Interventions to Improve Quality of Sleep Among Patients Post Coronary Artery Bypass Graft (CABG) in ICU: A Scoping Review

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Abstract

Coronary Heart Disease (CHD) was the number two cause of death; one of the treatments for CHD was Coronary Artery Bypass Graft (CABG). Patients after undergoing CABG will undergo treatment in the Intensive Care Unit (ICU). In patients who experience treatment in the ICU, many patients experience sleep disturbances related to therapy regime rhythm in the ICU. This literature review aims to identify the intervention for managing sleep quality in post-CABG patients undergoing treatment in the ICU. The method use was a narrative review study, The review was conducted two databases, PubMed and ScienceDirect, to search data from 2012 to 2022. The keywords used were Coronary Artery Bypass Graft, Intensive care unit, and Sleep Quality. The results of this study included nine articles reviewed, which were entirely randomized control trials and randomized clinical trials. The review found that the interventions to manage sleep quality are deep breathing therapy, aromatherapy with roses, acupressure, self-care, and drug administration. From the results of the review, it was found that all articles reported using several specific interventions in the intervention group that were proven to improve sleep quality in post-CABG patients. The study results provide information for nurses regarding sleep quality in post-CABG patients.

Keywords: CABG; ICU; sleeping quality

Introduction

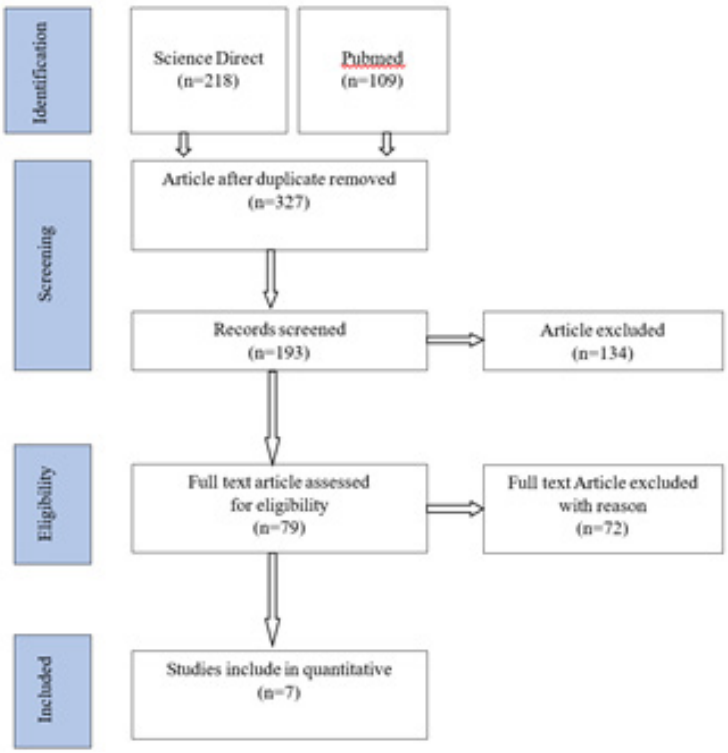
Indonesia has experienced an increase in cases of cardiovascular disease. One of them is coronary heart disease (CHD). CHD occurs due to a blockage or narrowing of the coronary arteries, limiting blood flow to the heart (Arnold et al., 2020). Data from the World Health Organization (WHO) shows that CHD is the first cause of death in the world from 2000 to 2015. Meanwhile, in Indonesia, CHD is the number two cause of death, with a total of 138,400 deaths (World Health Organization, 2017). One of the CHD treatments is Coronary Artery Bypass Graft (CABG). The CABG procedure is a medical surgical procedure that aims to improve blood perfusion of myocardial ischemia, which is blocked and expected to restore cardiac function to a minimum close to normal. The role of CABG in relieving complaints of chest pain (angina pectoris) is better than conservative therapy (Velazquez et al., 2011).

