



THE EFFECTIVENESS OF ACUPRESSURE IN REDUCING PAIN AFTER CORONARY ANGIOGRAPHY: A SYSTEMATIC REVIEW

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Abstract

Coronary angiography, a critical diagnostic tool for coronary artery disease, often results in post-procedural pain that affects patient recovery and satisfaction. Acupressure, a non-invasive technique rooted in traditional Chinese medicine, has shown promise in reducing pain by stimulating endorphin release and enhancing physiological responses. This systematic review aimed to evaluate the effectiveness of acupressure in managing pain among patients undergoing coronary angiography. Four databases (Scopus, PubMed, ProQuest, and ScienceDirect) were searched for relevant articles published between 2020 and 2025, using keywords such as "acupressure," "pain," and "coronary angiography." Joanna Briggs Institute guidelines were used to assess study quality. Seven randomized controlled trials involving 774 participants were included. All studies reported significant pain reduction after acupressure interventions ($p < 0.05$), with durations ranging from 15 to 120 minutes at points like LI4 and PC6. Acupressure not only reduced pain but also stabilized vital signs and reduced anxiety. These findings suggest that acupressure is an effective intervention for post-coronary angiography pain, providing a strong basis for its integration into clinical practice. Further research is needed to standardize protocols and explore long-term effects.

Keywords: *acupressure, coronary angiography, pain, systematic review.*

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INTRODUCTION

Coronary angiography, while essential for diagnosing coronary artery disease, is frequently associated with post-procedural complications such as pain. This pain arises from factors like tissue trauma, prolonged immobility, or vascular irritation, underscoring the need for effective pain management interventions (Khalifeh et al., 2023). Among non-pharmacological approaches, acupressure has emerged as a promising therapeutic intervention for nurses to alleviate discomfort. As a non-invasive, cost-effective technique, acupressure aligns with holistic nursing care principles (Qadir, 2023). However, despite its growing application, no systematic reviews have yet comprehensively evaluated its efficacy in managing post-angiography pain. This gap highlights the necessity of this systematic review to consolidate existing evidence and inform clinical practice.

Globally, *Coronary Heart Disease* (CHD) remains a leading cause of mortality, with over 9 million deaths annually (Danaei & Rahimi, 2020). *Coronary Heart Disease* (CHD) is a significant health concern in Indonesia, affecting 1.45% of the working-age population and causing substantial economic burden (Uli et al., 2020). Diagnostic tools for CHD include *coronary computed tomography angiography* (CCTA) and *invasive coronary angiography* (ICA), with ICA remaining the gold standard despite CCTA's potential (Putri & Ruslim, 2024). Pain following coronary angiography via radial access is a common complication, with prevalence rates ranging from 43.8% to 44% within the first day post-procedure (Dehghani et al., 2020; Gul et al., 2021).

Acupressure, rooted in traditional Chinese medicine, involves applying pressure to specific body points (e.g., LI4, PC6) to stimulate physiological responses (Qadir, 2023). By activating the central nervous system, it promotes endorphin release, natural analgesics that reduce pain perception (Alizadeh & Takasi, 2024). Additionally, acupressure enhances blood circulation, reduces muscle tension, and stabilizes vital signs, contributing to holistic pain relief (Bal & Gun, 2024). Studies demonstrate its efficacy in postoperative and chronic pain contexts, with interventions targeting cardiovascular-related acupoints showing significant pain reduction in angiography patients (Alizadeh & Takasi, 2024). These mechanisms position acupressure as a viable, evidence-based intervention for post-angiography care.

Unmanaged post-angiography pain can lead to prolonged recovery, heightened anxiety, and decreased patient satisfaction, adversely impacting quality of life (Gökçe & Arslan, 2023). Nurses, as frontline caregivers, play a pivotal role in integrating acupressure into pain management

protocols to mitigate these outcomes (Ister & Altinbas, 2023). This systematic review aims to evaluate the effectiveness of acupressure in reducing pain among post-angiography patients, synthesize evidence on optimal protocols, and provide recommendations for clinical implementation. By addressing this gap, the study seeks to enhance patient care and support evidence-based nursing practices.

METHOD

This review evaluates the effectiveness of acupressure in managing pain in patients after undergoing coronary angiography. The type of research used is a systematic review through searching articles in four databases, namely Scopus, PubMed, ProQuest and ScienceDirect. Systematic review includes searching, reading, understanding and making conclusions from published studies and theories which are then presented in a structured manner (Brink et al., 2006). This study follows the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines to ensure the quality and transparency of the analysis (Bolan et al., 2021).

