



Volume 4 Issue 1
(Jul-Dec)
2026

Submission:

7th September, 2026

Acceptance:

9th October, 2026

DOI: 10.5281/
zenodo.23368562

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Available from: <https://esrfjums.co.in/index.php/main/article/view/121>

Published by: Eureka Sciencetech Research Foundation, Kolkata.

Online access: <https://esrfjums.co.in>

Self-reported Sleep Quality and Perceived Sleep Disruptors among Hospitalized Patients in a Tertiary Care Hospital: A Cross-sectional Study

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Abstract

Introduction: Sleep disturbance is common among hospitalized patients and may adversely affect recovery and well-being. This study aimed to determine the proportion of patients hospitalized for at least 3 days, with unsatisfactory sleep, describe perceived sleep disruptors, and assess their association with socio-demographic, clinical and hospital-related factors.

Materials and Methods: A hospital-based descriptive cross-sectional study was conducted among patients admitted to five randomly selected in-patient departments of a tertiary medical college, Kolkata, from 10 April to 20 May 2026. Eligible patients admitted for at least three days were recruited. Data were collected through face-to-face interviews using a pre-designed, pre-tested schedule. Perceived sleep quality and perceived sleep disruptors were assessed using 5-point Likert scales. Participants reporting fair, poor or very poor sleep were categorised as having unsatisfactory sleep. Associations were assessed using Chi-square/Fisher's exact test and Mann-Whitney U test, with $p < 0.05$ considered significant.

Results: A total of 183 patients were included in the final analysis. The median age was 40 years (IQR: 26–46.5), 50.8% were male, and median length of stay was 7 days (IQR: 4–13.5). Unsatisfactory sleep was reported by 101 (55.2%) participants, including 36 (19.7%) with fair, 39 (21.3%) with poor and 26 (14.2%) with very poor sleep. Acute medical conditions related to the current admission were the most commonly reported significant disruptor of sleep (77, 42.1%), followed by pre-existing medical conditions (45, 24.6%), noise (40, 21.9%) and light (38, 20.8%). Unsatisfactory sleep was significantly associated with perceived disruption from noise ($p < 0.001$), light ($p = 0.006$), frequent vital-sign monitoring ($p = 0.016$), personal care routines ($p = 0.037$), existing medical conditions ($p = 0.033$), and acute medical conditions ($p = 0.010$). Age, sex, department of admission, diagnosis and length of stay showed no significant association with sleep quality.

Conclusion: More than half of hospitalized patients experienced unsatisfactory sleep. Clinical conditions and modifiable hospital-related factors, particularly noise, light and interruptions related to routine care, were associated with poorer sleep. Measures to minimize unnecessary nighttime disturbances may improve sleep among hospitalized patients.

INTRODUCTION

Sleep is a therapeutic process that helps people recover from both acute and chronic illnesses.¹ Alterations in the normal sleep pattern have negative impact on medical conditions, mental health, cognitive performance and recovery of the hospitalized individuals.² Sleep quality in hospitalized patients is significantly impaired by a combination of environmental, clinical, and psychological factors. Research indicates that approximately 77% of in-patients report poorer sleep quality in the

Keywords: Sleep Quality, Sleep Disruptors, Hospitalized Patients, Tertiary Care Hospital



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hospital compared to their home environment, often suffering from reduced total sleep time and increased nocturnal awakenings.³

Hospital environmental factors, particularly noise, light exposure, and room type, are important contributors to sleep disruption among hospitalized patients.⁴ One study from 2024, based on data from a large Sydney hospital, found that noise was the most disruptive factor, ranked as 'very disruptive' by 20% of patients, followed by acute health conditions (11%) and nursing interventions (10%).⁵ The physical factors including pain, underlying disease, medications, psychological and social factors like anxiety, stress, and demographic factors like room type, age, shift work patterns and ward routines play a key role.

While the WHO and USEPA recommend sound levels stay below 30-45DB, clinical areas exceed these limits causing stress in patients.⁶ In India, the main factors affecting sleep in hospitalized patients (noise, light, pain, illness severity) are known, but their exact burden and patterns across different regions and hospital types are not well mapped. The present study attempts to assess the quality of sleep among hospitalized patients and to find the association between the factors affecting sleep and sleep quality.

MATERIALS AND METHODS

Study type and design: Hospital based descriptive cross-sectional study.

