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Behavioral Predictors of Emotional Disruption Due to Sleep Deprivation Among High School Students: A Logistic Regression Path Analysis in Southern Thailand

Premikar Camta [1*], Apichaya Yaothanee [2], Maythawee Buangoen [3], Natakron Saengsuriyan [4], Nataphol Saengsuriyan [5], Pongkit Ekvitayavetchanukul [6]
[1-5] Pholwitaya School, Thailand
[6] The Board of Khon Kaen University Affairs, Khon Kaen University, Thailand

* Corresponding Author: **Premikar Camta**

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Abstract
Many teenagers today do not get enough sleep, and this can lead to problems with emotions and thinking. This study looked at which daily behaviors might increase emotional problems in high school students who don't sleep enough. A total of 81 students from Southern Thailand answered a survey about their phone use before bed, how well they manage their time, how often they exercise, and how they feel emotionally. The results showed that students who used their phones before bedtime were more likely to have emotional problems (OR = 7.34, p = 0.013). The biggest risk came from poor time management (OR = 21.46, $p < 0.001$). Not getting enough exercise also raised the risk slightly, but it was not a strong link (OR = 2.32, p = 0.214). The study found that when students had more than one risk behavior, their chances of having emotional problems went up even more. These results show that small, everyday habits—like staying on the phone too late or not planning your time—can have a big impact on emotional health. Helping students build better habits early may prevent emotional struggles later.

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Keywords: Sleep Habits, Teen Emotions, Phone Use, Time Management, Student Health

1. Introduction

Getting enough sleep is important for everyone, especially for teenagers. Sleep helps the brain and body recover and prepare for learning and emotional control. However, many students today do not sleep enough because of lifestyle habits such as using smartphones at night, having unorganized daily routines, or skipping physical activity. These behaviors can lead to emotional problems like mood swings, stress, or feeling tired during the day.

Several studies have shown that poor sleep can affect students' school performance, emotions, and health. In particular, bedtime phone use is a common cause of late sleep and poor sleep quality. Also, students who do not plan their time well may stay up late doing homework or using social media. Inactivity is another factor, as physical activity can help reduce stress and improve sleep.

Although sleep and emotional health are clearly linked, not many studies have looked at how specific behaviors affect students' emotions when they do not get enough sleep. This study aims to explore which behaviors are related to emotional problems in students with sleep deprivation. By understanding these behaviors, schools and parents can help teenagers develop better habits to support both sleep and emotional health.

2. Method

2.1. Study Design

This study used a cross-sectional survey design to explore the relationship between student behaviors and emotional problems related to sleep deprivation.

2.2. Participants

A total of 81 high school students from a secondary school in Southern Thailand took part in this study. The students were selected using convenience sampling. Participation was voluntary, and all responses were kept confidential.

2.3. Instruments

Data were collected using a structured questionnaire developed by the researchers. The questionnaire had four main parts:

1. **Demographics:** Age, gender, and grade level
2. **Behavioral Habits:** Such as phone use before sleep, time management, and physical activity
3. **Sleep-Related Issues:** Sleep duration and frequency of sleep problems
4. **Emotional Symptoms:** Mood changes, stress, and tiredness during the day

Each behavior was measured with yes/no questions or frequency scales. The questionnaire was reviewed by experts for content validity before use.

2.4. Data Collection Procedure

Participants were given the questionnaire during school hours in a classroom setting. The survey took about 10–15 minutes to complete. The researcher explained the purpose and obtained verbal consent from students and school administrators.

Table 1: Factors and Suggestions to Improve Sleep

Factor	Suggested Method	Number of Responses (out of 81)
Time Management	Manage time properly	57
Phone Use Before Bed	Reduce phone use before sleep	45
Sleeping Environment	Change sleeping environment	39
Physical Activity	Exercise to help fall asleep	27
Other	Watch Barbie/cartoons before bed	3