Eligibility Criteria

The search was conducted using four databases, namely Scopus, PubMed, ProQuest and ScienceDirect with articles retrieved from 2020 to 2025. The literature search was conducted using the keywords *Medical Subject Headings* (MeSH), namely ("acupressure" OR "acupuncture" OR "pressure therapy" OR "manual therapy") AND ("pain" OR "discomfort" OR "soreness" OR "ache") AND ("management" OR "relief" OR "treatment" OR "control") AND ("coronary" OR "heart" OR "cardiac") AND ("angiography" OR "catheterization" OR "imaging" OR "diagnostic procedure"). The inclusion criteria for articles were: (a) articles in English, (b) original research, and (c) published in peer-reviewed journals. Exclusion criteria were studies that did not discuss acupressure interventions to reduce pain in coronary angiography patients.

Study Selection

Based on the results of the literature search in four databases using keywords that have been adjusted to MeSH, the researchers identified the articles obtained. Two reviewers (AHZ and EKD) independently screened the articles by applying the inclusion criteria, resulting in a total of 835 articles, including from Scopus (n = 120), PubMed (n = 26), ProQuest (n = 621), and Sciencedirect (n = 68). Next, the four databases were searched to find duplicate articles (n = 243). Further filtering was carried out by excluding titles and abstracts that did not match the study participant criteria (n = 385).

Then, the availability of full-text articles was explored, and full-text articles whose

participants did not focus on acupressure interventions to reduce pain in coronary angiography patients were excluded (n = 7). The final result of this process resulted in 7 articles that were considered eligible for systematic review and in accordance with the inclusion and exclusion criteria of the article (Figure 1). If there are differences or disagreements between reviewers during the screening process, these will be discussed until consensus is reached.

Methodological Quality Assessment

Researchers identified study quality by considering the risk of bias by assessing the methodological quality of the study and determining the extent to which the study addressed potential bias in its design, conduct, and analysis. To this end, this systematic review used the Joanna Briggs Institute (JBI) critical appraisal, tailored to the study design used.

Two reviewers (AHZ and EKD) independently assessed articles that met the inclusion criteria by assessing methodological validity before inclusion as part of the review using the JBI critical appraisal for several types of studies, including randomized controlled clinical trials (RCTs).

The JBI checklist includes several questions to assess study quality. The JBI for RCTs includes 13 questions regarding the use of randomization, blinded group allocation, treatment groups, blinded participants, blinded outcome assessors, follow-up, outcome measures, and statistical analyses used.

The assessment criteria were rated as “yes,” “no,” “unclear,” or “not applicable”; each “yes” rating was assigned one point, and all other ratings were assigned zero. Each rating was then calculated and summed. If the research assessment results reach at least 75%, then the research meets the critical assessment at the cut-off point.

The risk of bias in this literature review is assessed based on the research methods of each study, including aspects of theory, design, sample, variables, instruments, and data analysis

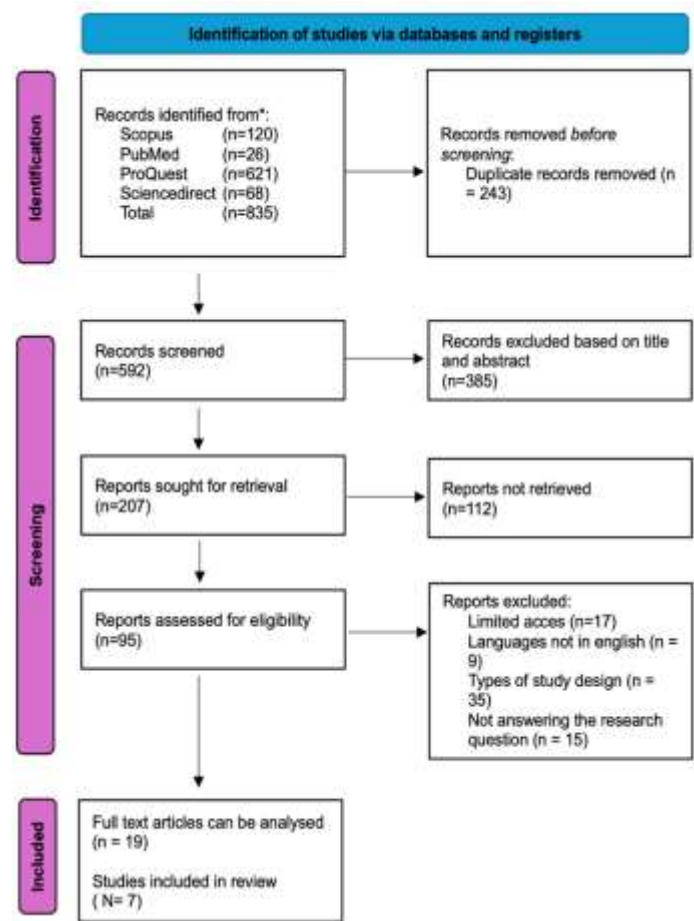


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses search article according to the criteria