Study Setting: Selected In-Patients Departments of Nil Ratan Sircar Medical College and Hospital, Kolkata

Study Period: 10th April 2026 to 20th May 2026 (approximately 6 weeks)

Study Population: Patients admitted at different selected In-Patients Departments of Nil Ratan Sircar Medical College and Hospital, Kolkata.

Inclusion Criteria:

- Patients who were admitted in In-Patients Departments for at least 3 days

Exclusion Criteria:

- Patients who were unconscious, on ventilation, hemodynamically unstable or unable to communicate
- Patients who were not present at their bed at the time of data collection

Sample Size Estimation

Sample size was calculated using the single proportion formula assuming a prevalence of poor sleep quality of 63.6% among hospitalized patients, based on the study by Jena et al,⁷ at 95% confidence level and 7% absolute precision, the minimum required sample size was 183.

Study Technique

Participants were selected using a two-stage sampling with quota/

consecutive sampling at the second stage. From the 24 inpatient departments of Nil Ratan Sircar Medical College and Hospital, 5 departments were selected by simple random sampling. From each selected department, eligible patients available at the time of data collection were included in the study.

Study Tools

A pre-designed, pre-tested, validated, interviewer administered questionnaire using Google form administered through mobile phones, containing sections on reporting demography, clinical characteristics and the sleep questionnaire. The sleep questionnaire consisted of a subjective sleep quality and a perceived sleep disruptors section. The sleep questionnaire was adapted from Baliga et al,³ after performing face and content validity.

1. **Subjective sleep quality** was rated on a single 5-point Likert scale (1 = Very poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Very good). For analytical purposes, responses were dichotomized into satisfactory sleep (good / very good) and unsatisfactory sleep (fair / poor / very poor).
2. **Perceived sleep disruptors:** Comprising 9 distinct items: acute medical conditions, pre-existing illnesses, ambient noise, lighting, diagnostic tests, personal care routines, treatment procedures (e.g., IV infusions, nebulization), vital-sign monitoring, and pest-related disturbances (insects/mosquitoes). Each disruptor was rated on a 5-point Likert scale (1 = Not at all disruptive, 2 = Slightly disruptive, 3 = Somewhat disruptive, 4 = Quite disruptive, 5 = Very disruptive). Rather than computing an aggregate score across diverse domains, each item was evaluated independently and classified as a significant disruptor (somewhat, quite, or very disruptive) versus not a significant disruptor (not at all or slightly disruptive).

The questionnaire is in the form of a 5-point Likert-scales to record self-reported sleep quality (very poor to very good) and sleep disruptors (not at all disruptive, to Very disruptive)

Data Collection Procedure

- 40 students were distributed evenly into 5 groups for each IPD
- All researchers were trained for 2 days at the department of Community Medicine by 2 experts regarding data entry to reduce inter-researcher variability. The questionnaire was semi-structured to reduce differences in data entry.
- Each researcher was asked to collect data from patients admitted in the IPD based on the inclusion and exclusion criteria. It was ensured no single patient were interviewed by more than one researcher
- The schedule for data collection was administered through Google Forms to each patient and data were recorded through face-to-face interview.

Study variables

1. Input/ Independent Variables

- Age



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- Gender
- Disease condition
- Department
- Diagnosis
- Length of stay
- Factors affecting sleep

2. Output/Dependant Variables:

- Sleep quality in hospitalised patients (satisfactory/unsatisfactory)

Definitions used

- **Unsatisfactory sleep:** Participants reporting “fair”, “poor”, and “very poor sleep” were classified as having *unsatisfactory sleep*.
- **Satisfactory Sleep:** Participants reporting “good” or “very good sleep” were classified as having *Satisfactory sleep*.
- **Significant disruptor:** Factor reported as “Somewhat disruptive”, “Quite disruptive” and “very disruptive” were classified as *Significant disruptor*.
- **Not a significant disruptor:** Factor reported as “not at all disruptive” and “slightly disruptive” were classified as *not a significant disruptor*.

Statistical Analysis

All collected data were entered and cleaned using MS Excel Spreadsheet (Microsoft Inc, USA) and analysed using Statistical Package for Social Scientists (IBM SPSS, Version 20). Distribution of data was checked using Kolmogorov Smirnov tests and P-P/ Q-Q plots. Summary data were presented as median (Inter-quartile range) based on the non-normal distribution of data. Categorical variables were compared using Chi-square/Fisher's exact test, while continuous variables were compared using Mann Whitney U test. Statistical significance was considered at $p < 0.05$.

