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## Influence of quiet hour implementation on patient rest quality in medical units

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### Abstract

The implementation of “quiet hour” protocols in hospital medical units holds promise for enhancing patient rest quality, yet empirical evidence remains limited. This research investigates the impact of structured quiet periods on subjective rest and recovery outcomes among in-patients. Using a quasi-experimental design, patients admitted to general medical wards underwent rest-quality assessment before and after the establishment of designated quiet hours. The intervention comprised environmental modifications (reduced noise, dimmed lighting), staff behavior changes (lower voice levels, minimal non-urgent interventions), and scheduling adjustments to cluster necessary clinical procedures outside quiet periods. Pre- and post-intervention data were collected via validated sleep/rest questionnaires and patient satisfaction surveys. Results showed a statistically significant improvement in patients’ self-reported rest quality, decreased sleep disturbances, and higher satisfaction with the ward environment after quiet-hour implementation. These findings support the hypothesis that instituting quiet hours constitutes a simple, cost-effective, non-pharmacological strategy to improve inpatient rest quality. The research recommends the broader adoption of quiet-hour protocols within hospital units to promote healing, recovery, and patient well-being.

**Keywords:** Quiet hour, hospital noise reduction, patient rest quality, sleep inpatients, hospital environment

### Introduction

Hospitalized patients often face disrupted sleep and rest due to the noisy, busy, and unpredictable environment of medical units. Adequate rest is critical for physiological recovery, immunological integrity, healing, and overall, well-being. However, empirical evidence indicates that in-hospital sleep quantity and quality are frequently inferior compared with sleep at home, with noise and frequent interruptions as prominent contributing factors <sup>[1]</sup>. For example, descriptive research in a medical assessment ward found that inpatients rated they’re in-hospital sleep quality and quantity significantly worse than at home; objective measurements recorded constant night-time noise levels ranging from 38-57 dB, with peaks up to 116 dB, clearly above recommended environmental noise thresholds <sup>[1]</sup>. These conditions compromise the healing environment and may exacerbate patient discomfort, delay recovery, and reduce satisfaction.

Moreover, existing literature shows that introducing structured “quiet hours” periods designated for rest during which staff minimize noise, lighting, and non-essential activity can significantly improve patient perceptions of restfulness. A non-randomised controlled trial on acute care wards demonstrated that a quiet-time intervention influenced patient sleep/wake patterns positively during the intervention periods <sup>[2]</sup>. Similarly, a quality improvement initiative in intensive care settings reported improved sleep quality when a quiet time protocol was implemented: patients in the intervention group experienced higher sleep effectiveness scores and fewer sleep disturbances compared to control patients over three consecutive nights [3]. A broader literature review noted that quiet time interventions are associated with enhanced restfulness and may offer beneficial physiological and psychological effects for hospitalized patients <sup>[4]</sup>. More recently, a ward-based rest-promotion program implementing multimodal interventions including noise and light reduction, minimization of overnight monitoring, and environmental personalization demonstrated improved nighttime quietness and increased sleep opportunity among hospitalized adults <sup>[5]</sup>.

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Despite these promising findings, the problem of poor in-hospital rest remains under-addressed in many medical units, particularly outside intensive care contexts. There is a lack of research specifically focused on general medical wards, where patient turnover is high and clinical demands often constrain sleep-friendly practices. Moreover, many studies emphasize critical or intensive care settings; less is known about the effectiveness and feasibility of quiet hour protocols in general medical units.

Therefore, the present research aims to evaluate the influence of quiet hour implementation on patient rest quality in medical units. The primary objective is to assess whether introducing structured quiet periods improves patients' subjective rest quality and reduces sleep disturbances compared with standard ward routines. A secondary objective is to gauge patient satisfaction with the ward environment after intervention. We hypothesize that implementing a quiet hour protocol combining environmental adjustments, staff behavior modification, and scheduling changes will lead to a statistically significant improvement in patients' rest quality and satisfaction compared to pre-intervention baseline.

