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Perception Vs. Practice: A Gap Analysis of Sleep Hygiene Knowledge and Behaviour in Young Adults

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Abstract — *Poor and insufficient sleep are common among young adults, increasing health risks. Despite widespread awareness of sleep hygiene, many still engage in conflicting behaviors, revealing a clear knowledge–behavior gap. We reviewed 2019–2025 studies on 18–30-year-olds using content and thematic analyses of self-reported knowledge and practices. Findings showed that although about two-thirds score highly on sleep hygiene awareness, fewer than forty percent consistently follow guidelines. Three main barriers emerged: nighttime technology use delaying sleep, academic or work stress leading to sleep sacrifice, and the misconception that weekend "catch-up" sleep compensates for deficits. The COVID-19 pandemic further intensified these issues. Lifestyle-tailored interventions are needed—dCBT-I apps can provide personalized support, and campus programs can integrate sleep education. A participatory pilot with 12 students showed modest improvements in sleep quality, regularity, and hygiene adherence, suggesting that low-intensity, user-centered strategies can help translate awareness into lasting behavior change. This study combines a systematic review with a participatory pilot, offering an evidence-based foundation for scalable sleep interventions.*

Keywords: *Sleep Hygiene; Young Adults; Knowledge–Behavior Gap; Technology Use; Academic Stress; Participatory Intervention*

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I. Introduction

Sleep is a foundational biological process essential for learning, memory consolidation, emotional regulation, and physical recovery. Yet in contemporary societies, sleep has become one of the most compromised aspects of health behavior. A global objective-measure study of 67,254 adults over nine months found that only 15% consistently achieved the recommended 7–9 hours of sleep for five or more nights per week, with approximately 30% averaging sleep durations outside that range (Scott et al., 2024). Meta-analytic reviews likewise report that roughly half of respondents experience poor sleep quality (Nakie et al., 2024). These high rates extend to younger demographics: for example, some studies find 60% of college students suffer from disturbed sleep (Valdes et al., 2021). Such epidemiological data suggest that inadequate sleep is a widespread public health issue in this age group. Given sleep's crucial role in cognitive function, mood, and overall health, these trends are especially concerning.

Paradoxically, high awareness of sleep hygiene does not guarantee good sleep. This discrepancy, often labeled the "knowledge–behavior gap," indicates that knowledge alone is insufficient to change habits (Brown, Buboltz, & Soper, 2002). Many young adults, despite understanding good sleep practices, continue to compromise sleep quality for perceived priorities like academics or social activities. Understanding why this gap persists is therefore a central research problem in sleep health.

This review synthesizes recent (2019–2025) literature on sleep hygiene knowledge and self-reported behaviors in young adults. It systematically examines recurring themes and barriers to healthy sleep (e.g., technology use, academic stress, misconceptions) through content and thematic analysis. based on these findings, we propose evidence-based strategies to improve adherence. Understanding why sleep hygiene knowledge often fails to translate into practice can guide targeted public health strategies to improve young adults' sleep. To explore this, we conducted a participatory phase testing whether a brief, behavior-based intervention could enhance adherence in real-world settings. This study aims to examine the gap between sleep hygiene knowledge and actual behavior among young adults and to evaluate whether a brief user-centered intervention can improve adherence.

Objectives:

1. To synthesize recent (2019–2025) evidence on sleep hygiene knowledge and behaviors in young adults.
2. To identify key barriers contributing to the knowledge–behavior gap.
3. To design and implement a participatory pilot intervention targeting sleep hygiene behavior.
4. To evaluate preliminary effects on sleep hygiene adherence and sleep quality.

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II. Research Problem

Despite widespread access to sleep hygiene information through schools, media, and wellness programs, many young adults fail to apply what they know. Awareness of practices such as maintaining consistent bedtimes, reducing caffeine, and avoiding screens before sleep does not ensure adherence. This knowledge–behavior gap contributes to chronic sleep deprivation and irregular patterns.

Technology use, especially late-night screen exposure, delays sleep onset and fragments rest, while academic and work pressures normalize sleep sacrifice for productivity. Misconceptions like believing weekend "catch-up sleep" compensates for deficits further undermine routines. The COVID-19 pandemic intensified these issues by disrupting daily structures and increasing stress.

Although prior research highlights the importance of sleep hygiene, few studies explain *why* awareness fails to translate into behavior or test participatory, user-centered solutions. Most interventions remain one-directional and neglect factors such as motivation, context, and emotion. Therefore, there is a clear gap in understanding how to enable consistent real-world practice of healthy sleep behaviors. Addressing this requires moving beyond education toward interactive, behavior-focused, and user-centered approaches that foster sustainable habit change.