Ethical Consideration

After explaining the study design and its implication, informed consent was obtained from the patients. Permissions for the study were obtained from the concerned head of the departments before the study. The study protocol was submitted for review and approval by the Institutional Ethics Committee (IEC). Participation was strictly voluntary. Participants were informed that their data will be kept confidential. The results were only reported in an aggregated and anonymized format.

RESULTS

Majority of the study participants (39.9%) were in the age group of 20-40 years, male (50.8%), recruited from General Medicine (31.1%) and Orthopedics (24.6). The commonest diagnosis was Trauma and

Surgery (28.4%), while the least number of participants were having autoimmune disease (2.2%). The median age of the study participants was 40 years, while the length of stay was a median of 7 days (Table 1)

Most patients in the study had satisfactory sleep (44.8%) which included very good or good sleep (22.4% each). Unsatisfactory sleep was seen in 55.2% of which very poor sleep was seen in 14.2%, poor sleep was seen in 21.3% while fair sleep was seen in 19.7%. (Figure 1)

Among participants, 29% of the patients had a worse sleep than at home, while 39.9% reported slightly / much better sleep than at home. A third reported similar sleep compared to home (30.6%).

In the present study, acute medical conditions, such as pain following surgery or anxiety regarding treatment and recovery, emerged as the most commonly perceived significant sleep disruptor, reported by 77 of 183 participants (42.1%). This was followed by pre-existing medical conditions not related to the current hospital stay (45/183, 24.6%), noise (40/183, 21.9%), light (38/183, 20.8%), diagnostic tests (32/183, 17.5%), personal care routines (32/183, 17.5%), treatment procedures such as continuous intravenous infusions, injections and nebulisation (31/183, 16.9%), checking of vital signs (26/183, 14.2%), and other conditions including bedbugs, mosquitoes and insects (18/183, 9.8%). (Figure 2)

No significant differences in satisfactory/ unsatisfactory sleep were seen with age groups, sex, department admitted in, diagnosis or the length of stay. (Table 2)

Table 3 shows the association between perceived significant sleep disruptors and sleep quality. Participants who reported noise, light, frequent checking of vital signs, personal care routines, existing medical conditions, and acute medical conditions as significant sleep disruptors were more likely to report unsatisfactory sleep than those who did not perceive these factors as significant disruptors. These associations were statistically significant ($p < 0.05$). In contrast, perceived disruption due to diagnostic tests and other factors (including bedbugs and insects) was not significantly associated with sleep quality.

DISCUSSION

The present study looked into the sleep quality and perceived disruptors of sleep in a government medical college and hospital in Kolkata, West Bengal. More than half of the enrolled patients experienced unsatisfactory sleep during their admission. Environmental and hospital-related factors in genera were commonly perceived as the major sleep disruptors. Noise, light, frequent vital sign monitoring, personal care routines and medical conditions were significantly associated with unsatisfactory sleep. None of the socio-demographic or disease characteristics were significantly associate with sleep disruption.

Among the study participants in the present study, 55.2% had unsatisfactory sleep. These findings are similar to other studies reporting poor or very poor sleep among 30-65% of hospitalised patients, variations explained by the type of hospital and nature of disease to a large extent.^{5,8,9,10,11} with lesser sleep disruptions reported in general wards and higher in intensive care units. The results are further influenced



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by the use of different tools of sleep deprivation assessment. Assessment tools vary widely across studies. While instruments like the Pittsburgh Sleep Quality Index (PSQI) evaluate habitual, long-term sleep, inpatient-focused tools, such as the Richards-Campbell Sleep Questionnaire (RCSQ) or single-item Likert scales, specifically capture immediate, ward-related disruption.^{12,13} Additionally, self-reported ratings often diverge from objective measures like actigraphy or polysomnography, which typically detect greater sleep fragmentation than patients perceive.

Compared to the sleep quality at home a quarter of patients in the present study reported poorer sleep, while a higher proportion (47%) of patients from an acute hospital setting reported sleep in the hospital as 'much worse' than home.⁵ Despite advances in hospital care, sleep disturbance remains common among hospitalized patients.