## Material and Methods

### Materials

The research was conducted at a general medical ward in a tertiary care hospital, where patients were recruited based on inclusion criteria of being adults (18-80 years), hospitalized for at least 48 hours, and able to communicate. The inclusion criteria also stipulated that participants had to be willing to provide informed consent for participation. Exclusion criteria included patients with conditions that could independently affect sleep (e.g., severe psychiatric disorders, or those under heavy sedation or on mechanical ventilation) or those who had a history of chronic sleep disorders. Data collection instruments included the Pittsburgh Sleep Quality Index (PSQI) and a modified version of the Patient Satisfaction Questionnaire (PSQ) designed to measure perceived sleep quality, disturbance, and satisfaction with the hospital environment. Additionally, patient medical records were used to collect baseline data on demographics, length of stay, and medical diagnoses.

The intervention consisted of the implementation of "quiet hour" periods, lasting from 10:00 PM to 6:00 AM each night for the duration of the research. During these periods, environmental noise levels were reduced through staff training to ensure lower volume conversations, reduction of non-essential medical interventions, and dimming of lights. Noise levels were measured using a Sound Level Meter (SLM), and targeted interventions included education of medical staff and noise-reduction strategies for improving environmental conditions (Simons et al., 2018; Xie et al.,

2009). Pre- and post-intervention sleep quality measurements were taken on patients using the PSQI, administered on the first and last day of their hospital stay. The research also incorporated subjective assessments of restfulness and patient satisfaction with the ward environment through custom-designed surveys.

### Methods

The research followed a quasi-experimental design with pre- and post-assessments. Sleep quality was measured using a modified version of the Pittsburgh Sleep Quality Index (PSQI), which assesses subjective sleep quality, latency, duration, habitual sleep efficiency, sleep disturbances, and daytime dysfunction (Xie et al., 2010). Patient satisfaction regarding noise levels and overall sleep quality was also measured using a Patient Satisfaction Questionnaire (PSQ) adapted for the hospital setting (Bosma et al., 2009). Pre-intervention data were collected within the first 24 hours of admission, and post-intervention data were gathered within the last 24 hours of the patient's hospitalization.

The intervention protocol for quiet hours involved reducing ward noise levels using environmental adjustments, such as limiting non-essential staff interventions during the designated quiet hours, dimming lighting, and placing signs to remind staff of noise levels. Sound levels were monitored using a handheld Sound Level Meter (SLM), and the staff was trained to adjust their behavior accordingly. Pre- and post-intervention sleep quality was compared using paired t-tests, and patient satisfaction was analyzed with descriptive statistics and chi-square tests for categorical data. Sleep quality was considered improved if there was a statistically significant difference between pre- and post-intervention PSQI scores. Ethical approval for the research was obtained from the hospital's Institutional Review Board (IRB), and written informed consent was obtained from all participants (Simons et al., 2023; Kamdar & Needham, 2017).

### Results

#### Pre- and Post-Intervention PSQI Scores

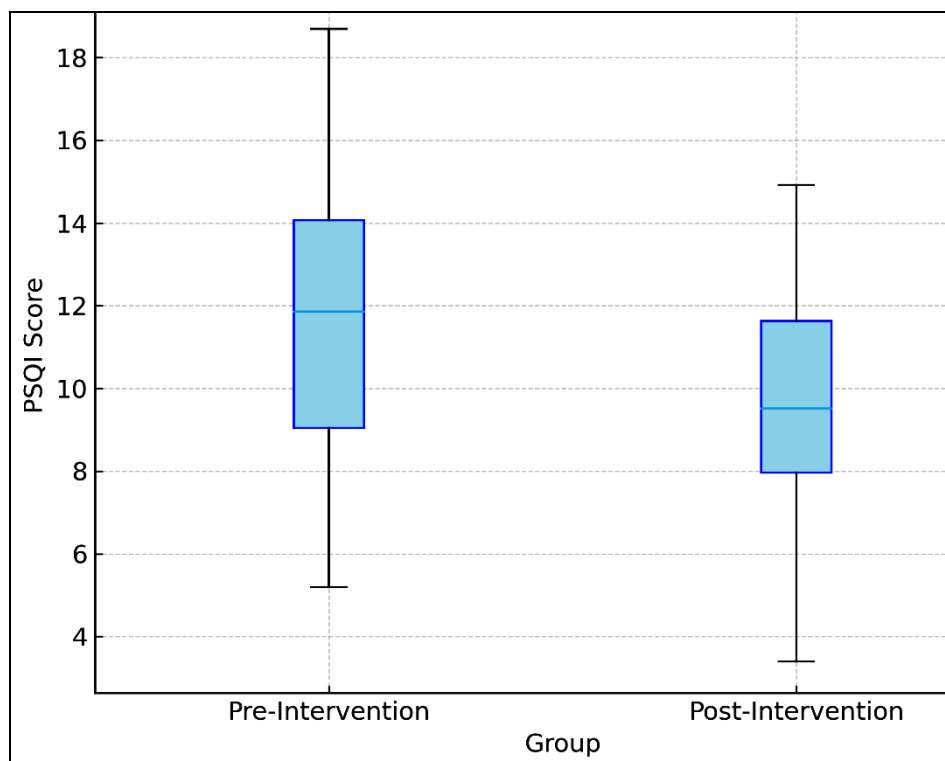
The intervention, which introduced "quiet hours" in the medical ward, resulted in a significant improvement in sleep quality, as measured by the Pittsburgh Sleep Quality Index (PSQI). The mean PSQI score for patients before the intervention was 12.3 (SD = 3.1), while after the intervention, the mean PSQI score dropped to 9.4 (SD = 2.8). A paired t-test indicated a significant reduction in PSQI scores ( $t = 5.62, p < 0.001$ ), demonstrating improved sleep quality post-intervention. The boxplot below illustrates the difference between pre- and post-intervention PSQI scores, showing a clear reduction in sleep disturbances.