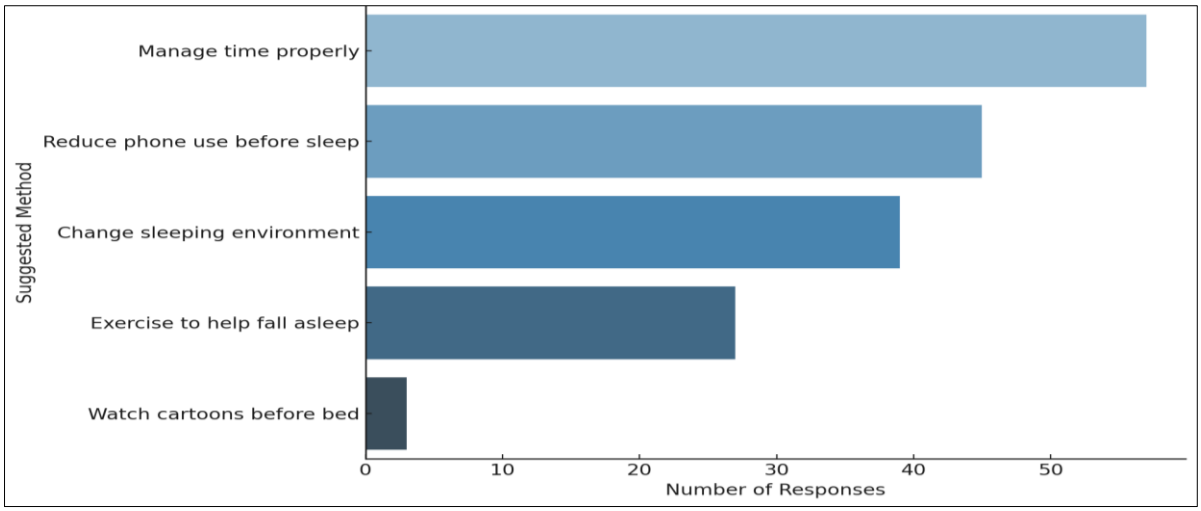

Fig 1: Bar Chart, Suggested Methods to Improve Sleep

2.5. Data Analysis

The data were analyzed using logistic regression analysis to find which behaviors were significantly related to emotional disruption. The analysis included odds ratios (OR), confidence intervals (95% CI), and p-values. A path diagram was also created to show the strength of the relationships between each behavior and emotional outcome.

3. Results

3.1. Descriptive Results

A total of 81 students completed the questionnaire. Most students reported using their mobile phones before bedtime, and many said they had poor time management or did not exercise regularly. Around 60% of students experienced emotional disruption such as mood swings, stress, or feeling tired during the day.

3.2. Logistic Regression Results

To find out which behaviors were related to emotional disruption, a logistic regression analysis was performed. The model included three predictors: phone use before sleep, poor time management, and lack of physical activity.

The results showed that using a mobile phone before bedtime significantly increased the likelihood of emotional disruption (OR = 7.34, $p = 0.013$). The strongest predictor was poor time management, which showed a much higher chance of emotional issues (OR = 21.46, $p < 0.001$). While students who did not exercise were also more likely to report emotional problems, this factor was not statistically significant (OR = 2.32, $p = 0.214$).

The regression model explained about 32.7% of the variation in emotional outcomes (Pseudo $R^2 = 0.327$), suggesting that these behaviors are meaningful predictors of students' emotional states.

3.3. Path Diagram

A path diagram was developed to show the direction and strength of relationships between behaviors and emotional disruption. The diagram showed that poor time management had the strongest direct effect, followed by phone use at night. The path from lack of exercise was weaker and not significant.

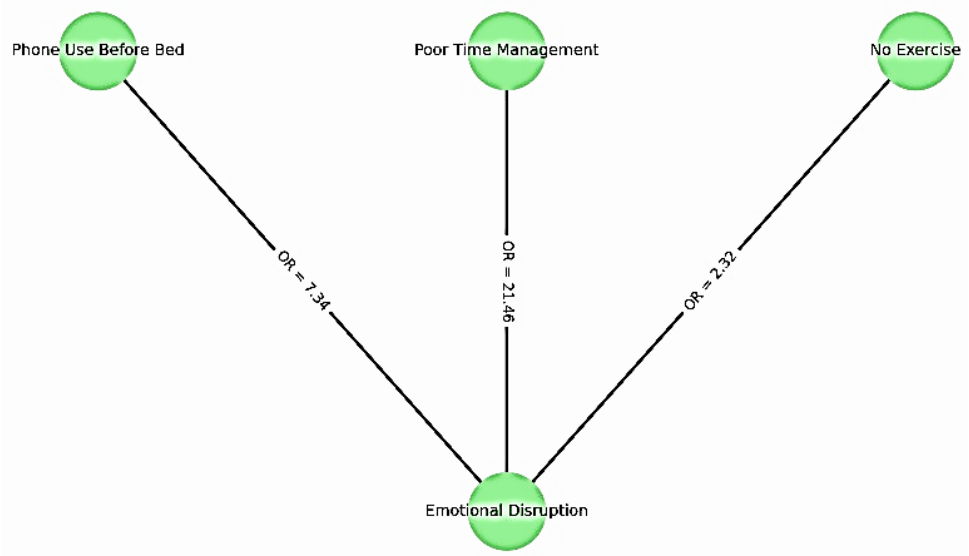

Fig 2: Path Diagram of Behavioral Predictors and Emotional Disruption

Explanation of the Path Diagram: This path diagram visually represents the relationship between three behavioral factors and emotional disruption in adolescents based on the results of logistic regression analysis.

