRISMA diagram (Figure 1). From the total number of articles identified in the initial search phase, a screening process was conducted based on titles and abstracts and compliance with the inclusion and exclusion criteria, resulting in 11 articles that met the criteria for analysis in this study.

RESULTS

Table 2 summarizes the characteristics of the 11 studies included in this review. All studies employed a cross-sectional design and were conducted in Indonesia between 2022 and 2026. Sample sizes ranged from 52 to 221 participants, involving children and adolescents aged 10–18 years from elementary, junior high, senior high, and vocational schools across several provinces. Statistical analyses primarily used Chi-square tests, while Fisher's Exact, Pearson, and Spearman rank correlation tests were applied in several studies depending on the data characteristics. Of the included studies, four reported a statistically significant association between sleep quality and nutritional status (BMI) ($p < 0.05$), whereas seven studies found no significant relationship ($p > 0.05$). These findings indicate inconsistent evidence regarding the association between sleep quality and nutritional status among Indonesian school-aged children and adolescents, suggesting that contextual factors and methodological differences may contribute to the observed heterogeneity.

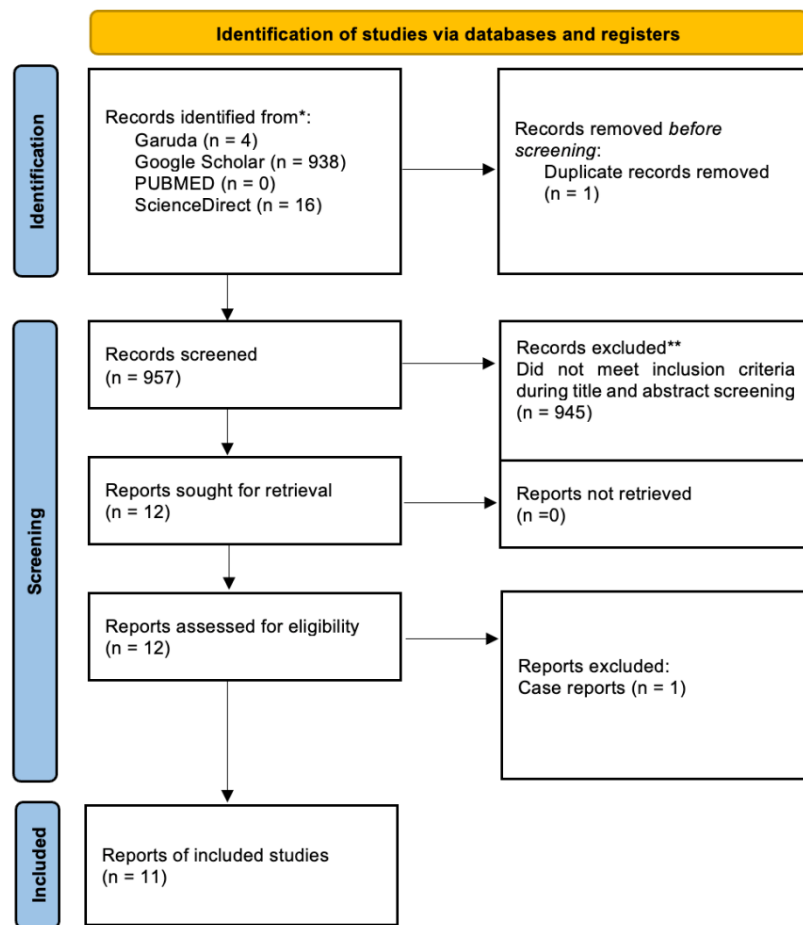


Figure 1. PRISMA Flowchart

Table 2. Characteristics of study

No	Study, (year)	Metodhs	Analysis	Total (n)	Age	Location	Results
1	Zahwa et al, (2026) ¹⁴	CS	Chi-square	52	15–18 years old	State Vocational High School 39 Jakarta, Jakarta Special Capital Region	p = 0,587 There is no association between sleep quality and nutritional status (BMI)
2	Putri et al. (2026) ¹⁶	CS	Fisher	82	10–12 years old	Gamping Subdistrict	p = 0,237 There is no association between sleep quality and nutritional status
3	Kewo et al, (2025) ¹⁷	CS	Chi-square	88	14–17 years old	Tondano State High School 2, Minahasa Regency	p = 0,023 There is a relationship between sleep quality and nutritional status