Table 1. Result of Literature Research

Title	Country	Design	Sample	Age	Sex	Intervention	Instrumen	Outcome	Result	JB
Effect of Auricular Acupressure on Comfort, Pain, and Physiological Indices after Coronary Artery Angiography: A Randomized Controlled Trial (Asadi et al., 2025)	Iran	RCT	84 patients (42 interventions, 42 control)	Interventions (mean=61-80) and control (mean=58-80)	Interventions (68,3% male, 31,7% female) Control (50% male, 50% female)	Intervention: ear acupressure for 60-120 minutes. Control: Standard postoperative care.	Numeric Rating Scale (NRS)	Ear acupressure intervention for 60-120 minutes has a significant impact of 0.018 on the pain level of post angiography patients.	Ear acupressure significantly reduced pain intensity and improved comfort in post-coronary angiography patients. The intervention group showed significant improvement in pain scores at 60 and 120 minutes post-intervention compared to the control group.	12/13 92%
The Effects of Ear Acupressure on Back Pain After Coronary Angiography: A Randomized Controlled Trial (Vagharseyyedin et al., 2022)	Iran	RCT	118 patients (59 intervention, 59 control)	Interventions (mean=52,83) dan control (mean=53,31)	Interventions (male=42,3%, female=57,7%), control (male=51,7%, female 57,7%)	Intervention: ear acupressure for 20 minutes every 2 hours after treatment. Control: Standard postoperative care.	Visual Analogue Scale (VAS)	Ear acupressure intervention has a significant 0.001 with a decrease in pain in post angiography patients.	Ear acupressure was effective in reducing back pain at specific time points (20 minutes and 2 hours post-intervention) compared to the control group. However, pain reduction was not sustained at subsequent time points.	11/13 85%
Effect of Acupressure on the Blood Pressure, Heart Rate, and Pain Severity of Patients who Underwent Coronary Angiography: A Randomized Controlled Trial (Ister & Altinbas, 2023)	Turki	RCT	100 patients (50 interventions, 50 control)	Interventions (mean=51,5), control (mean=51,4)	Interventions (female=56%, male=44%), control (female=61%, male 39%)	Intervention: acupressure for 30-60 minutes. Control: No intervention.	Visual Analog Scale (VAS)	Pain intensity after acupressure intervention has significantly decreased with a p value of 0.000.	The application of acupressure intervention causes a decrease in pain levels in coronary angiography patients with a visual analog scale (VAS) measurement.	11/13 85%
The effect of acupressure on pain level and hemodynamic parameters after coronary angiography: a randomized controlled study (Düzel et al., 2023)	Turki	RCT	124 patients after undergoing coronary angiography (62 intervention group, 62 control)	Interventions (mean=59,73), control (mean=59,35)	Interventions (female=47%, male=53%), control (female=42%, male 58%)	Intervention: Acupressure on points LI4, PC6, LI11 for 15 minutes, 2 hours after usual angiography. Control: no acupressure	Visual Analog Scale (VAS)	Significant pain reduction in the intervention group at all measurement times (p<0.005).	Acupressure is effective in reducing pain levels after coronary angiography	11/13 85%