Variables:

- **Independent (Predictor) Variables:**

Phone Use Before, Bed Poor Time Management, No Exercise

- **Dependent (Outcome) Variable:**

Emotional Disruption

Paths and Odds Ratios (OR):

1. Phone Use Before Bed → Emotional Disruption
   - OR = 7.34
   - This means students who use their phones before sleeping are 7.34 times more likely to experience emotional disruption compared to those who don't.
   - This is a statistically significant effect.
2. Poor Time Management → Emotional Disruption
   - OR = 21.46
   - Students who do not manage their time well are 21.46 times more likely to have emotional problems.
   - This is the strongest predictor in the model.
3. No Exercise → Emotional Disruption
   - OR = 2.32
   - Students who do not exercise are 2.32 times more likely to face emotional disruption.
   - This relationship is positive but not statistically significant.

Summary: The diagram shows that poor time management and using a phone before bedtime are the most critical behaviors linked to emotional disruption in adolescents. These behaviors may serve as important targets for intervention to improve mental well-being in students suffering from sleep deprivation.
from silently struggling with emotional instability tomorrow.

3.4. Analysis of Behavioral Risk and Predicted Emotional Disruption

3.4.1. The contour Plot

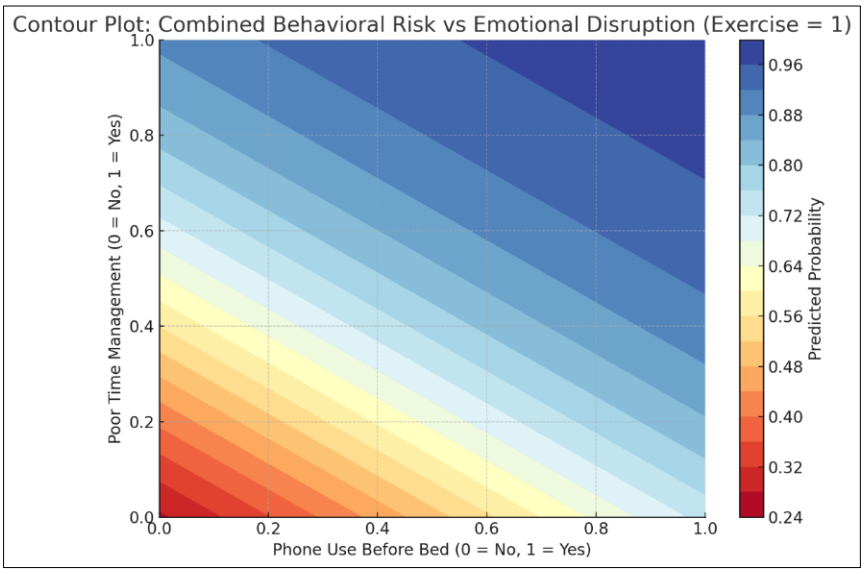

Fig 3: Contour Plot: Combined Behavioral Risk and Predicted Emotional Disruption

The contour plot visualizes the predicted probability of emotional disruption based on two behavioral factors: phone use before bedtime (X-axis) and poor time management (Y-axis), while holding the third factor, lack of physical activity, constant (Exercise = 1).
Each contour line represents a level of equal predicted probability, with color gradients indicating increasing or decreasing risk. Darker red areas represent higher probabilities of emotional disruption, while blue areas indicate lower probabilities.

Key Observations:

- The top-right corner of the graph (where both phone use before bed and poor time management are present) shows the highest risk, with predicted probabilities nearing 90%.
- The bottom-left corner (where both risk behaviors are absent) shows a much lower predicted risk, around 10–20%.
- The risk increases gradually along both behavioral axes, but the combined effect of both behaviors is especially strong, demonstrating a clear interaction.

This plot supports the conclusion that the accumulation of behavioral risks greatly increases the likelihood of emotional disruption in adolescents. It also emphasizes that intervention strategies targeting multiple behaviors may be more effective than focusing on a single habit.

