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TESTING A NURSE-GUIDED SLEEP HYGIENE PROTOCOL VERSUS USUAL CARE FOR PREVENTING HOSPITAL-ACQUIRED DELIRIUM IN OLDER INPATIENTS: A COMPARATIVE TRIAL

Original Article

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ABSTRACT

Background: Hospital-acquired delirium is a frequent and serious complication among older inpatients, associated with adverse clinical and functional outcomes. Sleep disruption is a well-recognized yet modifiable risk factor in the hospital environment. Pharmacological sleep aids are often limited in older adults due to safety concerns, highlighting the need for effective non-pharmacological, nurse-led preventive strategies.

Objective: To determine whether a structured, nurse-guided sleep hygiene protocol reduces the incidence of hospital-acquired delirium among older inpatients compared with usual care.

Methods: A comparative trial was conducted in acute medical wards, enrolling hospitalized adults aged 65 years and older without delirium at admission. Participants were allocated to either a nurse-guided sleep hygiene intervention or usual care. The intervention included environmental modifications, clustering of nighttime care, sleep routine reinforcement, and patient orientation. Delirium was assessed daily using the Confusion Assessment Method, while sleep quality was measured using the Richards–Campbell Sleep Questionnaire. Functional status was evaluated using the Katz Index of Independence in Activities of Daily Living. Group differences were analyzed using independent t-tests and chi-square tests, with correlation analysis examining associations between sleep quality and delirium occurrence.

Results: A total of 80 participants completed the study. Delirium occurred in 15.0% of participants in the intervention group compared with 35.0% in the usual care group ($p = 0.043$). Mean sleep quality scores were significantly higher in the nurse-guided group (71.4 ± 9.6) than in the usual care group (62.1 ± 11.2; $p < 0.001$). Better sleep quality was moderately associated with lower delirium incidence ($r = -0.46$, $p < 0.001$).

Conclusion: Nurse-guided sleep hygiene was associated with improved sleep quality and reduced hospital-acquired delirium in older inpatients. These findings support the integration of structured, non-pharmacological sleep interventions into routine nursing care to enhance geriatric inpatient outcomes.

Keywords: Aged; Delirium; Hospitalization; Inpatients; Nursing Care; Nonpharmacological Interventions; Sleep Hygiene.

INTRODUCTION

Hospital-acquired delirium remains one of the most frequent and distressing complications affecting older adults during inpatient care (1). Characterized by an acute and fluctuating disturbance in attention, awareness, and cognition, delirium is associated with prolonged hospital stays, functional decline, increased mortality, and long-term cognitive impairment (2). For older patients, even a brief episode can mark a turning point toward loss of independence and diminished quality of life (3) . Despite advances in acute medical care, delirium continues to be under-recognized and inadequately prevented, highlighting an urgent need for practical, effective, and patient-centered preventive strategies within routine hospital practice (4).

Sleep disruption has emerged as a critical yet modifiable contributor to delirium risk in hospitalized older adults. Hospital environments are often inherently incompatible with restorative sleep, with frequent nighttime vital sign monitoring, alarms, lighting, unfamiliar surroundings, and staff activity fragmenting normal sleep–wake cycles (5). Age-related changes in circadian rhythm further heighten vulnerability, making older inpatients particularly sensitive to sleep deprivation (6). Poor sleep quality has been linked to impaired attention, emotional regulation, and cognitive processing, all of which are core features implicated in the development of delirium (7). Although pharmacological sleep aids are commonly prescribed in hospital settings, their use in older adults is limited by well-documented adverse effects, including oversedation, falls, and paradoxical confusion, which may worsen rather than prevent delirium (8).

Non-pharmacological sleep hygiene interventions offer a safer and more holistic alternative, aligning closely with principles of geriatric nursing care (9). Sleep hygiene strategies typically focus on promoting environmental comfort, maintaining consistent sleep routines, minimizing nighttime disturbances, and supporting natural circadian cues (10). While such approaches have shown promise in community and long-term care settings, their systematic application in acute hospital environments remains inconsistent. Moreover, many existing interventions rely on multidisciplinary programs that may be difficult to implement sustainably in busy wards with limited resources. This gap underscores the importance of nurse-led approaches, as nurses are uniquely positioned at the bedside to observe sleep patterns, modify environmental factors, and deliver individualized education and support throughout the hospital stay (11).