Title	Country	Design	Sample	Age	Sex	Intervention	Instrumen	Outcome	Result	JB1
The effects of acupressure on pain, anxiety and vital signs in patients undergoing coronary angiography: A randomized and sham-controlled trial (Bal & Gun, 2024)	Turki	RCT	105 patients post coronary angiography (35 acupressure group, 35 sham, 35 control)	Interventions (mean=61,42), sham (mean=62,34), control (mean=61,80)	Interventions (female=37%, male=63%), sham (female=40%, male=60%), control (female=37%, male=63%)	Acupressure: Acupressure technique on points HT7, LI4, PC6 for 16 minutes, 30 minutes after clinic admission Sham: Acupressure on points 1-1.5 cm from the actual location, Control: Standard treatment.	Pain with Visual Analog Scale (VAS), anxiety (Spielberg er state anxiety inventory)	Pain (VAS): - Acupressure: significant reduction vs. sham/control (p < 0.01). - Sham: no difference before/after (p > 0.05). - Control: increase in pain (p < 0.01). Anxiety: - Acupressure vs. sham/control: significant decrease (p < 0.05). Vital Signs: -Acupressure/sham: significant decrease (p < 0.01). - Control: significant improvement (p < 0.01).	Acupressure menurunkan nyeri, kecemasan dan tanda-tanda vital	10/13 77%
Effects of virtual reality and acupressure interventions on pain, anxiety, vital signs and comfort in catheter extraction processes for patients undergoing coronary angiography: A randomized controlled trial (Gökçe & Arslan,	Turki	RCT	153 patients after coronary angiography (51 acupressure group, 51 virtual reality, 51 control)	Interventions (mean=58,2), vr (mean=59,4), control (mean=58,2)	Interventions (female=39%, male=61%), vr (female=51%, male=49%), control (female=39%, male=61%)	Acupressure: Acupressure technique on point LI4, ST36 for 9-10 minutes vr: vr during extraction for 40 minutes, Control: Standard care.	Pain Scale: Visual Analog Scale (VAS), Anxiety: State-Trait Anxiety Inventory (STAI), Vital Signs:	VR & acupressure: Significantly reduced pain (p < 0.01), anxiety (p < 0.05), and increased comfort (p < 0.01) vs. control. Vital Signs: Stable in VR and acupressure group (p < 0.05), unstable	Acupressure is proven to reduce the pain of patients undergoing coronary angiography so that it can improve vital signs and patient comfort levels.	11/13 85%

Title	Country	Design	Sample	Age	Sex	Intervention	Instrumen	Outcome	Result	JBI
2023)							Blood pressure, heart rate, respiratory rate, Comfort: Comfort Scale (GCQ - General Comfort Questionnaire).	in control (p > 0.05).		
The Effect of Hand Reflexology Massage on Pain and Fatigue in Patients after Coronary Angiography: A Randomized Controlled Clinical Trial (Rejeh et al., 2020)	Iran	RCT	90 patients after undergoing coronary angiography (45 intervention group, 45 control)	Interventions (mean=60,60), control (mean=57,75)	Interventions (female=23%, male=27%), control (female=13%, male 37%)	Intervention: acupressure hand reflexology for 20 minutes. Control: Did not receive the intervention	Pain with Numeric Rating Scale (NRS)	Pain intensity after acupressure intervention has a significant decrease with p value of 0.001.	Acupressure is effective in reducing patient pain after coronary angiography	10/13 77%

RESULT AND DISCUSSION

Result

The assessment of the results obtained by the included articles is shown in Table 1. Of the seven articles with RCT research design with criteria 1-13 questions, two articles scored 10/13 (77%), three articles scored 11/13 (85%), and one article scored 12/13 (92%). The results were obtained with a total of 7 articles published from 2020 to 2025 and published in English with the design of all articles being RCT. The search results showed that 4 articles were conducted in Turkey and 3 articles were conducted in Iran.

The results of the search extraction found that articles with acupressure intervention in coronary angiography patients were carried out on patients with an average age in the range of 51.5-61.8. Five articles showed that acupressure intervention was effective in coronary angiography patients with male gender (Asadi et al., 2025; Bal & Gun, 2024; Düzel et al., 2023; Gökçe & Arslan, 2023; Rejeh et al., 2020). However, two articles showed that acupressure therapy was effective in coronary angiography patients with female gender (Ister & Altinbas, 2023; Vagharseyyedin et al., 2022).

The results of the search extraction found that acupressure can be done on several parts of the body. Two articles showed that acupressure can be done on the ear (Asadi et al., 2025; Vagharseyyedin et al., 2022), at points HT7, LI4, PC6, LI11, ST36 (Bal & Gun, 2024; Düzel et al., 2023; Gökçe & Arslan, 2023), one article on the hand (Rejeh et al., 2020), and one article did not specify which part (Ister & Altinbas, 2023). The duration of acupressure varies and is not specific. We grouped them into 3, namely 5-20 minutes (Bal & Gun, 2024; Düzel et al., 2023; Gökçe & Arslan, 2023; Rejeh et al., 2020; Vagharseyyedin et al., 2022), 25-40 minutes (Ister & Altinbas, 2023), and more than 60 minutes (Asadi et al., 2025).

