

ORIGINAL ARTICLE

Nursing care and management of patients' sleep during hospitalisation: A cross-sectional study

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Abstract

Aim: To explore and describe how patients' sleep is addressed at acute-care hospitals in Sweden with regard to nursing care, management and the development of knowledge in this area.**Background:** Sleep is a basic human need and thus important for health and health maintenance. Patients describe sleeping in hospital as a stressor, and research shows that nurses tend to underestimate patients' perceived problems with sleep during hospitalisation. How do nursing staff at acute hospitals address patients' sleep and the development of knowledge in this area?**Design/Method:** A cross-sectional descriptive study was conducted based on data collected through a web survey. Head nurses, registered nurses, nursing care developers and local training supervisors at 36 randomised acute-care hospitals in Sweden were invited to participate. This study was executed and reported in accordance with SQUIRE 2.0.**Results:** The results of the survey (53 responses from 19 wards at 15 acute-care hospitals) showed that no policy documents exist and no current training addresses sleep during hospital stay. All participants agreed that sleep should be considered a nursing topic and that it is important for hospitalised patients.**Conclusion:** Patients' sleep during hospitalisation is undermanaged at acute-care hospitals. Nurses, health care managers and organisations face challenges if they are to achieve better outcomes.**Relevance to clinical practice:** This study shows that nurses do consider patients' sleep important and addressing sleep as part of nursing care. Future studies in the area should focus on what kinds of support and education are needed in the clinical context.

KEYWORDS

Cross-sectional study, Hospitalisation, Management, nursing care, patients, sleep

1 | INTRODUCTION

Sleep is a basic human need and thus important for health and maintaining health. Sleep loss and sleep deprivation have a negative impact on learning and memory (Rasch & Born, 2013), affect immune and inflammatory processes (Lange, Dimitrov, & Born, 2010; Meier-Ewert et al., 2004) and can affect the ability to retain and process information

(Mogras, Guillem, Brazzini-Poisson, & Godbout, 2009). Carskadon and Dement (Carskadon & Dement, 2011) define sleep as "a reversible behavioural state of perceptual disengagement from, and unresponsiveness to the environment."

Many patients describe sleeping in hospital as a stressor, and nurses tend to underestimate patients' perceived problems with sleep during hospitalisation (Kamdar et al., 2012; Ritmala-Castren,

Axelin, Kiljunen, Sainio, & Leino-Kilpi, 2017; Ritmala-Castren et al., 2016). Despite this, patients' sleep appears not to be prioritised in nursing (Gellerstedt, Medin, Kumlin, & Rydell Karlsson, 2015; Ye, Keane, Hutton Johnson, & Dykes, 2013). Several studies show that patients' sleep is disturbed during hospitalisation and that most patients experience impaired sleep quality. Patients' sleep is considered to be disturbed in terms of duration, quality and fragmentation (Gellerstedt, Medin, & Rydell Karlsson, 2014; Lane & East, 2008; Lee, Low, & Twinn, 2007; Wesselius et al., 2018).

2 | BACKGROUND

Florence Nightingale (Nightingale, 1992) promoted the idea that rest and sleep are important for the maintenance of patients' health. In her Nursing Need Theory, Virginia Henderson (Henderson, 2006) proposed 14 components of nursing based on patients' basic needs, including rest and sleep. Reduced sleep quality and disturbed sleep can contribute to an increased risk of falls, adverse effects on immune systems and worsened cardiometabolic outcomes (Pilkington, 2013; Stewart & Arora, 2018). Impaired sleep quality also has a negative effect on learning, cognitive ability and stress management (Orzel-Gryglewska, 2010). Nursing managers are responsible for developing nursing methods and ensuring that nursing is pursued with the aim of delivering excellent care (McSherry, Pearce, Grimwood, & McSherry, 2012). Studies indicate that healthcare professionals do not have sufficient knowledge to actively work to promote patients' sleep (Hopper, Fried, & Pisani, 2015; Radtke, Obermann, & Teymer, 2014) and show that patients' sleep is not explicitly incorporated as a subject in nursing education (Huang, Liao, Chang, & Lai, 2018; McIntosh & MacMillan, 2009). Ye et al. (2013) found that healthcare staff do not discuss sleep with patients enough and do not use assessment tools to identify and initiate nursing interventions to promote better sleep.

Who is responsible for patients' sleep during hospitalisation and how do acute-care hospitals address nursing and the development of methods to manage patient sleep? To the best of our knowledge, no previous study has explored and described how nurses and nursing staff at acute hospitals addresses and develop nursing practices for patients' sleep during hospitalisation. The results of the present study may contribute to extended knowledge about managing patients' sleep and draw attention to potential gaps of knowledge.

3 | METHODS

3.1 | Aim

To explore and describe how patient's sleep is addressed at acute-care hospitals in Sweden in terms of nursing care, management and the development of knowledge in this area.

What does this paper contribute to the wide global clinical community?

- Patients' sleep seems to be undermanaged by nursing staff and nursing managers at acute-care hospitals.
- Patients' sleep in hospital needs to be recognised and addressed more seriously than it is currently.
- Nurses do consider patients' sleep important and addressing sleep a part of nursing care.

3.2 | Design

A cross-sectional descriptive study based on a web survey. This study was executed and reported in accordance with Standards for Quality Improvement Reporting Excellence (Ogrinc et al., 2016) (File S1).

3.3 | Survey

The survey used in the present study was developed and designed by the research group. Based on the stated aim of the study and previous findings (Gellerstedt et al., 2015, 2014), operationalisation was achieved by formulating four domains: 1. policy documents (e.g., guidelines), 2. care development and education, 3. nursing process and 4. experiences and reflections about sleep and patients' sleep. Twenty-two questions and statements were formulated that covered the four domains, and some were followed with the opportunity to comment further on the answers. The first two questions in the survey aimed to gather demographic data. The survey was tested for face and content validity in two steps (Polit & Beck, 2017). During the first step, a group of 20 registered nurses was invited to comment on any vagueness in the questions due to phrasing and word selection and on their perceptions of the response options. This test group also estimated the time required to conduct the survey and decided upon 5–10 min. After the first step, two questions were revised based on the need for clarification by specifying examples. After the revision, the survey was tested again in the same way by 10 registered specialist nurses with a master's degree. No further revisions to the survey, response options or layout were made after this. During steps 1 and 2, there was no internal loss from the survey. The questionnaire was constructed as a web survey by a professional web survey company.

3.4 | Setting

The Swedish government (SOU, 2002:31) defines an acute-care hospital as "a hospital with a 24-hr open emergency room, access to a 24-hr operation unit, and access to X-ray and intensive care." In March 2018, 59 of 71 hospitals in Sweden met these criteria. In Sweden, all hospitals belong to one of six healthcare regions. Each region has one or two regional hospitals (hospitals that conduct highly specialised care and research), two to five county hospitals

(similar to regional hospitals, but on a smaller scale) and three to nine small county hospitals (hospitals that provides basic health care).

3.5 | Sampling

We used stratified sampling from the six regions to achieve geographical breadth and to include a range of hospitals of different sizes. In those regions with more than one regional hospital, more than two county hospitals and/or more than three small county hospitals, blind randomisation was used. The hospitals in each region were assigned a numerical label such as regional hospital 1 or county hospital 2, and a person outside the research group was invited to perform the blind randomisation by choosing a number between one and the highest number of hospitals in the particular category. The process resulted in a sample of the six regions, each represented by one regional hospital, two county hospitals and three small county hospitals, ($n = 36$ hospitals). General orthopaedic, surgical and medical wards were included at each hospital. Names and e-mail addresses of head nurses at 108 wards at the 36 hospitals were manually retrieved through the hospitals' telephone exchange operators.

3.6 | Participants

Those eligible for participation were head nurses, clinically active registered nurses on orthopaedic, surgical and medical wards, nursing care developers and local training supervisors. Nursing care developers are responsible for quality assurance and the development of nursing care at the department/ward level, and local training supervisors are responsible for educational efforts at the department/ward. Every

head nurse was asked to enrol three registered nurses on their ward and to send their information, together with the names and e-mail addresses of their ward's nursing care developer and local training supervisor, to the study's first author.

3.7 | Data collection

Information about the study, an invitation to participate in the survey and a request for names and e-mail addresses of was sent to 108 head nurses via e-mail. Nineteen provided names/e-mail addresses, 15 declined participation, and 74 did not respond to the invitation and request after two reminders (Figure 1). In total, 105 names and e-mail addresses of potential participants were collected.

3.8 | Data analysis

Data from the survey were analysed using descriptive statistics. Categorical variables are presented as numbers (n) and percentages (%). Free-text answers from the questions that gave participants an opportunity to comment or expand upon on their answers were read, sorted and grouped according to their similarities and differences as a thematic text analysis. For each group, categories were formulated, and the results are presented with an example of a written free-text response for each category (Patton, 2015).

3.9 | Ethical considerations

The study was conducted according to ethical principles ("World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects," 2000). The

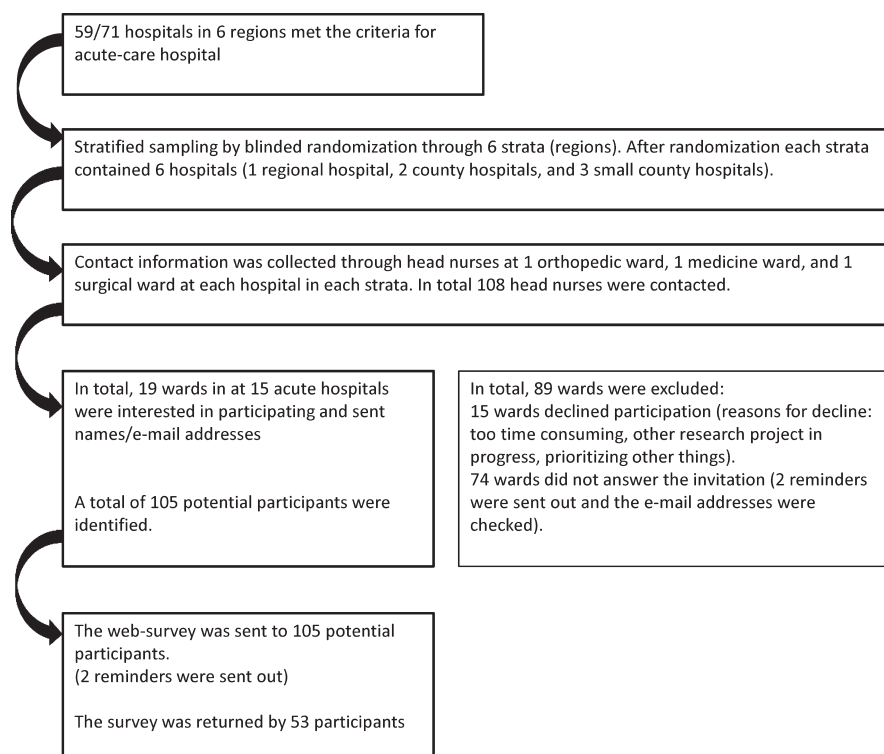


FIGURE 1 Flow chart for randomisation, sampling and inclusion

complementary letter with information about the study and its purpose was sent together with the survey by e-mail to the 105 participants. It emphasised that participation was voluntary and that returning a completed survey was considered informed consent to participate. The results are presented at the group level, although quotes from the free-text answers are also presented. All data were treated with confidentiality. The study was granted permission from the regional ethical review board in Stockholm, Sweden (Dnr: 2017/873-31/4).

4 | RESULTS

Surveys were completed at 19 wards at 15 acute-care hospitals representing all six healthcare regions (Figure 2). A total of 53 responses were collected from orthopaedic wards ($n = 4$), medical wards ($n = 7$) and surgical wards ($n = 8$). These wards were distributed across three regional, five county and seven smaller county hospitals ($n = 15$). The results are presented question by question as numbers and percentages in Table 1 and as numbers and text in Table 1. The results are based upon answers from 53 participants (5 nursing care developers and local training supervisors, 10 head nurses and 38 registered nurses).

The results from the four domains in the questionnaire are shown in Table 1. The first domain, policy documents, aimed to explore whether the departments and wards had established guidelines for managing patients' sleep. The results show that 72% to 79% (of $n = 53$) responded "does not exist" and 21% to 24%, "do not know." Guidelines on patient sleep are thus not common in the Swedish clinical context. In domain 2, care development and education, none of the responding departments had a designated person responsible for the area of sleep, and 70% of participants stated that patient sleep is not discussed on training days for the nursing staff, for example. The results also show that contact with an on-call physician is commonly used as a sleep-promoting intervention when patients are unable to sleep. Two-thirds of the respondents reported contacting the on-call physician for prescriptions of sleep medicine.

Domain 3, nursing process, aimed to explore and describe practices in the area of patients' sleep. Seventy-one per cent declared that they documented patients' sleep in medical records and 96% of these based their documentation on the nurse's observations. However, very few wards developed care plans for patients' sleep. This shows that sleep is discussed during handovers but rarely addressed during rounds and also that assessment instruments are very rarely used.

In the fourth domain, we allowed the participants to answer questions about whether they considered sleep a nursing topic and important for patients who are hospitalised. The participants' answers clearly show that this is the case. Eighty-seven per cent believed that impaired sleep quality and sleep deprivation affected the health of patients and led to negative consequences for recovery (Table 1).

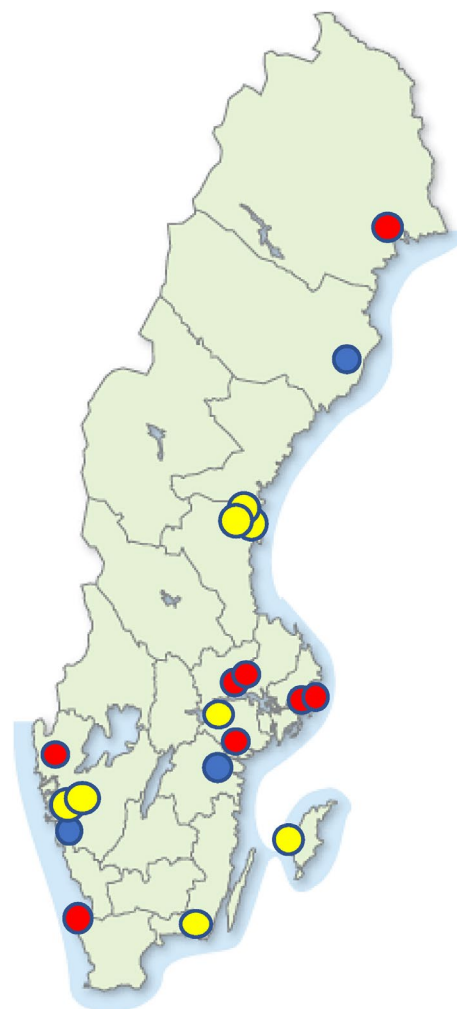


FIGURE 2 Geographical spread of responses to the survey in Sweden; $n = 19$ wards. Blue = regional hospital, red = county hospital, yellow = smaller county hospital [Colour figure can be viewed at wileyonlinelibrary.com]

The free-text answers and/or comments on answers were categorised as described in the Data analysis section. To enhance the authenticity of the results, a quote is presented to illustrate each category (Table 2).

5 | DISCUSSION

This study aimed to describe how patients' sleep is addressed at acute-care hospitals in Sweden with regard to nursing care, management and development of methods. The results indicate that patients' sleep is an underprioritised and overlooked topic. Numerous studies have shown that disturbed and insufficient sleep during hospitalisation is a stressor for many patients, who consider the issue a challenge affecting their well-being (Dogan, Ertekin, & Dogan, 2005; Gellerstedt et al., 2014; Hultman, Coakley, Annese, & Bouvier, 2012; Lane & East, 2008).

TABLE 1 a-d. Results from the four domains in the questionnaire presented as numbers (n) and percentages (%).

(a) Domain 1: Policy documents	n (%)			
Statements	Yes	No	Don't know	
Our clinic has guidelines regarding patients' sleep.	0 (0.0)	42 (79.8)	11 (20.2)	
Our ward has local guidelines regarding patients' sleep.	2 (3.8)	39 (73.6)	12 (22.6)	
Our clinic has policy documents providing guidance for nightshift regarding patients' sleep.	2 (3.8)	38 (71.7)	13 (24.5)	
(b) Domain 2: Care development and education	n (%)			
Questions	Yes	No	Don't know	
Is sleep and patients' sleep a topic highlighted on further training days?	10 (18.9)	37 (69.8)	6 (11.3)	
Does the clinic have any literature about sleep available?	10 (18.9)	27 (50.9)	16 (30.2)	
Does your clinic conduct training focus on patients' sleep?	0 (0.0)	45 (84.9)	8 (15.1)	
Is there a designated person at your clinic responsible for the topic of sleep and patients' sleep?	0 (0.0)	41 (77.4)	12 (22.6)	
Is there a designated person at your ward responsible for the topic of sleep and patients' sleep?	0 (0.0)	49 (92.5)	4 (7.5)	
Have there been any incident reports regarding patient sleep at your department in the last year?	6 (11.3)	20 (37.8)	27 (50.9)	
Is an on-call physician at your clinic contacted regarding patients' sleep? ^a	35 (66.0)	12 (22.7)	6 (11.3)	
(c) Domain 3: Nursing process	n (%)			
Statements	Always	Often	Seldom	Never
Patients' sleep is documented at my clinic.	6 (11.3)	32 (60.4)	14 (26.4)	1 (1.9)
Documentation regarding the patients' sleep is based on the nurse's observations.	10 (18.9)	41 (77.3)	2 (3.8)	0 (0.0)
At my clinic, some form of assessment tool is used to assess patients' sleep.	0 (0.0)	0 (0.0)	8 (15.1)	45 (84.9)
At my clinic, conventional sleep promotion is applied (e.g., earplugs, eye mask, massage).	3 (5.7)	16 (30.2)	29 (54.7)	5 (9.4)
Patients' sleep is a topic discussed on the medical round.	1 (1.9)	15 (28.3)	34 (64.2)	3 (5.7)
Patients' sleep is a topic that is addressed when reporting/hand over.	4 (7.5)	30 (56.6)	17 (32.1)	2 (3.8)
(d) Domain 4: Sleep as a nursing topic	n (%)			
Questions	Yes	No	Don't know	
Do you think sleep is important for patients being treated at an acute-care hospital? ^a	53 (100.0)	0 (0.0)	0 (0.0)	
Do you think that sleep is a nursing topic? ^a	50 (94.3)	0 (0.0)	3 (5.7)	
Have you experienced that impaired sleep affects patients' recovery? ^a	46 (86.8)	2 (3.8)	5 (9.4)	

^aTable 2 (results with categorisation and examples of quotes from written answers in the survey).

Developing nursing care methods is part of the head nurse's job description, and nursing should be conducted according to evidence-based methods. Some of the results of the present study might be considered remarkable; for example, on most wards, there are no policy guidelines on managing patients' sleep. Only two of 53 participants reported having any kind of policy documents and/or clinical guidelines on patients' sleep. Furthermore, no ward or department in the study had a designated person with responsibility for, and extended knowledge of, the topic. It is unrealistic to expect individual nurses to seek information about evidence-based sleep-promoting interventions while working their shifts. It would be appropriate and effective to assign one nurse on each ward to the role of "sleep manager" with responsibility for spreading knowledge among the

nurses. The responses in this survey indicate that the wards need to include discussion about patients' sleep on supplementary training days and make relevant literature readily available to staff. These findings confirm our previous report in which nurses claimed that they used their own experience instead of evidenced-based interventions due to lack of knowledge, time and support from management (Gellerstedt et al., 2015).

Wesselius et al (Wesselius et al., 2018) found that patients' sleep during hospitalisation is an average of 83 min per night shorter than sleep at home, patients wake up more often in the night during hospitalisation, and most wake up nearly 45 min earlier than at home. The results of that study are in accordance with previous research about the negative outcomes and consequences

TABLE 2 Description of thematic text analysis for free-text answers.

Are on-call physicians are contacted regarding patients' sleep?		
Please provide the reason(s) for contact		
Categorised reason(s) for contact	Numbers of written answers (n = 33)	Example of written answer
Prescription of sleep medicine	17	"To obtain a prescription for some form of sleep medicine and that the prescription is documented in the patient's journal."
Prescription in addition to general	9	"Prescriptions for sedatives and/or sleep medicine that we do not have on the ward's general prescription list."
Consulting/advice	7	"Worried patients who cannot sleep or patients who sleep poorly several nights in a row, and you need advice."
Do you consider sleep important for hospitalised patients, and do you consider patients' sleep to be a nursing topic?		
Please provide one or more examples		
Categorised areas	Numbers of written answers (n = 24)	Example of written answers
Patients' sleep is a nursing topic	8	"Lack of sleep affects the patients' energy for mobilization and learning. Tired patients often lose their appetite, which in turn leads to pressure ulcers and fall injuries."
Recovery and health promotion	12	"Sleep is very important, both for recovery and well-being, both psychological and physical."
Overlooked area	4	"A very important area, but I feel, unfortunately, that many people who do not work nightshifts do not think it is important."
Do you believe that impaired sleep affects patients' recovery?		
Please provide one or more examples		
Categorised areas	Numbers of written answers (n = 37)	Example of written answers
Disturbed sleep and affected	9	"Patients who cannot sleep are awake during the night and sleep instead during the day and the whole circadian rhythm is affected."
Emotional and cognitive effects	7	"Patients who sleep poorly show changes in mood, such as becoming irritable and sad, the risk for confusion increases with poor sleep, at worst, the risk of psychosis."
Impact on recovery and rehabilitation	21	"Sleep deficiency causes difficulties and delays related to mobilization after surgery for example."

of disturbed sleep and showing clear connections between sleep deprivation and negative consequences. Sleep deprivation and disturbed sleep may lead to such effects as increased confusion, decreased appetite, mood changes and reduced immune responses among hospitalised patients (Orzel-Gryglewska, 2010; Pilkington, 2013; Stewart & Arora, 2018). These findings seem to be confirmed by the present study, in which nursing staff reported delayed or lack of postoperative mobilisation, decreased appetite and cognitive confusion as examples of situations or areas where patients' sleep deprivation was noticeable.

The results of this study show that sleep-promoting interventions such as earplugs, eye masks and massage are sometimes used. Documentation of patients' sleep was mainly based on observations by individual nurses. However, none reported using any form of assessment tool. Radtke et al (Radtke et al., 2014) found that registered nurses were aware of the risks and consequences of impaired sleep on patients, but admitted that they lacked knowledge about sleep assessment tools such as Richards-Campbell's Sleep Questionnaire (Richards, O'Sullivan, & Phillips, 2000). Furthermore, the topics of sleep and patients' sleep are currently not addressed to any great

extent in nursing education, and this may explain the absence of nursing interventions (Huang et al., 2018; McIntosh & MacMillan, 2009). In addition, nurses and other healthcare professionals generally do not discuss sleep with their patients very often and rarely ask patients about their sleep during rounds. Does this mean that the information about patients' sleep stays within the group of nurses? This is obviously not the case given the response to the question "Are on-call physicians at your clinic contacted regarding patients' sleep?" The responses show that nurses frequently contact the on-call physician to discuss patients' sleeping problems and to get advice and prescriptions for medication. This further suggests that prescribing and administering sleep medication is a very common intervention for sleep promotion, supported by our previous study in which nurses reported that sleeping pills were the first-choice intervention due to a lack of nonpharmacological interventions and limited knowledge about sleep (Gellerstedt et al., 2015). If patients' sleep were prioritised in assessment agendas, nursing documentation and discussions on the round with staff who have established patient contact, care for patients' sleep could be more person-centred and possible interventions could be better planned. In this way, planning

and interventions could be based on the patient's perspective and quick fixes and general solutions avoided. As a positive side effect, this approach could also reduce the pressure on on-call physicians.

One positive outcome of this study is the participants' unanimous view that sleep is indeed a nursing topic and very important to hospitalised patients. The present study confirms our previous results showing that registered nurses were in favour of working actively with patients' sleep but felt they lacked support from management and their organisation (Gellerstedt et al., 2015). Castledine (Castledine, 2010) requested that all nurses take the subject of patients' sleep more seriously and our results confirm this call for action. Perhaps sleep is so obvious an area of importance that it has been forgotten; it is now time, however, to prioritise patients' sleep.

6 | METHODOLOGICAL CONSIDERATIONS

This study has both strengths and limitations. One strength was inclusion of hospitals of different sizes in a wide variety of locations at all three levels of service (regional, county and smaller county hospitals). Despite reminders and checking that e-mail addresses were correct, only 19 of 108 head nurses agreed to participate. Based on the difficulty of recruiting participants and the responses from the head nurses of 15 wards who explained why they had declined our invitation, we conclude that many acute-care hospitals are under pressure. Hospital staff have difficulty finding time to participate in, or carry out their own, research. The response rate in the group of wards included, however, was over 50%, representing all six regions and all targeted staff categories; this may be considered a strength. There was no internal loss of face or content validity in the completed questionnaires, which we interpret as another strength. This study was conducted and reported by in accordance with Standards for Quality Improvement Reporting Excellence [SQUIRE 2.0] (Ogrinc et al., 2016).

7 | CONCLUSIONS

Although nursing care staff consider patients' sleep during hospitalisation an important area, it is undermanaged and there are several challenges for nurses, nursing managers and organisations at acute-care hospitals if better outcomes are to be achieved.

7.1 | Relevance to Clinical Practice

This study indicates that patients' sleep during hospitalisation is a low-priority topic at acute-care hospitals, but that nurses do believe sleep is a nursing topic and that patients' sleep is an important area of nursing care. Based on the belief of most nurses in the study that reduced sleep affects patients' recovery, it is important that future studies focus on exploring the kinds of support nurses need to take actions in the area. Furthermore, most observations and assessments of patients' sleep were based on nurse's observations. More

use of self-reported assessments could be a step in the direction of person-centred care.

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CONFLICT OF INTEREST

None to declare.

CONTRIBUTION

Study design: LG, JM, MK and MRK; data collection: LG; data analysis: LG and MRK; and manuscript preparation: LG, JM, MK and MRK.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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Research and reporting methodology

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- ▶ The SQUIRE guidelines provide a framework for reporting new knowledge about how to improve healthcare.
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Text section and item name	Page/line no(s).
	info is located
Title and abstract	
1. Title	
Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patient-centredness, timeliness, cost, efficiency and equity of healthcare).	Page 1, line: 1-2
2. Abstract	
a. Provide adequate information to aid in searching and indexing.	Page 1, line 29
b. Summarise all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions.	Page 1, line: 4-25
Introduction: Why did you start?	Page 3, line: 65-70
3. Problem description - Nature and significance of the local problem.	Page 2-3, line: 31-64
4. Available knowledge - Summary of what is currently known about the problem, including relevant previous studies.	Page 2-3, line: 31-64
5. Rationale - Informal or formal frameworks, models, concepts and/or theories used to explain the problem, any reasons or assumptions that were used to develop the intervention(s) and reasons why the intervention(s) was expected to work	Page 3, line: 65-70
6. Specific aims - Purpose of the project and of this report.	Page 3, line: 72-74
Methods: What did you do?	
7. Context - Contextual elements considered important at the outset of introducing the intervention(s).	Page 3-5, line: 79-125

8. Intervention(s)	
a. Description of the intervention(s) in sufficient detail that others could reproduce it.	Page 4-5, Line: 84-102. Page 5-6, 112-123
b. Specifics of the team involved in the work.	Page 3-5, line: 79-132
9. Study of the intervention(s)	
a. Approach chosen for assessing the impact of the intervention(s).	
b. Approach used to establish whether the observed outcomes were due to the intervention(s).	
10. Measures	
a. Measures chosen for studying processes and outcomes of the intervention(s), including rationale for choosing them, their operational definitions and their validity and reliability.	Page 3-4, line: 79-96
b. Description of the approach to the ongoing assessment of contextual elements that contributed to the success, failure, efficiency and cost.	Page 4, line: 97-104
c. Methods employed for assessing completeness and accuracy of data.	
11. Analysis	
a. Qualitative and quantitative methods used to draw inferences from the data.	Page 5, line:133-139
b. Methods for understanding variation within the data, including the effects of time as a variable.	
12. Ethical considerations - Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest.	Page 5. line: 140-149
Results: What did you find?	
13. Results	
a. Initial steps of the intervention(s) and their evolution over time (eg, time-line diagram, flow chart or table), including modifications made to the intervention during the project.	Page 5-6, line 150-184
b. Details of the process measures and outcomes.	
c. Contextual elements that interacted with the intervention(s).	
d. Observed associations between outcomes, interventions and relevant contextual elements.	
e. Unintended consequences such as unexpected benefits, problems, failures or costs associated with the intervention(s).	
f. Details about missing data.	Page 9, line: 252-264
Discussion: What does it mean?	
14. Summary	
a. Key findings, including relevance to the rationale and specific aims.	Page 9, line: 265-276
b. Particular strengths of the project.	Page 9, line: 252-264
15. Interpretation	
a. Nature of the association between the intervention(s) and the outcomes.	

b. Comparison of results with findings from other publications.	Page 7-9, line: 185-251
c. Impact of the project on people and systems.	
d. Reasons for any differences between observed and anticipated outcomes, including the influence of context.	
e. Costs and strategic trade-offs, including opportunity costs.	
16. Limitations	
a. Limits to the generalisability of the work.	Page 9, line: 252-264
b. Factors that might have limited internal validity such as confounding, bias or imprecision in the design, methods, measurement or analysis.	Page 9, line: 252-264
c. Efforts made to minimise and adjust for limitations.	Page 9, line: 252-264
Conclusions	Page 9, line: 265-268
a. Usefulness of the work.	Page 9, line: 269-276
b. Sustainability.	
c. Potential for spread to other contexts.	
d. Implications for practice and for further study in the field.	Page 9, line: 269-276
e. Suggested next steps.	Page 9, line: 269-276
Other information	
18. Funding - Sources of funding that supported this work. Role, if any, of the funding organisation in the design, implementation, interpretation and reporting.	