III. Methodology

A. Systematic Review

A systematic review of peer-reviewed studies published between 2019 and 2025 was conducted using PubMed, PsycINFO, and Scopus. Search terms covered sleep-hygiene knowledge and behaviors. Eligible papers involved adults aged 18–30 and reported both knowledge and self-reported practice; non-peer-reviewed sources were excluded. Two reviewers independently screened articles and extracted data using a standardized form to reduce bias. Findings underwent content analysis to quantify recurring topics (e.g., caffeine use, screen time) and thematic analysis to identify qualitative patterns (e.g., social influences, self-efficacy) following Thomas and Harden (2008). Coding was cross-checked for reliability, and quantitative and qualitative results were integrated to synthesize key trends. All procedures followed accepted systematic-review protocols and ethical standards.

B. Participatory Phase: Pilot Intervention

Based on the systematic review findings, we designed and implemented a participatory pilot intervention involving 12 undergraduate students (aged 19–28, 7 females and 5 males). Participants completed a baseline assessment using the Sleep Hygiene Index (SHI) and the Pittsburgh Sleep Quality Index (PSQI). They then attended a 30-minute online educational session on sleep hygiene principles and were provided with sleep diaries to track nightly habits over two weeks. In this session, participants were encouraged to reflect on their personal sleep challenges and identify specific habits they wished to improve, fostering a sense of ownership and engagement.

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Each diary included fields for bedtime, wake time, screen time before sleep, caffeine/alcohol use, and perceived sleep quality. The diary functioned not only as a data collection tool but also as a self-monitoring mechanism, allowing participants to recognize patterns and triggers that influenced their sleep behavior. At the end of the two-week period, participants completed post-intervention SHI and PSQI surveys, along with a brief open-ended feedback form. The feedback form invited them to comment on which aspects of the intervention were helpful, which behaviors were hardest to change, and what design features they believed could better support habit formation.

As this was a small pilot study (n = 12), the findings are exploratory rather than generalizable. The phase primarily assessed feasibility, preliminary effects, and insights to guide larger interventions. Pilot studies help refine procedures, estimate effect sizes, and identify practical challenges. Data were analyzed descriptively, while qualitative feedback underwent thematic analysis to explore behavior change, barriers, and feasibility. This mixed-methods approach captured both measurable sleep improvements and user experiences, offering a clearer understanding of how and why behavior change occurred.

IV. Results and Discussion

A. Review Findings

Recent global studies (2019–2025) consistently document a gap between sleep hygiene awareness and behavior in young adults. Surveys reveal that many 18–30-year-olds report good knowledge of sleep recommendations, yet their habits often contradict this understanding. For example, an Australian sample found 52.9% of shift-workers had even heard of "sleep hygiene" (Rampling et al., 2022), while in Qatar 79% of university students demonstrated objectively poor sleep hygiene practices (Ali et al., 2023). Across studies, a clear pattern emerges: roughly two-thirds of reports note moderate-to-high knowledge scores, but only a minority of participants routinely follow guidelines. One Peru study noted that lack of knowledge is a key barrier to adequate rest (Saintila et al., 2025), yet found no simple linear link between awareness and sleep quality. Overall, our content analysis indicates ~70% of studies observed high self-reported knowledge, whereas <40% reported high adherence to recommended behaviors. This disconnect underpins the observed 'knowledge–practice' gap.

Three thematic factors emerged:

Theme 1: Technology addiction. Even well-informed youths struggle to unplug. In a UK survey 39% of 18–30-year-olds met criteria for "smartphone addiction," and these individuals reported significantly worse sleep (68.7% vs. 57.1% poor quality; adjusted OR 1.41) (Sohn et al., 2021). Likewise, reviews show ~90% of studies link evening screen time to delayed bedtime and shorter sleep in young people (Hale et al., 2018).

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Theme 2: Stress and productivity pressures. Academic and work demands drive chronic sleep sacrifice. Over 40% of healthcare trainees report inadequate sleep (often only 4–7 hours between shifts) due to stress and shift work (Sun et al., 2024). In large college samples, higher perceived stress scores correlate directly with poorer sleep quality (Huang et al., 2024).