No	Study, (year)	Metodhs	Analysis	Total (n)	Age	Location	Results
4	Kasenda et al, (2025) ¹⁸	CS	Fisher's Exact	91	14–16 years old	Guru Lombok State High School 1 Kalawat, North Minahasa Regency	p = 0,612 There is no association between sleep quality and nutritional status
5	Saleh et al. (2025) ¹⁹	CS	Chi-square	221	15–16 years old	Kupang State Vocational High School 3, NTT	p = 0,937 There is no association between sleep quality and nutritional status
6	Selviana et al. (2025) ²⁰	CS	Pearson	106	11–15 years old	State Junior High School 18 Surakarta, Central Java	p = 0,420 There is no association between sleep quality and BMI for age
7	Dewi, Aprianti (2024) ²¹	CS	Rank Spearman	91	16–18 years old	State Senior High School 2 Martapura, Banjar Regency	p = 0,086 There is no association between sleep quality and nutritional status
8	Wikanti et al, (2024) ²²	CS	Chi-square	184	16–17 years old	State Senior High School 32 South Jakarta, Jakarta Special Capital Region	p = 0,441; OR = 0,725 There is no association between sleep quality and adolescents' BMI
9	Simpatik et al, (2023) ¹⁵	CS	Chi-square	93	15–17 years old	As-Syafi'iyah Islamic High School 02 Jatiwaringin, Bekasi City	p = 0,034; OR = 4,667 There is a relationship between sleep quality and nutritional status
10	Tsaniya et al. (2022) ²³	CS	Spearman Rank	70	~10–12 years old	Public Elementary School 01 & Public Elementary School 02 Kaligarang, Jepara, Central Java	p = 0,000 There is a relationship between sleep quality and nutritional status
11	Anggita et al. (2023) ²⁴	CS	Spearman	55	13–15 years old	Al-Mukhsin Islamic Junior High School	p = 0,143 There is no association between sleep quality and nutritional status

CS, Cross-sectional

Several key patterns emerge when synthesizing the data based on demographic and methodological characteristics. Participants across all included studies were adolescents, primarily aged 10 to 18 years. Geographically, the research spanned various regions in Indonesia, including urban and semi-urban areas such as Jakarta, Central Java, NTT, and Minahasa. Methodologically, sleep quality was primarily assessed subjectively via self-report measures, most notably the Pittsburgh Sleep Quality Index (PSQI). For nutritional status, Body Mass Index (BMI) or BMI-for-age served as the universal anthropometric measure across all studies.

Table 3. Risk of Bias Assessment

No	Study	Method	1	2	3	4	5	6	7	8	Total Score	Information
1.	Zahwa et al	CS	+	+	?	?	-	-	?	+	3.5	Moderate
2.	Putri et al	CS	+	+	+	+	?	-	+	+	6.5	Moderate
3.	Kewo et al	CS	+	+	+	+	?	-	+	+	6.5	Moderate
4.	Kasenda et al	CS	?	+	?	?	-	-	+	+	4.5	Moderate
5.	Saleh et al	CS	?	+	+	?	?	-	?	+	5.0	Moderate
6.	Selviana et al	CS	+	+	+	+	-	-	?	+	5.5	Moderate
7.	Dewi&Aprianti	CS	?	+	?	+	?	-	+	+	5.0	Moderate
8.	Wikanti et al	CS	+	+	?	?	-	-	?	+	4.5	Moderate
9.	Simpatik et al	CS	+	+	?	?	-	-	?	+	4.5	Moderate
10.	Tsaniya et al	CS	+	+	+	+	-	-	?	+	5.5	Moderate
11.	Anggita et al	CS	+	+	+	+	-	-	+	+	6.0	Low