The Intensive Care Unit (ICU) is a part of the hospital, with specialized staff and equipment dedicated to caring for and closely monitoring patients suffering from life-threatening or potentially life-threatening injuries, illnesses or complications. One of the indications for admitting patients to the ICU is postoperative patients. Patients who are treated in the ICU room experience changes in their sleep. In contrast, critically ill patients experience short sleep hours, making it challenging to achieve REM and deep sleep, resulting in patients waking up quickly (Showler et al., 2023). In patients who experience treatment in the ICU, many patients experience sleep disturbances, the causes of which include noise, interventions given and medication (Aparício & Panin, 2020). The causes of sleep disorders in ICU patients consist of environmental factors, medication and biological factors (Amanda, 2019). 78% of patients undergoing CABG experience sleep disturbances(Bakry et al., 2022). This condition can affect the quality of life and the recovery process.

Based on this background, the researcher is interested in conducting a literature review titled "Sleep Quality Management in Post Coronary Artery Bypass Graft (CABG) Patients." This literature review aims to determine the management of sleep quality in post-CABG patients.

Research Method

The literature sources used in the article search process are PubMed and ScienceDirect databases used in the last ten years (2012-2022) to ensure that the articles included in the scoping review still pertain to the subject under investigation and address the most recent advancements in the industry. Longer time periods also useful on identifying patterns and changes that appear in the literature on the subject of study. Article searches were performed using English, namely "Coronary Artery Bypass Graft" OR "Coronary Artery Bypass Grafting" OR "Bypass Surgery" OR "CABG" AND "Intensive Care Unit" OR "ICU" AND "Sleep Quality.". The inclusion criteria used in this literature review included full-text free articles, English-language articles, the last ten years of publication (2012-2022) with the Randomized Control Trial and Quasi Experiment research designs, and articles discussing non-pharmacological interventions in postoperative patients and Coronary Artery Bypass Graft in improving sleep quality. The exclusion criteria in this literature review were articles in the form of a literature review. The results of the article search found seven articles that matched the predetermined inclusion criteria. The search engines used in this research are Scopus and Google Scholar. The research flow follows the Prisma algorithm (Kahale et al., 2021).



Picture 1. PRISMA Flow Diagram

Results

Characteristics	Article (N)	Author
Country		
Iran	**7**	**(Ghavami et al., 2018)** **(Ghorbani et al., 2019)** **(Yaghoubi et al., 2017)** **(Emami-Sigaroudi et al., 2021)** **(Bagheri et al., 2021)** **(Davari et al., 2021)** **(Aliakbari et al., 2021)**
Study Design		
Randomized Controlled Trial	**3**	**(Ghavami et al., 2018), (Bagheri et al., 2021) (Yaghoubi et al., 2017)**
Randomized Clinical Trial	**4**	**(Ghorbani, et al., 2019) (Emami-Sigaroudi et al., 2021) (Davari, et al., 2021) (Aliakbari et al., 2021)**
Type of Intervention		
Self Care	**2**	**(Ghavami et al., 2018) (Aliakbari et al., 2021)**
Breathing exercises	**2**	**(Ghorbani, et al., 2019) (Bagheri et al., 2021)**
Aromatherapy	**3**	**(Bagheri et al., 2021) (Emami-Sigaroudi et al., 2021) (Davari, H., et al., 2021)**

Accupressure	**1**	**(Yaghoubi et al., 2017)**
Duration of Intervention		
< 7 days	**4**	**(Davari, H., et al., 2021) (Ghorbani, et al., 2019) (Emami-Sigaroudi et al., 2021) (Yaghoubi et al., 2017)**
< 3 months	**2**	**(Bagheri et al., 2021) (Aliakbari et al., 2021)**
3 - 6 months	**1**	**(Ghavami et al., 2018)**
Outcome		
Sleeping quality	**7**	**(Ghavami et al., 2018) (Ghorbani, et al., 2019) (Bagheri et al., 2021) (Yaghoubi et al., 2017) (Emami-Sigaroudi et al., 2021) (Davari, H., et al., 2021) (Aliakbari et al., 2021)**
Activity daily living	**1**	**(Aliakbari et al., 2021)**
Lower extremity edema	**1**	**(Aliakbari et al., 2021)**
Instruments		
Pittsburgh Sleep Quality Index (PSQI)	**3**	**(Ghavami et al., 2018) (Bagheri et al., 2021) (Aliakbari et al., 2021)**
St Mary's Hospital Sleep Questionnaire (SMHSQ)	**3**	**(Ghorbani, et al., 2019) (Yaghoubi et al., 2017) (Davari, et al., 2021)**
Beck Depression Inventory (BDI)	**1**	**(Emami-Sigaroudi et al., 2021)**
Barthel's Index of Activities Daily Living	**1**	**(Aliakbari et al., 2021)**
Orem's Self Care form	**1**	**(Aliakbari et al., 2021)**

Next will be presented regarding data and search results based on number, author, year, intervention and research results based on the articles found.