The results of the search extraction found that the application of acupressure to patients after coronary angiography had an impact on pain, vital signs, comfort, and vital signs. The instruments used in the seven articles were the *Visual Analog Scale* (VAS) (Bal & Gun, 2024; Düzel et al., 2023; Gökçe & Arslan, 2023; Ister & Altinbas, 2023; Vagharseyyedin et al., 2022) and the *Numeric Rating Scale* (NRS) (Asadi et al., 2025; Rejeh et al., 2020). Acupressure intervention significantly reduced pain in patients after coronary angiography, as measured by the *Numeric Rating Scale* (NRS) and *Visual Analog Scale* (VAS). Various types of acupressure, including ear acupressure, acupressure at points LI4, PC6, LI11, and hand reflexology massage, showed significant

pain reduction compared with the control or sham group. These results were consistent across time points after the intervention, indicating the effectiveness of acupressure in reducing pain in patients after coronary angiography.

Discussion

Coronary angiography is a diagnostic procedure used to visualize the coronary arteries and detect any blockages or narrowing that may lead to coronary heart disease. Although this procedure is very beneficial, many patients experience post-angiography pain, which can be caused by various factors, including tissue trauma, reaction to anesthesia, and discomfort due to positioning during the procedure (Khalifeh et al., 2023). In this systematic review, we found that the majority of patients involved in the studies were between 51 and 61 years of age and were predominantly male. This may reflect the higher prevalence of coronary heart disease in this age group, as well as the tendency for men to develop cardiovascular problems earlier than women (Jin et al., 2020; Jones et al., 2020). In addition, the predominance of studies conducted in Turkey may be influenced by cultural factors, access to health services, and the prevalence of heart disease in the region, indicating the need for more attention to pain management in this context (Ister & Altinbas, 2023).

Acupressure is an alternative medicine technique that involves applying pressure to specific points on the body to stimulate healing and reduce pain. It originates from ancient Chinese medicine traditions and has been shown to be effective in reducing pain in a variety of conditions (Qadir, 2023). In the context of post-angiography patients, acupressure may provide significant benefits, including pain reduction, increased comfort, and stabilization of vital signs. Extracted results from our study showed that the duration of acupressure interventions varied, with some studies applying acupressure for 15 to 120 minutes. The points used, such as LI4 and PC6, were shown to be effective in reducing pain, suggesting that acupressure may be a flexible intervention that can be tailored to patient needs (Alizadeh & Takasi, 2024).

The outcome of acupressure intervention showed a significant decrease in pain in post-angiography patients, as measured using pain scales such as the *Visual Analog Scale* (VAS) and *Numeric Rating Scale* (NRS). This decrease in pain can be explained by several mechanisms. Physiologically, acupressure can stimulate the central nervous system to release endorphins, which function as natural analgesics (Bal & Gun, 2024). In addition, acupressure can also improve blood circulation and reduce muscle tension, which contribute to pain reduction. Acupressure reduces pain and anxiety in patients with open

thoracotomy by stimulating specific acupoints, which activate the central nervous system to release endorphins natural analgesics that help alleviate pain and induce relaxation (Shady et al., 2020). This aligns with the gate control theory of pain, suggesting that targeted pressure modulates pain signals and provides relief by closing neural pathways transmitting pain sensations. Several previous studies in other fields, such as post-operative pain or chronic pain, have also shown that acupressure is effective in reducing pain, supporting our findings (Gökçe & Arslan, 2023). Thus, acupressure not only serves as an alternative treatment method but also as an evidence-based approach to pain management.

Overall, this systematic review suggests that acupressure is an effective intervention in reducing post-coronary angiography pain, supported by evidence from multiple high-quality studies. Despite variations in protocols and limited generalizability, these results provide a strong basis for integrating acupressure into clinical practice. Acupressure should be considered as part of a multidisciplinary approach to post-invasive pain management. With appropriate training of healthcare workers, especially nurses, and patient education on the benefits of acupressure, it is hoped that this intervention can improve patient comfort and reduce reliance on conventional analgesics. Further research is needed to explore the long-term effects and neurophysiological mechanisms underlying the effectiveness of acupressure in this context.

CONCLUSION

This systematic review demonstrates that acupressure is effective in reducing post-coronary angiography pain, supported by consistent evidence from high-quality studies. Although protocol variation and limitations in generalizability must be acknowledged, these findings provide a strong basis for integrating acupressure into clinical practice. