Non-pharmacological nursing interventions to promote sleep quality after coronary artery bypass graft surgery: a systematic review

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Summary

Introduction: This is a review of the literature that discusses effective non-pharmacological nursing interventions to promote sleep quality in patients who underwent coronary artery bypass graft (CABG) surgery.

Material and methods: This systematic review was conducted by using National Library of Medicine-National Institutes of Health, Science Direct, Scopus, Cochrane Central Register of Controlled Trials, Cumulative Index to Nursing, and Allied Health Literature databases by using keywords such as "non-pharmacological", "nursing interventions", "sleep quality", "coronary artery bypass graft", and "surgery".

Results: This systematic review included randomized controlled trials. Non-pharmacological nursing interventions were classified into 2 categories, relaxation techniques and educational strategies.

Conclusions: Systematization of nursing care in patients undergoing CABG surgery is extremely important for sleep quality from the preoperative period to the postoperative period. It can be said that the nursing interventions applied on the subject are among the alternative ways to protect the patient from cardiovascular damage.

Key words: sleep quality, coronary artery bypass graft surgery, nursing interventions, non-pharmacological.

Introduction

Patients with coronary artery bypass graft (CABG) more than often struggle with alterations in their sleep pattern, especially in the post-operative period [1, 2]. These patients have changed their sleep pattern over the recovery period and are accompanied by poor quality perception and frequent awakenings [3–5]. As a result of inappropriate sleep pattern, patients encounter fatigue, irritability, daytime sleepiness, mortality, and prolonged duration of hospitalization and associated costs [1, 6]. Various variables such as age, gender, health, medications, environment, or previous sleep disorders affect the consistency, duration, and depth of sleep in acute cases [7, 8]. Adequate quality of sleep has been shown to decrease immediately after with patients due to elevated blood pressure, irritability, depression, and a decrease in the overall satisfaction of their life [1, 7, 9]. Researchers have found a correlation between sleep quality and daily life activities among the patients with CABG [2, 4, 10]. Therefore, the creation of therapeutic successful techniques, including environmental regulation, as well as reducing sound and light, is critical for understanding the possible multifactor causes of sleep disorder [9].

Different techniques for promoting sleep have been tested in hospitalized patients. Studies have shown that a mixture of treatments that can alleviate anxiety, pain, and environmental factors effectively is successful at decreasing sleep disorders [9, 7, 11]. Therefore, the objective of this study is to review the available literature evidence of effective non-pharmacological nursing interventions to promote sleep quality in patients who underwent CABG surgery.

Material and methods

The PICO (population, intervention, comparator, and outcome) framework was used in this systematic review. It is a staple of evidence-based practice pedagogy in nursing. It is used to develop literature search

strategies, for systematic review, and to answer clinical or health care-related questions [12]. Using the PICO method, the guiding question was formulated wherein P (Problem/ Population) refers to certain patients, I (Intervention) refers to non-pharmacological interventions to promote sleep quality, C (comparison/control) refers to regular care, and O (outcomes) refers to enhanced sleep pattern [12, 13]. This systematic review followed the preferred reporting items for systematic reviews and meta-analyses checklist and the flow diagram for conducting systematic reviews (Fig. 1) [14].

Primary studies were included in the design, namely randomized controlled trials. With respect to the date of publication, no time limits were set. The following criteria were considered in the selection of articles.

Inclusion criteria

- Publication language being English,
- Accessibility of full text,
- Being randomized control, and clinical study,
- Studies performed in CABG patients,
- Studies measured the quality of sleep,
- Studies discussed non-pharmacological nursing interventions,
- Individuals aged 18 years and older.

Selection of the studies

A search was conducted in the National Library of Medicine-National Institutes of Health (PubMed/MEDLINE), Science Direct, Scopus, Cochrane Central Register of Controlled Trials (Cochrane Central), and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases by using keywords such as "non-pharmacological", "nursing interventions", "sleep quality", "coronary artery bypass graft", and "surgery". The literature search was conducted between June and July 2022. These articles were outlined accordingly to include the author/s, year, title, study design, sample, method, result, conclusion, and limitations. The selected papers were evaluated (Fig. 1).