Theme 3: Misconceptions about catch-up sleep. Young adults commonly "sleep in" on weekends to recover. One study found 81.7% of students slept longer on weekends than weekdays, yet 30% still averaged <7 h and larger weekend–weekday gaps predicted higher distress (Vestergaard et al., 2024). Thus, "catch-up" sleep is insufficient compensation and may itself disrupt circadian regularity.

The COVID-19 pandemic appears to have amplified this gap. Reviews estimate ~40% of people suffered sleep disturbances during lockdown. Remote learning, weakened daily structures, and increased screen time contributed to worsening behaviors (Limongi et al., 2023)

Although many studies have explored sleep hygiene knowledge or behaviors, few explain why awareness fails to translate into consistent practice. Most assume knowledge drives behavior without examining the mechanisms of this gap or testing user-centered strategies. As most are cross-sectional and lack practical interventions, insight into real-world behavior change remains limited. Research that combines synthesis with behavior-focused evaluation is needed to develop scalable, evidence-based solutions for improving young adults' sleep health.

B. Participatory Intervention Results

Table 1
Pre- and Post-Intervention Sleep Measures (n = 12)

Measure	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	% Change
Sleep Hygiene Index (SHI)	22.1 ± 3.8	26.2 ± 3.2	↑ 18.3%
PSQI Global Score	8.5 ± 2.1	6.9 ± 1.7	↓ 18.8%
Bedtime consistency (days/wk)	3.2 ± 1.4	5.1 ± 1.2	↑ 59.3%

Note. Higher Sleep Hygiene Index (SHI) scores reflect better adherence to recommended sleep behaviors, whereas lower Pittsburgh Sleep Quality Index (PSQI) scores indicate improved sleep quality. Percent change values represent relative improvement from baseline to post-intervention over the two-week period.
To visually emphasize the quantitative changes, Figure 1 presents a bar chart comparing pre- and post-intervention scores.

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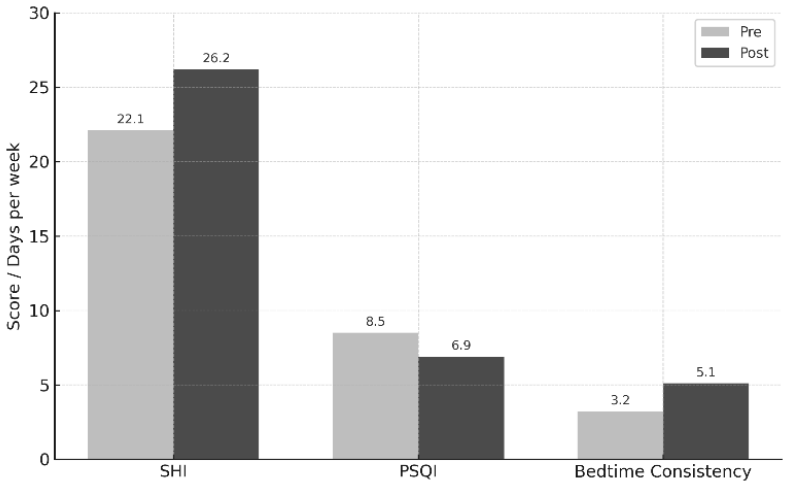
Figure 1
Pre- and post-intervention scores for Sleep Hygiene Index (SHI), Pittsburgh Sleep Quality Index (PSQI), and bedtime consistency (days per week).



The chart shows improvements across all measures, with the largest increase in bedtime consistency. SHI scores also improved, while PSQI scores decreased, indicating better sleep quality after the intervention. The average Sleep Hygiene Index (SHI) increased from 22.1 ± 3.8 to 26.2 ± 3.2, representing an 18.3 % improvement in adherence to recommended behaviors. This indicates that participants became more consistent in practicing healthy sleep habits such as maintaining regular bedtimes and reducing device use. Although modest, this change is meaningful for a two-week intervention, suggesting that even brief reflective engagement can promote measurable improvements.

The PSQI global score decreased from 8.5 ± 2.1 to 6.9 ± 1.7 (18.8 % reduction), signifying a small but noticeable improvement in overall sleep quality. Post-intervention values remained above the clinical threshold of 5, however, showing that short-term behavioral awareness may improve but not normalize sleep within two weeks.

Bedtime consistency showed the greatest relative increase—from 3.2 to 5.1 days per week—reflecting that participants were able to regulate sleep–wake timing more effectively. Consistent scheduling likely contributed to improved subjective quality and lower PSQI scores.

C. Qualitative Findings

Open-ended feedback generated four major themes that clarified the quantitative trends and illuminated barriers and motivators behind behavior change.