Table 2. Intervention Explanation

No.	Author, Year	Intervention	Result
1.	**(Ghorbani et al., 2019)**	**Breathing exercise:**	**Sleep duration:** **A statistical paired t-test showed a significant difference (p = 0.004) between the intervention group's mean sleep duration at baseline and after deep breathing exercises in the postoperative period.** **Sleep quality:** **The baseline sleep quality score was 18.22 (3.81) in the group** **Control and 19.47 (2.68) in the intervention group. The postoperative sleep quality score (after deep breathing exercises) was 19.50 (3.60) in the intervention group and decreased to 14.97 in the control group (4.73). Paired t-test showed a significant difference between the two groups (p = 0.002).**
2.	**(Emami-Sigaroudi et al., 2021)**	**Aromatherapy**	**Significant difference between the scores of the two intervention groups and the control group score in improving sleep quality, aromatherapy with damask rose and lavender. Both were effective in improving the subjective quality of sleep after the intervention. Improvement is more pronounced in the intervention group than in the control group**

3.	**(Davari et al., 2021)**	**Aromatherapy lavender**	**Lavender inhalation has no significant effect on the physiological parameters of patients after CABG. However, this study shows that lavender aromatherapy significantly improves patients' sleep quality but does not eliminate their sleep problems.**
4.	**(Aliakbari et al., 2021)**	**Program self-care**	**Sleep quality scores in the intervention group were lower than in the control group ($p = 0.001$). In addition, this study showed that daily activity scores in the intervention group were higher than those in the control group ($p < 0.05$). The oedema score in the intervention group was significantly lower than that in the control group ($p = 0.006$)**
5.	**(Ghavami et al., 2018)**	**Self care course**	**There was a statistically significant difference between sleep quality before and after the intervention ($p = 0.001$), indicating that implementing the self-care intervention in post-CABG patients improved their sleep quality.**
6.	**(Bagheri et al., 2021)**	**Relaxation**	**There was a significant difference between the BR ($MD = -2.5$, $p = 0.004$) and the PMR group ($MD = -2.25$, $p = 0.009$) had better sleep quality overall compared to the control group. However, there were no statistically significant differences between the three study groups in terms of sleep latency, sleep duration, sleep disturbances, sleep medications, and daytime dysfunction after the intervention ($p > 0.05$).**
7.	**(Yaghoubi et al., 2017)**	**Accupressure**	**Before the intervention, the control group's median sleep quality score (interquartile range) was 15 (13–17). Experimental and 14 (13-14) in the control group. Therefore, there was no statistically significant difference between the two groups ($p = 0.689$) However, after the administration of the acupressure intervention, the score changed significantly: the SMHSQ score rose to 14 (13-14) in the experimental group, while it remained at 23 (23-25) in the control group. This showed a reasonable difference in sleep quality between the two groups after CABG ($p = 0.001$). Also, the difference in the control group's mean score (+9 points) before and after the intervention period was more significant than that of the acupressure group (-1 point). So, it can be concluded that acupressure can improve sleep quality in patients in the intensive care unit after CABG surgery.**

Discussion

Based on the articles analysed, it was explained that all non-pharmacological interventions significantly improved post-CABG patients' sleep quality. Intervention management, among other things, is divided into two groups, namely the management, physical and psychological factors, to help improve patient comfort. Physical management includes progressive muscle relaxation, acupressure, and self-care. Psychological management involves deep breathing techniques, aromatherapy, and Benson relaxation.

Deep breathing exercises can improve the patient's sleep quality ($p = 0.002$) because the technique can evoke a relaxation response to achieve a calm state by reducing cortisol production in the blood. This can help regulate emotional balance and peace of mind, making it easier for patients to fall asleep. Lavender ($p = 0.001$ and $p < 0.001$) can improve sleep quality because of the effectiveness of the chemical content in essential oils as psychoactive subtances, which can affect work function in the brain related to olfactory sensory stimuli. This is due to the presence of linalool, ester (linalyl acetate), and geraniol in lavender and rose oils, which are believed to improve insomnia by providing a relaxing effect (Lutfian et al., 2022).