CS, Cross-sectional

Risk of Bias Assessment of Included Studies

The methodological quality and risk of bias for the 11 included cross-sectional studies were evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist (Table 3). The assessment revealed that the majority of studies (10 of 11) fell into the Moderate risk-of-bias category, with total scores ranging from 3.5 to 6.5 out of 8. Only 1 study, Anggita et al. (2023), was classified as having a Low risk of bias with a score of 6.0.²⁴

Critically, across the specific domains, all 11 studies demonstrated robust and appropriate statistical analysis (Item 8). However, a universal methodological limitation was identified in Item 6: none of the studies adequately described or employed strategies to address confounding factors. Additionally, performance in clarifying inclusion criteria (Item 1) and ensuring the validity of exposure measurements (Item 3) varied considerably across the papers, which introduces a degree of uncertainty into the overall synthesis.

DISCUSSION

This literature review analyzed 11 studies to determine the relationship between sleep quality and nutritional status in children and adolescents in Indonesia. The findings indicate that the association is inconsistent; only 3 out of 11 studies reported a statistically significant relationship, whereas 8 out of 11 studies found no significant association.^{14–24}

The results of this review align with the broader multifactorial nature of nutritional status observed in existing literature. While some studies emphasize that poor sleep quality may contribute to abnormal nutritional status, particularly overweight or obesity,^{15,17,23} the majority of the reviewed evidence (8 studies) suggests that factors such as diet, physical activity, socioeconomic conditions, and family environment may exert a more dominant influence than sleep quality alone.^{18,21} Several studies indicated that adolescents with poor sleep quality can still maintain normal nutritional status if their dietary intake is balanced and meets the body's needs.²¹

Biologically, the relationship between sleep and nutritional status is governed by hormonal mechanisms. Poor sleep quality disrupts hormonal regulation by increasing ghrelin (which

stimulates appetite) and decreasing leptin (which signals fullness). This hormonal imbalance can alter diet behavior, leading to increased energy intake and subsequent weight gain.^{16,18} Additionally, behavioral pathways play a role: poor sleep often leads to fatigue, which reduces physical activity, further compounding the risk of an energy imbalance.¹⁵

Given the varied findings, it is evident that a complex interplay of variables drives nutritional status. Inconsistencies across studies are likely influenced by confounding factors such as dietary habits and physical activity levels,²³ socioeconomic status,¹⁸ and the high use of gadgets and social media, which disrupt sleep patterns and increase sedentary behavior.^{21,22} Therefore, intervention efforts to improve the nutritional status of children and adolescents must be comprehensive, focusing not only on sleep hygiene but also on dietary education, physical activity, and screen time regulation.

A primary strength of this review is its specific focus on the Indonesian adolescent population and its use of a standardized quality assessment tool (JBI) to evaluate the evidence. However, several limitations must be acknowledged. First, the statement that sleep quality is not the sole determinant of nutritional status must be interpreted with caution, as all included studies employed cross-sectional designs, which preclude causal inference and long-term impact assessment.²⁰ Furthermore, there is a lack of high-quality evaluation studies, and the reliance on subjective, self-reported sleep quality measurements (e.g., PSQI) introduces potential recall bias.¹⁹ Finally, substantial heterogeneity existed regarding age groups and measurement methods, precluding the possibility of conducting a meta-analysis.

CONCLUSION

The available evidence suggests that the relationship between sleep quality and nutritional status among Indonesian children and adolescents remains inconsistent. While several studies reported significant associations, most studies did not observe statistically significant relationships. Further longitudinal studies with rigorous methodological quality are needed to clarify this association.

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Declarations

Authors' contributions

UAH conceptualized the study and was responsible for screening. SAPA contributed to the writing of the introduction, abstract, and conclusion, as well as drafting the manuscript. FAF and WKH conducted data extraction and were responsible for the results section. HP contributed to data extraction. All authors reviewed and approved the final manuscript.

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Conflict of interest

There is no conflict of interest in this research.

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