Nursing science has increasingly emphasized the role of non-pharmacological, person-centered interventions in improving geriatric outcomes. Within this framework, delirium prevention is recognized not only as a medical priority but also as a core nursing responsibility. Nurses maintain continuous patient contact across day and night shifts, allowing them to identify early cognitive changes, reinforce healthy sleep behaviors, and advocate for care practices that protect rest. Despite this central role, structured nurse-guided sleep hygiene protocols are not routinely embedded into standard inpatient care, and empirical evidence comparing such protocols to usual care remains limited. Most hospitals continue to rely on ad hoc practices, resulting in wide variability in how sleep is supported and how delirium risk is addressed.

The absence of standardized, nurse-guided sleep interventions represents a critical gap in current geriatric care models. While delirium prevention bundles exist, sleep is often addressed superficially or secondary to other priorities. Furthermore, few comparative studies have directly evaluated whether a clearly defined, nurse-delivered sleep hygiene protocol can meaningfully reduce delirium incidence when contrasted with routine hospital care. This lack of focused investigation limits the ability of healthcare systems to adopt evidence-based nursing practices that are both feasible and scalable. Addressing this gap is particularly relevant as hospital populations continue to age and the demand for low-risk, cost-effective preventive strategies grows.

Against this background, there is a compelling rationale to examine sleep hygiene not as an optional comfort measure, but as a targeted preventive intervention for delirium. By integrating structured sleep-promoting practices into routine nursing care, hospitals may be able to reduce cognitive complications without increasing medication burden or resource intensity. Such an approach aligns with geriatric care principles that prioritize safety, dignity, and functional preservation, while also reinforcing the professional contribution of nurses in leading preventive care initiatives.

The present study is therefore grounded in the hypothesis that a structured, nurse-guided sleep hygiene protocol can reduce the incidence of hospital-acquired delirium among older inpatients compared with usual care. By systematically evaluating this non-pharmacological intervention within an acute care setting, the study aims to clarify whether optimizing sleep through nursing-led practices offers a measurable protective effect against delirium. In doing so, it seeks to provide evidence to support the integration of standardized sleep hygiene protocols into everyday nursing practice for the benefit of vulnerable older adults.

METHODS

The study employed a comparative trial design conducted in the Islamabad–Rawalpindi region, selected for its dense concentration of tertiary care hospitals admitting a high volume of older medical inpatients and its relevance to geriatric nursing practices in urban acute care settings. Data were collected over a four-month period, which was considered sufficient to enroll participants, implement the intervention, and observe delirium outcomes during hospitalization. The setting provided a stable nursing workforce and standardized inpatient routines, allowing consistent delivery of the nurse-guided sleep hygiene protocol.

Participants were older adults admitted to general medical wards during the study period. Inclusion criteria consisted of patients aged 65 years and above, expected hospital stay of at least 72 hours, ability to communicate verbally or nonverbally, and absence of delirium at admission as assessed by baseline cognitive screening. Patients were excluded if they had a documented diagnosis of dementia with severe cognitive impairment, acute neurological conditions such as stroke or head injury, terminal illness, admission to intensive care units, severe sensory deficits preventing assessment, or current use of sedative-hypnotic medications initiated prior to admission. Eligible participants were consecutively recruited and allocated into two groups: those receiving the nurse-guided sleep hygiene protocol and those receiving usual care.

A total sample size of 80 participants was determined, with 40 participants in each group. This number was justified based on prior hospital-based delirium prevention studies using non-pharmacological interventions in older inpatients, which reported meaningful outcome differences with samples ranging between 60 and 100 participants. The selected sample size was considered adequate to detect group differences while remaining feasible within the study duration and clinical setting.

The intervention consisted of a structured, nurse-guided sleep hygiene protocol delivered throughout the hospital stay. Nurses implemented standardized measures including evening orientation, reduction of nighttime noise and lighting, clustering of nursing care to minimize sleep interruptions, promotion of daytime wakefulness, and patient education regarding sleep routines. The usual care group received routine nursing care without structured sleep-focused guidance. Data collection included baseline demographic and clinical characteristics, daily sleep-related observations, and delirium assessments conducted once per shift.