Overall, most patients perceived acute medical conditions, such as pain following surgery or anxiety regarding treatment and recovery, as the major sleep disruptors, whereas routine hospital care and other environmental factors including checking of vital signs, noise and light, were reported as significant disruptors by a relatively smaller proportion of participants. Adams et al,⁵ from Australia, identified that noise was reported as 'very disruptive' by 20% of their patients, followed by acute conditions and nursing interventions, while light was reported as 'very disruptive' by only 7% of patients (9/130). The greater impact of pain discomfort and psychological stress of admission overrode the environmental factors in the present cohort of patients. In addition, patients might have a certain degree of acceptance of the presence of environmental disruptors in a busy government run hospital with shared rooms.

Of the environmental distractor perceived by the study participants, noise was the commonest. Majority of patients from several other studies, also perceived noise as a significant disruptor of sleep.^{5,6} Among patients that identified noise as significant disruptors most identified the source of noise from other patients/ staff (72.5%). Overcrowding in government hospitals along with the presence of visitors, attendants and conversations leads to higher levels of noise generation, that might seem disruptive to the patients. The lesser proportion of patients in the present study finding noise from equipment as disruptive (27.5%), in comparison to studies by Koshy et al,⁶ was because of the inclusion of patients from non-intensive care wards.

The present study tried to identify a subset of patients from the socio-demographic and clinical characteristics, that were more prone to sleep deprivation during their hospital stay. However, neither the age, sex, admission wards, diagnosis or length of stay were significantly associated with unsatisfactory sleep in the present cohort. Koshy et al,⁶ also did not find any significant difference in sleep quality with age and sex in their study. It seems that hospital environmental exposures affect almost all patients irrespective of age or diagnosis. De Souza et al,¹⁴ using the Pittsburgh Sleep Quality Index (PSQI) scale for an objective measurement of sleep in their cohort of hospitalised patients, also found no significant relation between age and sex and PSQI scores. Although broad diagnostic classifications (e.g., infective, surgical/trauma, metabolic) were not significantly associated with sleep quality ($p = 0.379$), the perceived severity of bedside

symptoms played a substantial role. Patients identifying acute illness symptoms, such as postoperative pain, fever, and acute psychological distress, were significantly more likely to report unsatisfactory sleep ($p = 0.010$). Similarly, pre-existing chronic conditions, including persistent baseline pain, dyspnea, and chronic comorbidity burden, were also significantly associated with poorer sleep ($p = 0.033$). This underscores that nocturnal sleep disruption is driven by active acute symptom burden and underlying comorbidities rather than the umbrella diagnostic admission category itself.^{2,5}

Patients who perceived noise, light, frequent checking of vital signs, personal care routines, as significant sleep disruptors were more also likely to report unsatisfactory sleep. Similar associations between environmental disturbances, routine nursing care and poorer sleep quality among hospitalized patients have been reported by Baliga et al,³ Adams et al,⁵ and Koshy et al,⁶ who identified noise, light, nursing interventions and patients' underlying illnesses as important contributors to impaired sleep during hospitalization. In addition, environmental disturbances like strong light and loud noises can cause fragmented sleep, delayed sleep start, and recurrent arousals. Sleep continuity can also be further disrupted by pauses for personal care and vital sign monitoring.^{4,5}

As both sleep quality and perceived disruptors were assessed simultaneously using self-reported measures, these findings demonstrate an association rather than causation. It is possible that patients with poorer sleep were more likely to perceive environmental stimuli as disruptive, while these factors may also have contributed to sleep disturbance. The cross-sectional design does not permit determination of the direction of this relationship.

LIMITATIONS

The present study was conducted in a single hospital among a very small subset of patients from randomly selected hospital wards with different characteristics, making the generalisability of the findings limited. Since sleep quality, sleep disruptors and environmental factors like noise and light, were self-reported with no objective assessment, chances of recall or perception bias cannot be ruled out. Another major limitation of the study was the use of sedatives in patients. Since the researchers did not have access to the medical records, the use and doses of sedatives could not be assessed. Finally multivariable regression could not be performed due to the small size of the sample.