Self-care can improve sleep quality ($p = 0.001$) through sleep hygiene, and fulfilment of nutritional intake can increase patient comfort and reduce side effects related to sleeping pills, such as respiratory depression, anxiety, cognitive impairment, and weakness in post-CABG patients. Benson relaxation and progressive muscle relaxation ($p = 0.01$) can improve sleep quality because they involve elements of faith and belief, lead stronger and more calming relaxation response by repeating certain words or sentences. Meanwhile, progressive muscle relaxation is due to the movement of muscle contraction and relaxation, which can stimulate physical and psychological responses. This therapy is done by tightening and relaxing the muscles of one body part and another to give a feeling of physical relaxation. Acupressure can improve sleep quality ($p = 0.001$) because it can increase the secretion of neurotransmitters, which are chemical compounds that regulate sleep. Acupressure therapy can stimulate the release of neurotransmitters, for example, endorphins, dopamine, and serotonin, which can relax muscles and provide comfort to patients (Ramadhani Suaib & Nandar Kurniawan, 2022).

Based on the results of the articles that have been analysed, it can be seen that all articles report a significant increase in patients' sleep quality after CABG. The act of performing a CABG procedure can effectively treat the patient's coronary disease, for example, disturbances of comfort due to chest pain. However, the recovery phase from the CABG procedure can cause problems such as pain in the operating area, fatigue, etc. This creates a separate stressor that increases the patient's need for sleep. According to (Yang et al., 2015) states that the average post-CABG patient finds it difficult to get adequate sleep due to postoperative insomnia, drowsiness, a lack of sleep continuity and poor sleep quality. A study conducted by (Jha et al., 2019) stated that the decreased sleep quality in post-CABG patients is a stressful condition that causes inappropriate hypothalamic-pituitary-adrenal axis activation. This activation will increase the release of cortisol, an excacerbation of the immune system and a predisposition to inflammation and infectious processes. Furthermore, the poor sleep quality of post-CABG patients can also increase the activity of the sympathetic nervous system and blood pressure, which can affect the patient's recovery.

This aligns with research by (Dianingtyas & Waluyo, 2020), which mentioned that sleep quality plays a vital role in humans, especially in post-cardiac surgery patients. Some of the effects of poor sleep quality will occur for a long time or be chronic, but in postoperative conditions, sleep disturbances can occur acutely. They consider that many things are caused by sleep disorders, such as impaired cognitive function (delirium), worsening pain perception, psychomotor disorders, affective disorders, and metabolic disorders. Health workers, especially nurses, must understand the sleep quality of post-CABG patients well so that the best interventions can be given to overcome sleep problems in patients later.

Self-care intervention: The patient is

given a self-care program under a doctor's supervision, significantly improving the patient's sleep quality during treatment. In deep breathing technique therapy, participants were taught how to do deep breathing, which saw an increase in sleep quality in the intervention group compared to the control group. In several journals, relaxation therapy/aromatherapy using damask roses and lavender to improve sleep quality in post-CABG patients is considered very influential. The acupuncture technique of massaging each sunspot for between 1 and 3 minutes (average 15 minutes) can improve sleep quality in patients in the intensive care unit after CABG surgery. The use of herbal medicines such as valerian was observed to enhance the quality of sleep on the 30th day after the patient left the CABG operating room.

From the results of the review, it was found that all articles reported the use of several specific interventions for the intervention group that were proven to improve sleep quality in post-CABG patients; Some of these interventions were self-care, deep breathing technique therapy, relaxation/aromatherapy therapy, acupuncture techniques, and the use of herbal medicines. Researchers recommend the deep breathing relaxation technique because it is simple and does not require special equipment to manage sleep disorders in post CABG patients

Conclusion

The interventions given to post-CABG patients were divided into physical interventions in progressive muscle relaxation, acupressure, and self-care. Psychic in the form of deep breathing techniques, aromatherapy, and Benson relaxation have a significant effect on the sleep quality of CABG patients who experience sleep disturbances. This intervention can effectively treat various symptoms of coronary disease in patients, such as impaired comfort due to chest pain. In dealing with sleep disturbances experienced by post-CABG patients, the intervention reduces the symptoms of sleep disturbances by eliciting a relaxation response that can provide calm and relaxation.

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