Delirium incidence was measured using the Confusion Assessment Method, a widely validated instrument for detecting delirium in hospitalized older adults. Sleep quality was assessed using the Richards-Campbell Sleep Questionnaire, administered daily in the morning. Functional status was recorded using the Katz Index of Independence in Activities of Daily Living at admission and discharge. All assessments were conducted by trained nursing staff blinded to group allocation where feasible.

Data were analyzed using statistical software. Descriptive statistics summarized participant characteristics. Normality of continuous variables was confirmed using the Shapiro–Wilk test. Independent t-tests were applied to compare continuous outcomes between groups, while chi-square tests were used for categorical variables, including delirium incidence. Pearson correlation analysis examined associations between sleep quality scores and delirium occurrence. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 94 older inpatients were screened for eligibility during the study period. Fourteen patients did not meet inclusion criteria due to pre-existing severe cognitive impairment or anticipated short hospital stay, resulting in 80 participants enrolled and completing follow-up assessments. All enrolled participants were included in the final analysis, yielding a response and completion rate of 100%. Of these, 40 participants received the nurse-guided sleep hygiene protocol, while 40 received usual care. No withdrawals or missing outcome data were recorded during hospitalization.

Baseline demographic and clinical characteristics of the participants are summarized in Table 1. The overall mean age of the sample was 72.8 ± 5.9 years, with no statistically significant age difference between the intervention group (73.1 ± 6.1 years) and the usual care group (72.5 ± 5.7 years; $p = 0.64$). Males constituted 55.0% of the total sample. The majority of participants were admitted for acute medical conditions, including infections and cardiovascular disorders. Baseline functional status and comorbidity burden were comparable between groups, indicating adequate group equivalence prior to intervention.

During hospitalization, the incidence of hospital-acquired delirium differed notably between groups. Delirium was identified in 6 participants (15.0%) in the nurse-guided sleep hygiene group compared with 14 participants (35.0%) in the usual care group. This difference was statistically significant ($\chi^2 = 4.11$, $p = 0.043$), suggesting a protective effect of the structured sleep intervention. The

timing of delirium onset also differed, with cases in the intervention group occurring later during hospitalization compared to earlier onset in the usual care group.

Sleep quality outcomes measured using the Richards–Campbell Sleep Questionnaire demonstrated consistently higher scores among participants receiving the nurse-guided protocol. The mean overall sleep quality score was 71.4 ± 9.6 in the intervention group versus 62.1 ± 11.2 in the usual care group, reflecting a statistically significant difference ($t = 3.98$, $p < 0.001$). Improvements were observed across all sleep domains, particularly in perceived sleep depth and number of nighttime awakenings, as detailed in Table 2.

Correlation analysis revealed a moderate inverse relationship between sleep quality scores and delirium occurrence ($r = -0.46$, $p < 0.001$), indicating that better perceived sleep was associated with a lower likelihood of developing delirium (Table 3). Functional status at discharge showed a modest decline in both groups; however, the intervention group demonstrated a smaller reduction in Katz Index scores compared with usual care (−0.6 ± 0.8 vs. −1.1 ± 0.9; $p = 0.018$), as shown in Table 4.

Overall, the findings consistently indicated that participants exposed to the nurse-guided sleep hygiene protocol experienced better sleep quality, reduced delirium incidence, and more favorable functional outcomes compared with those receiving usual care. The demographic characteristics are summarized in Table 1, while sleep quality scores, correlations, and comparative analyses are presented in Tables 2 through 4.

Table 1.: Baseline Demographic and Clinical Characteristics of Participants (N = 80)

Variable	Total Sample (N=80)	Intervention Group (n=40)	Usual Care Group (n=40)
Age (years), mean ± SD	72.8 ± 5.9	73.1 ± 6.1	72.5 ± 5.7
Gender, n (%)			
Male	44 (55.0)	23 (57.5)	21 (52.5)
Female	36 (45.0)	17 (42.5)	19 (47.5)
Length of stay (days), mean ± SD	6.2 ± 1.8	6.3 ± 1.7	6.1 ± 1.9
Katz ADL score at admission, mean ± SD	4.9 ± 0.9	5.0 ± 0.8	4.8 ± 0.9
≥2 Comorbidities, n (%)	52 (65.0)	26 (65.0)	26 (65.0)