CONCLUSION

Unsatisfactory sleep was common among hospitalized patients, with more than half of the participants reporting fair, poor or very poor sleep during their hospital stay. Both clinical conditions and hospital-related factors, particularly noise, light, frequent monitoring of vital signs and personal care routines, were associated with poorer perceived sleep. No significant association was observed between sleep quality and age, sex, department, diagnosis or length of hospital stay. Since several of the identified sleep disruptors are potentially modifiable, efforts to reduce unnecessary nighttime interruptions and improve the hospital environment may help promote better sleep among hospitalized patients. Further studies using objective measures of sleep



-ep and environmental factors are warranted to better understand the magnitude and determinants of sleep disruption in hospitalized patients.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this study.

FUNDING

The authors did not receive any funding for the study

AI USE DECLARATION

The use of AI has been limited to checking for grammatic errors.

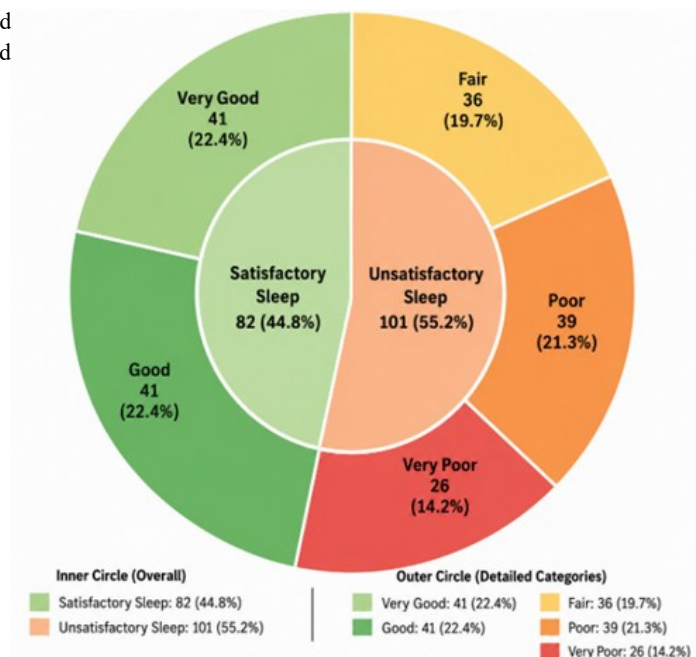


Figure 1: Distribution of study population based on quality of sleep

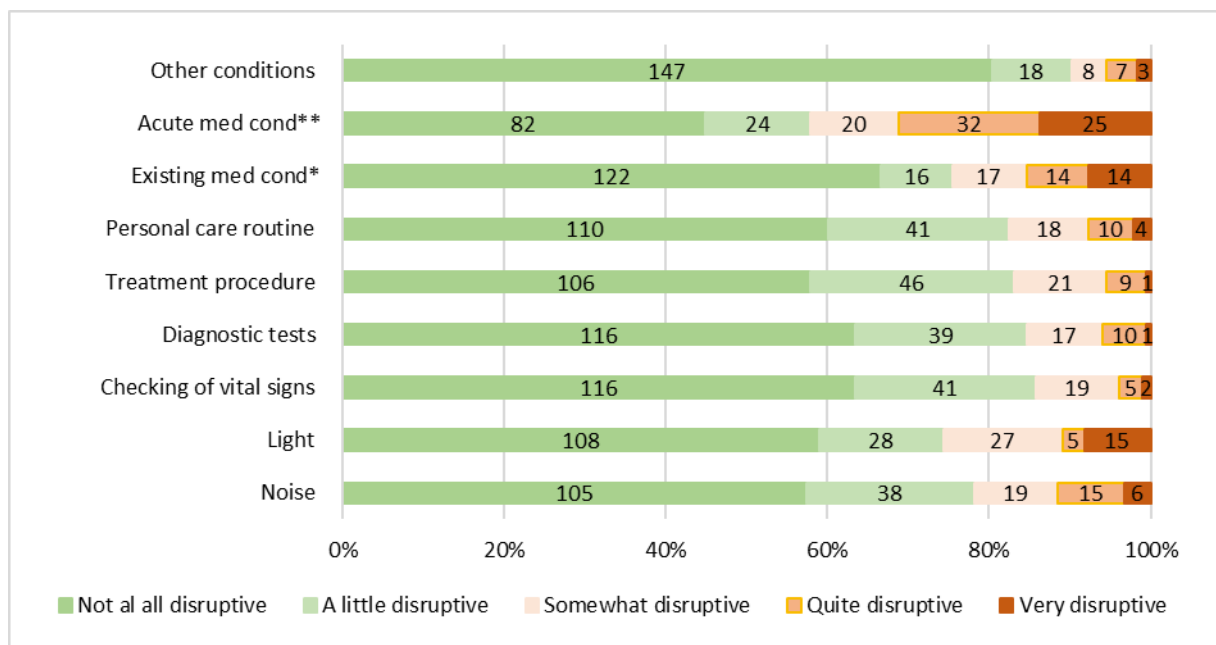


Figure 2: Perceived sleep disruptors described by the study participants

Table 1: Distribution of study population based on demographic and clinical characteristics (n=183)

Variables	Age groups	Frequency	Percent
Age-groups (Median [IQR] = 40[26-46.5])	<20 years	16	8.7
	20-40 years	73	39.9
	40-60 years	55	30.1
	≥ 60 years	39	21.3
Sex	Female	90	49.2
	Male	93	50.8
Department	Chest Medicine	29	15.8
	General Medicine	57	31.1
	General Surgery	29	15.8
	Gynaecology	23	12.6
	Orthopaedics	45	24.6
Diagnosis	Trauma and surgery	52	28.4
	Infective	41	22.4
	Malignancy	26	14.2
	Metabolic	21	11.5
	Vascular	14	7.7
	Autoimmune	4	2.2
	Others*	7	3.8
LOS (Median [IQR]= 7 [4-13.5])			

*Others include weakness, pain etc given as diagnosis

Table 2: Association of socio-demographic and clinical variables with sleep (n=183)

Variable	Level	Satisfactory Sleep N (%) (n=82)	Unsatisfactory sleep N (%) (n=101)	Chi square	p value
Age group (years)	<20	8 (50)	8 (50)	0.832	0.842
	20-40	30 (41.1)	43 (58.9)		
	40-60	25 (45.5)	30 (54.5)		
	≥ 60	19 (48.7)	20 (51.3)		
Sex	Female	41 (45.6)	49 (54.4)	0.04	0.842
	Male	41 (44.1)	52 (55.9)		
Department	Chest medicine	17 (58.6)	12 (41.4)	3.891	0.421
	General medicine	22 (38.6)	35 (61.4)		
	General surgery	12 (41.4)	17 (58.6)		
	Gynaecology	12 (52.2)	11 (47.8)		
	Orthopaedic	19 (42.2)	26 (57.8)		
Diagnosis	Autoimmune	0	4 (100)	9.014	0.379
	Infective	18 (43.9)	23 (56.1)		
	Malignancy	13 (50)	13 (50)		
	Metabolic	9 (42.9)	12 (57.1)		
	Obstetric causes including childbirth	12 (66.7)	6 (33.3)		
	Others	3 (42.9)	4 (57.1)		
	Trauma and surgery	21 (40.4)	31 (59.6)		
	Vascular	6 (42.9)	8 (57.1)		
Length of stay [Median (IQR)]		8 (5-14)	7 (4-11.5)		0.193 [#]
Total		82 (44.8)	101 (55.2)		

Mann Whitney U test



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Table 3: Association between perceived significant sleep disruptors and self-reported sleep quality (n=183)

Significant disruptors of sleep	Total n (%)	Satisfactory sleep n (%)	Unsatisfactory sleep n (%)	Chi square	p value
Noise	40 (100)	8 (20)	32 (80)	12.739	0.000*
Light	47 (100)	13 (27.7)	34 (72.3)	7.521	0.006*
Frequent checking of vital signs	26 (100)	6 (23.1)	20 (76.9)	5.787	0.016*
Diagnostic tests	28 (100)	9 (32.1)	19 (69.9)	2.144	0.143
Personal care routines	32 (100)	9 (28.1)	23 (71.9)	3.586	0.037*
Existing medical condition not related to current hospital stay	45 (100)	14 (31.1)	31 (68.9)	4.527	0.033*
Acute medical condition related to current hospital stay	77 (100)	26 (33.3)	51 (66.2)	6.554	0.010*
Others [#]	18 (100)	5 (27.8)	13 (72.2)	2.341	0.126

[#] Others include bedbugs and insects

*Statistically significant



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