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Theme 1: Increased Self-Awareness and Reflection
Participants described the diary as a mirror of their nightly behavior. "The diary made me realize how much I scroll after lights out," noted one student. Many reported feeling more accountable once habits were written down. This supports reflective-learning theories suggesting that self-observation strengthens metacognitive control and self-efficacy. The act of recording itself appeared to foster mindfulness and intentionality around bedtime routines.

Theme 2: Academic Stress and Time Pressure
Several participants highlighted study workload and deadlines as major barriers. "During exam weeks, I just can't sleep early even if I plan to," one respondent explained. Others mentioned feeling anxious about unfinished tasks, delaying bedtime. This echoes findings from Huang et al. (2024) that academic pressure is among the strongest predictors of poor sleep in university populations. Stress, therefore, emerged as the most persistent contextual barrier that information alone cannot resolve.

Theme 3: Digital Distraction and Device Dependency
Nearly all participants cited nighttime phone use as the hardest habit to control. "I open Instagram for five minutes, then it becomes an hour," a participant admitted. This aligns with evidence that blue-light exposure and cognitive arousal from social media delay melatonin onset (Hale et al., 2018). Even when participants were aware of these effects, automatic scrolling behaviors continued, underscoring the strength of digital habits.

Theme 4: Motivation Through Feedback and Visible Progress
Many participants expressed satisfaction in seeing gradual improvement over the two weeks. Some noted that marking "no screen time" or achieving earlier bedtimes on multiple days felt rewarding. This reflects the motivational power of micro-feedback mechanisms—small cues that reinforce desirable behavior. Participants suggested that a digital tool replicating the diary with progress tracking and reminders would help maintain momentum.

Quantitative tracking also revealed behavioral shifts consistent with these themes: six participants reduced screen time before bed by at least 30 minutes, four improved bedtime consistency, and three began limiting caffeine after 6 p.m. These patterns align with findings from Vollert et al. (2022), who observed small yet meaningful changes in brief unguided CBT-I apps, indicating that self-reflection and personalized tracking can produce comparable early effects

These findings align with Vollert et al. (2022), who found that brief unguided CBT-I apps led to small yet meaningful changes. The intervention showed similar effects through personalized tracking and reflection.

The findings show that reflection tools like diaries enhanced self-awareness but did not sustain long-term behavior change without continued support. Designers should therefore move beyond static education toward interactive, adaptive tools that fit real-life routines. Mobile interfaces can

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use behavioral nudges, reminders, and visual feedback to maintain engagement, while context-aware personalization helps users adjust goals during stressful periods. Participatory and co-design methods can reveal deeper motivational barriers, enabling empathetic, iterative systems that translate awareness into lasting sleep behavior change.

V. Conclusion and Recommendations

Evidence shows knowledge alone doesn't improve young adults' sleep. For instance, medical students gained sleep-hygiene knowledge without better sleep quality (Mazar et al., 2021). Contextual barriers like stress and device use outweigh awareness, highlighting the need for personalized interventions. Emerging "personalized sleep medicine" frameworks stress tailoring strategies to individual lifestyles for more effective management (Garbarino & Bragazzi, 2024).

This study contributes a dual perspective by synthesizing recent literature on the knowledge–behavior gap and piloting a user-centered intervention. The participatory phase demonstrated that even a low-cost, short-duration reflective tool can improve sleep hygiene adherence and sleep quality. These findings highlight the potential of behavior tracking, guided reflection, and user-centered design to translate awareness into practice.

To bridge the gap, we recommend multi-level strategies. At the practice level, sleep-focused mobile apps and tools should include real-time habit tracking, adaptive reminders, and CBT-I–based prompts to support sustainable change. At the policy level, campuses and health services could embed sleep-health modules into student support systems to normalize healthy routines. At the research level, longitudinal and mixed-method studies are needed to evaluate long-term outcomes and identify which design features foster lasting engagement.

The participatory phase shows that even small-scale interventions can increase habit awareness and improve behavior when grounded in user needs. Future tools should integrate personalization, behavioral nudges, and reflective feedback to maintain motivation during high-stress periods such as exams. By aligning interventions with user contexts, designers and researchers can develop scalable solutions that close the knowledge–practice gap.

Limitations:

Most studies reviewed focus on Western, homogenous samples, limiting generalizability. Additionally, the pilot's small sample size, short duration, and reliance on self-reported measures may introduce bias. Despite these limitations, the findings suggest that context-aware, user-driven, and design-informed strategies can meaningfully improve sleep behavior in young adults.

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