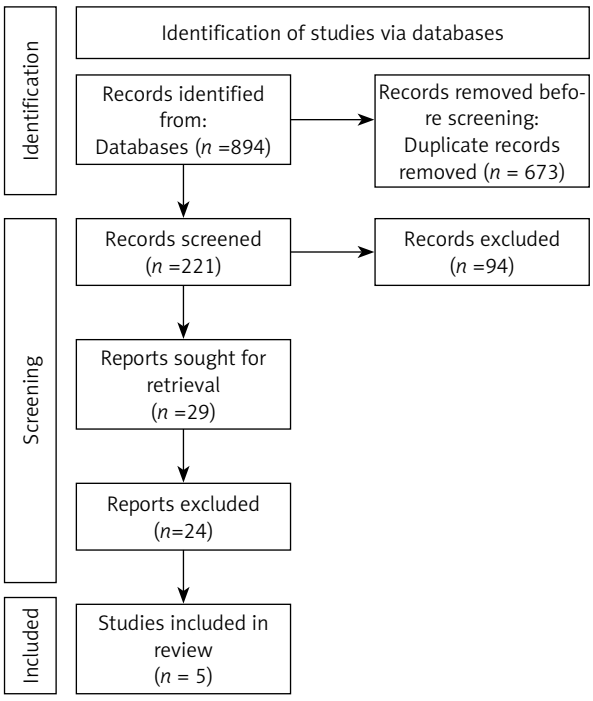

Fig. 1. Flow chart of the studies included in the systematic review (PRISMA-P flow diagram)

Risk of bias assessment

The bias risk was assessed as recommended by the Cochrane Collaboration Guidelines (Fig. 2) [15].

Limitations

The current study has some limitations. It was limited to published English language studies. There were not enough studies to evaluate non-pharmacological nursing interventions to promote sleep quality in patients who underwent CABG surgery.

Results

The studies are distributed between 2010 and 2021 for the year of publication. These data show that changed sleep patterns are a more recent issue. According to the sort of intervention, 2 general groups were assigned to the study, these being relaxation strategies and education technique. Four of the studies studied relaxation method effectiveness, and one study examined educational approach effectiveness. The relaxation methods included in these reviews were massage,

Studies + Low risk of bias – High risk of bias ? Unclear risk of bias	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Nerbass *et al.*, 2010	–	–	+	?	–	+	+
Yaghoubi *et al.*, 2017	–	?	+	–	–	+	+
Ghavami *et al.*, 2018	+	+	+	?	–	+	+
Ghorbani *et al.*, 2018	–	?	–	–	–	+	+
Bagheri *et al.*, 2021	+	+	+	+	–	+	+

Fig. 2. Risk of bias assessment for the included studies

Table 1. Analysis of the studies

Author (year)	Title	Study design	Sample	Method	Results	Conclusions	Limitation
Nerbass *et al.*, 2010	Effects of massage therapy on sleep quality after coronary artery bypass graft (CABG) surgery	Randomized control trial	40 patients were allocated to 2 groups (20 patients were in the massage group and the other 20 patients were in the control group)	The control group and the massage therapy group comprised participants who were subjected to three nights without massage and three nights with massage therapy, respectively. The patients were assessed on the following mornings by using Epworth Sleepiness Scale (ESS) for excessive daytime sleepiness, The Pittsburgh Sleep Quality Index (PSQI) for quality of sleep, Berlin Questionnaire (BQ) for obstructive sleep apnoea, and Visual Analogue Scale (VAS) for pain in chest, back and shoulder. Participants kept a sleep diary during the study period	Pain in the chest, shoulders, and back decreased significantly in both groups from day 1 to day 3. The participants in the massage therapy group had fewer complaints of fatigue on day 1 ($p = 0.006$) and day 2 ($p = 0.028$). It was reported more effective sleep during all 3 days ($p = 0.019$) when compared with the participants in the control group	Massage therapy is an effective technique to improve patient recovery from cardiopulmonary artery bypass graft surgery by reducing fatigue and improving sleep	A self-reported, subjective method was used to assess the effects of massage therapy and polysomnography was not carried out
Yaghoubi *et al.*, 2017	Effect of acupressure on sleep quality after coronary artery bypass surgery	Randomized controlled trial	A sample of 60 patients were randomly assigned to either experimental group or control group	Each group consisted of 30 patients with the experimental group receiving acupressure on five different solar points for 5-15 minutes during two consecutive postoperative days and the control group receiving only sedative drugs on request. Sleep quality was measured the day before and after using the St Mary's Hospital Sleep Questionnaire (SMHSQ) in both groups	There was no statistically significant difference between the two groups ($p = 0.689$). However following acupressure, the scores changed significantly. There is a reasonable difference in sleep quality between the two groups after CABG ($p = 0.001$)	Acupressure improved sleep quality in patients in the intensive care unit after CABG surgery	None
Ghavami *et al.*, 2018	Effect of self-care interventions on sleep quality in post-coronary artery bypass grafting patients: a single-centre, randomized--controlled study	Randomized controlled trial	146 patients were divided into two groups as the self-care intervention ($n = 73$) and control group ($n = 73$)	The self-care intervention group received six educational courses on sleep hygiene, nutrition and physical activity. The control group was instructed to continue their normal life and routine care and received no education. PSQI was used to collect data	There was no significant difference between the two groups in terms of mean global PSQI scores before the study ($p = 0.91$). The scores were statistically significantly higher after the self-care intervention ($p = 0.01$)	Patients undergoing CABG may benefit form self -care intervention based on sleep hygiene, nutrition and physical activity to improve quality of sleep	The participants of the study were recruited only from one hospital. The duration of the intervention was relatively short

Table 1. Cont.

Author (year)	Title	Study design	Sample	Method	Results	Conclusions	Limitation
Ghorbani *et al.*, 2018	The effects of deep--breathing exercises on postoperative sleep duration and quality in patients undergoing CABG: a randomized clinical trial	Randomized clinical trial	64 patients were allocated into two groups (32 patients were in the deep breathing exercises training group and other 32 patients were in the control group without deep breathing exercises training)	The study was a clinical trial. The patients were selected by convenient sampling and then the participants were randomly allocated to the intervention and control groups. The baseline and postoperative sleep duration and quality metrics were measured. The SMHSQ was used to evaluate sleep quality in two groups	The results revealed that sleep duration and quality of the group who had received deep breathing exercise training was different from those of the control group, and that the difference was significant ($p < 0.001$)	The results indicated that deep breathing exercises prevent decline in sleep quality postoperatively. It is a simple method to implement and does not impose a high cost	Small sample size and the sleep duration and quality data were subjective and qualitative
Bagheri *et al.*, 2021	Effect of Benson and progressive muscle relaxation techniques on sleep quality after coronary artery bypass graft: a randomized controlled trial	Randomized trial	120 patients were allocated into three groups (40 per group) as the Benson Relaxation group, progressive muscle relaxation techniques, and control group	Patients in the Benson Relaxation group and progressive muscle relaxation techniques group performed relevant exercises twice a day for four weeks. Sleep quality was measured before and immediately after the intervention using PSQI	There was no statistically significant differences were identified among the three study groups in terms of sleep latency, sleep duration, sleep disturbances, sleeping medication, and daytime dysfunction after the intervention ($p > 0.05$)	A four-week program of both Benson Relaxation and progressive muscle relaxation can be effective in the overall improvement of sleep quality in patients following CABG	The trial was conducted in two healthcare centres in an urban area. The measuring of the effect of Benson Relaxation and progressive muscle relaxation techniques on sleep quality was limited only to 2 points, before the intervention and after the intervention in the 4th week. Both Benson Relaxation and progressive muscle relaxation techniques were taught by the same researcher, which might have been associated with the bias of one of the relaxation techniques

acupressure, Benson Relaxation Technique, and deep breathing exercises (Tab. 1).

Discussion

Evidence shows that the quality of sleep is often poor in the postoperative period among CABG surgery patients, particularly after the surgery patients have high sleep interference [3, 4, 16]. Poor postoperative sleep quality may be attributed to many causes, including surgical incision pain, the presence of a chest drain, excessive bedtime discomfort, and high rates of anxiety [7, 17]. Sleep should be an integral component of nursing practice to guarantee patient recovery and to decrease complications, costs, and hospital stay. It is important that nurses have an understanding of the sleeping habits of the patients because this can help improve the sleep quality [5, 18].

All research included in this review indicate that patients' sleep can be improved by non-pharmacological treatment. Many approaches have facilitated decreased sleep duration while others have enhanced sleep quality perception [19, 20]. The following are the 2 key category of studies addressing relaxation techniques, which made up the highest number of studies followed by investigation addressing educational strategies [19, 21]. The relaxation technique category was effective in improving sleep quality. Statistically significant results have been reported in preventing a decline in the score concerning sleep quality in the studies. A study revealed that the baseline score for sleep quality post operation increased in patients who received deep breathing exercises [22]. Another study mentioned that massage therapy is beneficial for improving sleep quality and decreasing fatigue among patients after CABG surgery [23]. This is similar to the study that stated that foot bath and massage therapies improved sleep quality in patients [17, 24].

A paper included in this review examined the use of Benson Relaxation Technique [10]. In the Benson Relaxation Technique, sleep quality, sleep latency, sleep efficacy, and sleep disturbances were significantly better than in the control groups [10, 25]. Also, acupressure 15 minutes before bedtime substantially promoted sleep quality among patients following CABG, highlighting that acupressure is a harmless and inexpensive approach [26].

The studies classified as education strategies provided new insights into sleep hygiene practices, healthy nutrition, and physical activity [19, 21, 27, 28]. Patient education should be widely promoted in clinical practice for sleep quality, which is a resource of low cost, easily accessible, and which reinforces the value of individualized patient and family care [29].

It is therefore important that nurses have knowledge on sleep-enhancing care so that factors that deteriorate sleep quality and therefore affect the recovery of patients, particularly with regard to educational contents, can be actively decreased [24, 30]. To achieve this aim, implementation of strategies that are low cost or without cost should be encouraged.

Conclusions

The result of this study show that measures such as massage, acupressure, relaxation techniques, deep breathing exercises, and education on self-care activities have been assessed, and sleep rating scores have dramatically improved. Nurses can develop a definitive plan of care that incorporates these interventions so as to provide quality care to a patient during the postoperative period of CABG surgery. Identifying gaps in knowledge on the subject will be helpful in encouraging future studies.

The authors declare no conflict of interest.

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