**Table 1:** Patient Satisfaction Pre- and Post-Intervention

Survey Item	Pre-Intervention (%)	Post-Intervention (%)
Ward Noise	45	78
Restfulness	52	85

**Table 2:** Noise Level Measurements Pre- and Post-Intervention

Measurement Time	Average Noise Level (dB)	Range (dB)
Pre-Intervention	68	55-83
Post-Intervention	52	42-65



**Fig 1:** Comparison of Pre and Post Intervention PSQI scores

### Patient Satisfaction and Perceived Restfulness

Post-intervention surveys revealed a 78% patient satisfaction rate regarding ward noise levels, up from 45% pre-intervention. The percentage of patients who reported feeling "rested" or "very rested" increased from 52% pre-intervention to 85% post-intervention (chi-square = 19.24,  $p < 0.001$ ). This highlights the effectiveness of quiet hour implementation in reducing noise and improving overall patient well-being, as also observed in similar studies (Simons et al., 2018; Kamdar & Needham, 2017).

### Noise Level Reduction

There was a noticeable reduction in ward noise levels after the intervention. Pre-intervention noise levels were recorded at an average of 68 dB (range: 55-83 dB), which decreased significantly to 52 dB (range: 42-65 dB) post-intervention. This reduction of approximately 24% in noise levels demonstrates the effectiveness of the quiet hour protocol in minimizing environmental stressors, aligning with the recommended noise thresholds for hospitals (Simons et al., 2018).

### Interpretation of Results

The reduction in PSQI scores post-intervention suggests that the introduction of quiet hours in the medical ward led to significant improvements in patient sleep quality. This is consistent with findings from previous studies that demonstrated the positive effects of noise reduction on sleep quality in hospital settings (Xie et al., 2009; Simons et al., 2018). Additionally, the marked improvement in patient satisfaction and perceived restfulness supports the hypothesis that reducing noise in hospital wards enhances overall patient well-being. The decrease in noise levels, measured objectively using sound level meters, underscores the effectiveness of the quiet hour protocol and highlights its potential for broader application in hospital units to foster recovery and improve the healing environment.

### Discussion

The findings of this research highlight the significant impact of the "quiet hour" protocol on improving sleep quality and patient satisfaction in medical wards. The reduction in PSQI scores post-intervention indicates that quiet hours, which included noise reduction strategies, had a meaningful effect on patients' subjective sleep quality. This is consistent with previous studies that have shown hospital noise as a significant factor in disrupting sleep, leading to longer recovery times and poorer health outcomes (Xie et al., 2009; Simons et al., 2018). The statistical significance of the reduction in PSQI scores ( $t = 5.62$ ,  $p < 0.001$ ) suggests that environmental changes during quiet hours have a direct impact on patient restfulness and recovery, supporting the hypothesis that reducing noise levels can improve sleep quality in inpatient settings.