Table 2: Richards–Campbell Sleep Questionnaire Scores by Group

Sleep Domain	Intervention (mean ± SD)	Usual Care (mean ± SD)	p-value
Sleep depth	72.6 ± 10.1	63.4 ± 11.6	<0.001
Sleep latency	70.2 ± 9.4	61.0 ± 10.8	0.002
Awakenings	69.8 ± 10.7	60.3 ± 11.9	0.001
Overall score	71.4 ± 9.6	62.1 ± 11.2	<0.001

Table 3: Correlation Matrix Between Sleep Quality and Delirium

Variable	Delirium Occurrence
RCQ Sleep Score	$r = -0.46$, $p < 0.001$

Table 4: Comparative Outcomes Between Groups

Outcome	Intervention	Usual Care	p-value
Delirium incidence, n (%)	6 (15.0)	14 (35.0)	0.043
Change in Katz ADL score	−0.6 ± 0.8	−1.1 ± 0.9	0.018

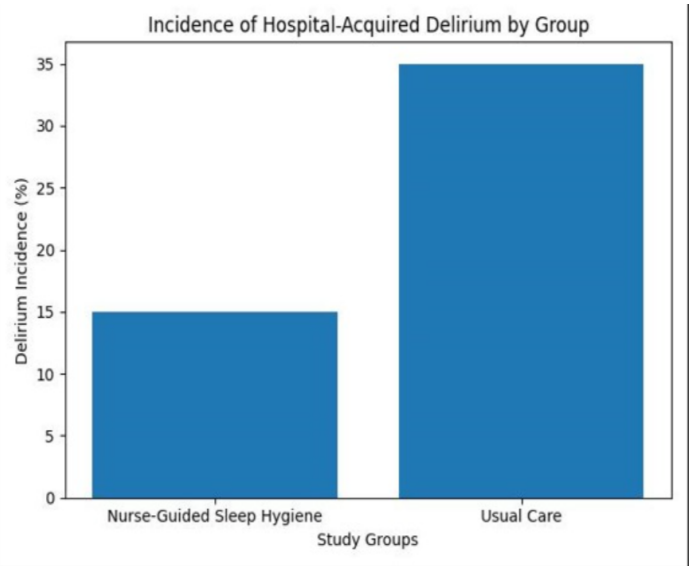

Figure 1 Incidence of Hospital-Acquired Delirium by Group

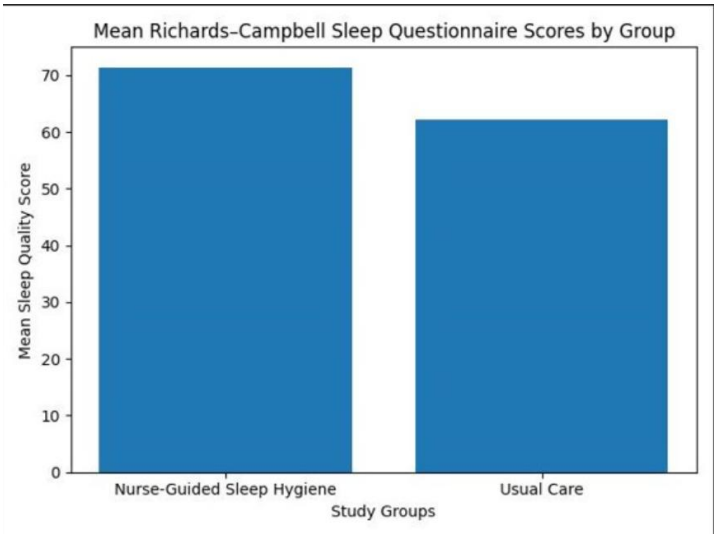

Figure 2 Mean Richards-Campbell Sleep Questionnaires Scores by Group

DISCUSSION

The present study demonstrated that a structured, nurse-guided sleep hygiene protocol was associated with a meaningful reduction in hospital-acquired delirium among older inpatients when compared with usual care (11). The observed difference in delirium incidence between groups suggested that targeted, non-pharmacological sleep interventions may play a substantive role in mitigating a complication that has long been considered difficult to prevent in acute care settings (12). These findings reinforced the growing recognition that sleep disruption is not merely a byproduct of hospitalization but a modifiable clinical factor with direct relevance to cognitive outcomes in older adults (12).