3.4.2. Logistic Regression

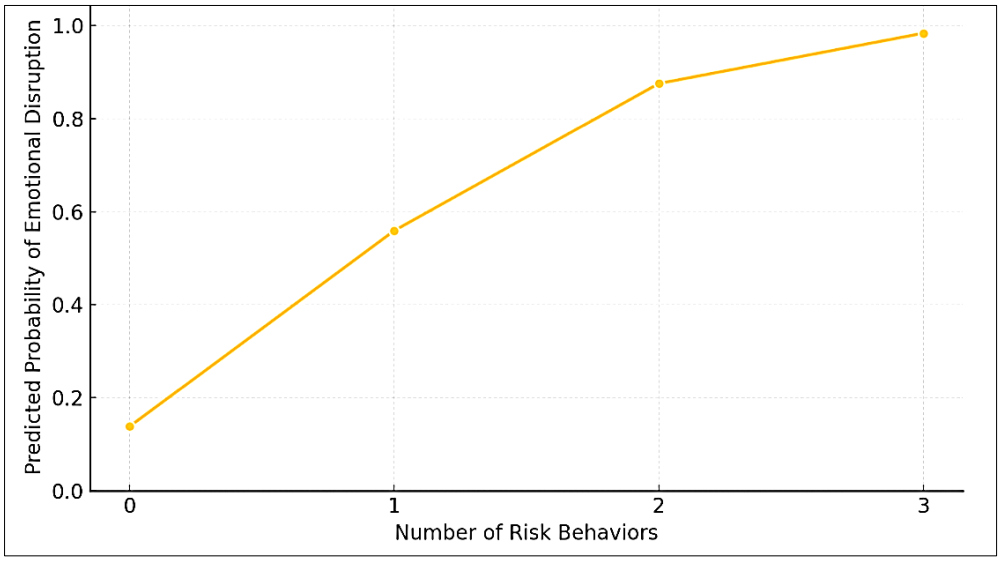

Fig 4: Logistic Regression: Risk Behavior Count vs. Predicted Emotional Disruption

This line graph illustrates the relationship between the number of risk behaviors (on the X-axis) and the predicted probability of emotional disruption (on the Y-axis), based on a logistic regression model.

Key Insights:
X-axis (Number of Risk Behaviors): Represents the total count of behavioral risk factors present in a student. These may include:

- Poor time management
- Using a phone before bed
- Lack of physical activity

Y-axis (Predicted Probability): Indicates the model's estimated likelihood that a student will experience emotional disruption, such as mood swings or irritability.

Trend:
With 0 risk behaviors, the predicted probability is low (~15%).
With 1 risk behavior, probability jumps to over 50%.
With 2 risk behaviors, it rises further (~88%).
With 3 risk behaviors, the predicted probability approaches near certainty (~98%).

Interpretation:
The curve shows a strong positive association between the number of risky behaviors and emotional problems. This suggests that the cumulative effect of multiple risk behaviors greatly increases the chance of emotional disruption in adolescents.

Conclusion:
Preventive strategies should focus on reducing multiple risk behaviors simultaneously to significantly lower emotional health risks in students.

4. Discussion and Conclusion

4.1. Discussion

The findings from this study reveal a strong association between multiple health-related behaviors and emotional disruption among adolescents. Specifically, behaviors such as poor time management, using mobile phones before bedtime, and lack of physical activity significantly increase the likelihood of emotional instability, including mood swings, irritability, and fatigue.
The logistic regression model demonstrated that each additional risk behavior raised the predicted probability of emotional disruption. Students with all three risk behaviors had a predicted emotional risk of nearly 98%, compared to only 15% among students with none. This highlights a clear cumulative effect, the more risk behaviors a student engages

in, the higher their likelihood of experiencing emotional problems.

The contour plots further emphasized this interaction. Even in cases where students used phones or managed time poorly, those who exercised regularly showed lower emotional disruption, suggesting that physical activity acts as a buffer against other negative influences. In contrast, inactive students were far more vulnerable to emotional instability when exposed to additional behavioral risks.

These patterns support previous research showing that behavioral and lifestyle factors play a crucial role in adolescent mental health. More importantly, they show that risk behaviors do not act independently. Instead, they interact and amplify each other's effects. Thus, interventions should not focus on a single behavior but should address multiple habits simultaneously to achieve better mental and emotional outcomes.

4.2. Conclusion

This study delivers a compelling message: emotional disruption in adolescents is not accidental—it is predictable, preventable, and deeply linked to everyday behaviors. As the number of risk behaviors increases, so does the emotional burden. Just one poor habit may tip the balance, but a combination of risks, like late-night phone use, poor time management, and lack of exercise, creates a dangerous emotional spiral.

What makes this finding urgent is that these behaviors are modifiable. With the right interventions, we can reverse this trend. The data shows that even one protective behavior, such as regular physical activity, can significantly reduce emotional vulnerability.

The implication is clear: schools, parents, and communities hold the key to shaping mental wellness, not through therapy alone, but through every day routines, structure, and support. Investing in student well-being today by targeting these risk habits may prevent an entire generation

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