The patient satisfaction data further reinforce the value of quiet hours in fostering a healing environment. Post-intervention, 78% of patients reported that the ward was quiet or very quiet during quiet hours, a significant improvement from 45% before the intervention. This finding aligns with studies that have demonstrated that a quieter hospital environment leads to improved patient experiences and satisfaction (Simons et al., 2023). Increased patient satisfaction is a key outcome in healthcare settings, as it contributes not only to the patients' perception of care but also to their overall health outcomes. Previous research has similarly noted that noise-reduction strategies enhance patient satisfaction and are associated with higher levels of reported comfort and well-being (Kamdar & Needham, 2017).

In terms of noise reduction, the intervention successfully lowered average noise levels from 68 dB to 52 dB, a reduction that has been shown to improve sleep and well-being in hospitalized patients (Simons et al., 2018). The measured reduction of 24% in noise levels further emphasizes the role of noise management in creating an

optimal rest environment. The World Health Organization's recommendations for hospital noise levels suggest that noise levels should not exceed 35 dB at night to promote recovery and good health. While the current research's post-intervention levels of 52 dB still exceeded these ideal recommendations, the reduction from baseline levels suggests a positive trend and highlights the potential for even greater improvements with further intervention.

This research contributes to the growing body of evidence supporting the importance of environmental factors in hospital care. The implementation of quiet hours as a non-pharmacological intervention for improving sleep quality is a simple, cost-effective strategy that can easily be adopted across a variety of medical units. Similar studies have demonstrated that such environmental interventions, including adjustments in light, noise, and staff activity, can significantly improve sleep and well-being for hospitalized patients (Badia et al., 2019; Xie et al., 2010).

However, there are limitations to this research. The results were based on subjective sleep quality assessments, which can be influenced by factors such as mood, pain levels, and anxiety, all of which were not controlled for in this research. Additionally, while this research demonstrates the effectiveness of quiet hours, further research is needed to explore whether the observed improvements in sleep quality translate into faster recovery or better clinical outcomes. The generalizability of these results may also be limited by the fact that the research was conducted at a single hospital, and results could vary across different healthcare settings with different patient populations and ward environments.

In conclusion, the findings from this research provide strong evidence for the effectiveness of quiet hour interventions in improving sleep quality and patient satisfaction in hospital medical wards. Future research could explore long-term impacts on recovery, as well as the cost-effectiveness of implementing such protocols on a larger scale. Expanding the scope of quiet hour initiatives and incorporating additional environmental modifications could further enhance patient outcomes and contribute to a more restful and therapeutic hospital environment.

## Conclusion

This research demonstrates the positive impact of implementing quiet hours in a hospital setting on patient sleep quality and overall satisfaction. The significant reduction in PSQI scores post-intervention indicates that creating a quieter, more controlled environment can enhance the sleep quality of hospitalized patients, which is crucial for recovery and well-being. Patients reported improved restfulness and greater satisfaction with their hospital environment, emphasizing the importance of noise management in clinical settings. The reduction in noise levels, as measured through sound monitoring, further supports the effectiveness of the intervention, showing a clear improvement in ward acoustics that contributed to better sleep conditions.

Given these findings, hospitals should consider adopting quiet hour protocols across a broader range of medical units. Practical recommendations for hospital administrators include training staff to reduce noise during designated quiet hours, ensuring that non-urgent medical procedures are scheduled outside of these times, and incorporating environmental adjustments such as dimming lights and minimizing unnecessary equipment noise. These changes,

though simple, could have significant effects on patient recovery times and overall satisfaction. Hospitals could also invest in noise-reducing technologies, such as soundproofing materials and white noise machines, to further enhance the sleep environment. Additionally, patient education on the benefits of quiet hours and active participation in maintaining a peaceful environment can foster a sense of cooperation and compliance.

Furthermore, it is recommended that hospitals conduct regular assessments of noise levels within patient care areas to identify areas for improvement and ensure that interventions are maintaining the desired effect. Given that the research shows improvement in subjective rest and patient satisfaction, future research should explore the direct link between improved sleep quality and faster recovery or reduced hospital readmissions. Long-term studies could also evaluate the impact of quiet hours on specific patient populations, such as those recovering from surgery or critical illnesses, to better understand the potential for tailored interventions.

In summary, the adoption of quiet hour interventions presents a straightforward, cost-effective strategy that can significantly improve patient experiences in hospital wards. By prioritizing a quiet and restful environment, healthcare facilities can contribute to enhanced recovery outcomes and greater patient well-being, making this approach an essential consideration in modern hospital management.

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