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Sleep outcomes in cardiac rehabilitation: A scoping review protocol of sleep-focused and non-sleep-focused approaches

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ADMINISTRATIVE INFORMATION**Support** - None.**Review Stage at time of this submission** - Preliminary searches.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202550023**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 May 2025 and was last updated on 11 May 2025.**INTRODUCTION**

Review question / Objective The objective of this scoping review is to describe and examine non-pharmacological approaches (sleep-focused and non-sleep-focused) provided in cardiac rehabilitation settings and their effect on sleep outcomes.

Therefore, the study aimed to answer the following research questions:

1. What non-pharmacological interventions are implemented in cardiac rehabilitation settings to address sleep outcomes?
2. What is the impact of sleep-focused and non-sleep-focused non-pharmacological interventions on sleep outcomes among individuals participating in cardiac rehabilitation programs?

Background Cardiovascular diseases (CVDs) are a leading cause of morbidity and mortality globally, accounting for an estimated 35% of deaths worldwide. With over 523 million individuals affected, the burden of heart and circulatory disease poses significant economic and healthcare

challenges (1). These statistics underscore the critical need for comprehensive prevention and rehabilitation strategies. Cardiac rehabilitation (CR) plays a crucial role in this regard, as it focuses on physical, emotional, and social recovery to optimize risk management (2), and has been shown to significantly reduce mortality rates, enhance quality of life, restore and improve physical, mental, and social functions, and prevent recurrent cardiac events (3–5).

Despite its established benefits, CR programs often lack the integration of comprehensive strategies to address modifiable risk factors, particularly those related to sleep health, a critical yet frequently overlooked determinant of cardiovascular outcomes. Sleep plays a critical role in maintaining cardiovascular health, with humans spending roughly 30% of their lives asleep (6). Poor sleep quality and insufficient sleep duration are associated with an increased risk of coronary heart disease and poor cardiometabolic health. Recognizing these risks, the American Heart Association (AHA) has identified sleep as a health marker and a target for preventive

interventions (7) Research has shown a strong relationship between poor sleep, characterized by insufficient duration, irregular patterns, and low quality, and the risk for the development and progression of CVD (8,9). Common sleep disturbances exacerbate systemic inflammation, oxidative stress, and sympathetic activation, contributing to endothelial dysfunction and heightened myocardial stress (10–13).

Post-cardiac event patients are particularly vulnerable to sleep disturbance. Anxiety-related insomnia and disrupted sleep routines are prevalent and often linked to changes in mood state, and pain (14–17), further exacerbating fatigue, depression, and reduced physical performance, and hindering engagement in cardiac rehabilitation (CR) programs (18,19). These sleep-related issues not only slow recovery but also contribute to poorer long-term cardiovascular prognosis, including increased risk for recurrent cardiac events (17). Addressing these disturbances through targeted interventions could significantly enhance rehabilitation outcomes. However, many CR programs lack validated screening processes and adequately trained personnel to implement such strategies effectively (20,21). Thus, this review aims to comprehensively explore and map the existing evidence on focused and non-focused sleep interventions within CR programs.

Rationale Sleep disturbances are common among individuals with cardiovascular disease and can negatively impact rehabilitation outcomes, quality of life, and long-term health. While cardiac rehabilitation (CR) programs are primarily designed to enhance cardiovascular health through exercise, education, and lifestyle modification, there is growing recognition that CR may also affect sleep health, whether through focused or non-focused interventions. However, the extent to which non-pharmacological interventions are integrated into CR and their specific effects on sleep outcomes remain poorly understood. This review aims to identify knowledge gaps, potential areas for intervention development, and opportunities to improve the overall effectiveness of cardiac rehabilitation.

METHODS

Strategy of data synthesis The proposed scoping review will follow the methodological framework proposed by Arksey and O'Malley (22) and Levac et al., (23), taking into account the further refinements made by the Joanna Briggs Institute (JBI) Reviewers' Manual (24).

A comprehensive and systematic search of the literature will be undertaken using a range of online

databases, including PUBMED, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science (WoS), PsycINFO, and Cochrane. The search strategy and selected sources were discussed within the research team and in liaison with the University of Haifa library information specialist. The search strategy will include key terms defining the population and concepts of the research question: 1) sleep disorders, and 2) cardiac rehabilitation. The population of interest is patients who have experienced a cardiac event or procedure and are eligible to participate in a cardiac rehabilitation program. The search strategy will include the co-occurrence of terms from the three concepts in the title, abstract, and keywords. The search terms will include "Heart diseases" OR "Myocardial ischemia" OR "Acute coronary syndrom" OR "Angioplasty" OR "Cardiovascular surgical procedures" OR "congestive heart failure" AND "Sleep disorder" OR insomnia OR Dyssomnia* OR Circadian AND "cardiac rehabilitation" OR Telerehabilitation.

Eligibility criteria

- Eligible criteria:
1. Adult patients aged 18 and above who have experienced a cardiac event or cardiac procedure.
 2. Cardiac rehabilitation programs (center-based, home-based, hybrid, etc.)
 3. Sleep disorders
 4. International studies
 5. Full text available
 6. All time frames
 7. Study type – observational, experimental, qualitative, mixed methods, case reports

Exclusion criteria:

1. Pediatrics or under 18
2. Congenital heart problems
3. Noncardiac patients
4. Interventions not within cardiac rehabilitation settings
5. Pharmacological sleep therapy
6. CPAP
7. Review papers
8. Animal studies.

Source of evidence screening and selection

A team of three researchers will review the articles retrieved from the database searches. All identified studies will be stored, organized, and managed using Covidence software. The articles will be imported into Covidence, and the abstracts will be screened for relevance. Any disagreements will be discussed during the weekly research team meeting and resolved through clarification of the eligibility criteria. Articles deemed eligible for full-text review will be stored for subsequent screening, which will be conducted independently

by two reviewers. Any disagreements at this stage will also be resolved in the weekly team meetings through discussion and consensus.

A PRISMA flow diagram will be used to document the review process, including the number of identified studies, screened, included, and excluded, along with reasons for exclusion at each stage.

Data management Data will be extracted and organized using the Covidence software. The data charting will follow the methodology outlined in the Joanna Briggs Institute (JBI) Reviewers' Manual (24), utilizing a standardized data extraction form to address the research questions. The following variables will be included: study title, authors, location, year of publication, study population, objectives, study design, assessment tools, interventions, outcome measures, and key findings. Additional relevant information may be identified and incorporated during the charting process.

Presentation of the results The results of this scoping review will be presented in a structured and descriptive manner. Study characteristics will be summarized in tables, while key findings related to focused and non-focused sleep interventions will be thematically categorized. Gaps in the literature and areas for future research will be highlighted. A combination of narrative synthesis and tabular presentation will be used to interpret findings, identify patterns, and highlight gaps in the existing literature. The synthesis will be aligned with the research objectives to ensure clarity, coherence, and relevance. Gaps in the literature and directions for future research will also be emphasized.

Language restriction No.

Country(ies) involved Israel.

Keywords Rehabilitation, Sleep, Cardiac.

Dissemination plans The findings of this scoping review will be submitted for publication in a peer-reviewed journal specializing in sleep and rehabilitation research.

Contributions of each author

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