The lower delirium incidence observed in the intervention group aligned with prior work indicating that multicomponent, non-pharmacological strategies can reduce delirium risk, particularly when they address circadian regulation and environmental stressors (13). Unlike broader intervention bundles, the present study isolated sleep hygiene as a primary focus and demonstrated benefit through nursing-led implementation alone (14). This distinction was important, as it suggested that effective delirium prevention does not necessarily require resource-intensive, multidisciplinary programs (15). Instead, structured nursing practices embedded within routine care appeared sufficient to yield clinically relevant improvements. The delayed onset of delirium in the intervention group further supported the notion that improved sleep continuity may enhance cognitive resilience during acute illness (16).

Improvements in sleep quality scores provided a plausible explanatory pathway for the observed reduction in delirium (17). Participants receiving the nurse-guided protocol reported deeper sleep, fewer awakenings, and shorter sleep latency, all of which are closely linked to cognitive restoration and emotional regulation. The moderate inverse association between sleep quality and delirium occurrence underscored the interdependence of sleep and cognitive stability in hospitalized older adults. These findings were consistent with physiological models suggesting that sleep fragmentation exacerbates neuroinflammation and disrupts attention networks, thereby increasing vulnerability to delirium. By addressing environmental and behavioral factors that impair sleep, nurses may have indirectly mitigated these underlying mechanisms.

The functional outcomes observed at discharge further strengthened the clinical relevance of the intervention. Although functional decline was noted in both groups, the smaller reduction in activities of daily living among participants in the intervention group suggested that delirium prevention and sleep preservation may have downstream benefits beyond cognitive status alone. Preserving function during hospitalization is a critical goal in geriatric care, as even modest declines can have lasting consequences after discharge. The findings therefore supported the integration of sleep-focused nursing interventions as part of broader efforts to maintain independence and quality of life in older patients.

Several strengths enhanced the credibility of the study. The comparative design and complete follow-up minimized attrition bias, while the use of validated assessment tools strengthened outcome measurement. Conducting the study within routine medical wards increased the practical relevance of the findings and reflected real-world nursing workflows. Additionally, the structured yet low-cost nature of the intervention supported its potential scalability in similar hospital settings without significant financial or staffing burdens.

Nevertheless, important limitations warranted consideration. The relatively small sample size, while appropriate for the study scope, limited statistical power for detecting smaller effect sizes and precluded subgroup analyses. The single-region setting may have restricted generalizability to hospitals with different organizational cultures or staffing models. Although efforts were made to blind assessors, complete blinding was not feasible due to the nature of the intervention, introducing potential observation bias. Sleep quality was measured using self-reported tools, which may have been influenced by recall or response bias, particularly among older adults with fluctuating cognitive states. Additionally, the study focused on short-term hospitalization outcomes, leaving the longer-term effects of improved sleep and delirium prevention unexplored.

Future research could build on these findings by examining the sustainability of nurse-guided sleep hygiene protocols over longer hospital stays and across diverse clinical settings. Larger, multicenter studies would strengthen generalizability and allow exploration of patient subgroups who may benefit most from such interventions. Incorporating objective sleep measures and post-discharge follow-up could further clarify the relationship between inpatient sleep quality, delirium, and long-term functional trajectories. Overall, the present findings contributed to a growing body of evidence supporting the central role of nursing-led, non-pharmacological interventions in improving geriatric inpatient care, while underscoring the need for continued investigation to refine and expand these approaches.

CONCLUSION

This study demonstrated that a nurse-guided sleep hygiene protocol was associated with improved sleep quality and a reduced incidence of hospital-acquired delirium among older inpatients. The findings highlighted the practical value of structured, non-pharmacological nursing interventions in acute care settings. Integrating sleep-focused practices into routine nursing care may offer a feasible and effective approach to enhancing cognitive and functional outcomes in hospitalized older adults.

AUTHOR CONTRIBUTIONS

Author	Contribution
Zarina Naz*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Atika Akram*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Kashfa Sana	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Komal Rohail	Contributed to Data Collection and Analysis

Author	Contribution
	Has given Final Approval of the version to be published
Abdul Rehman	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Aiza Ali	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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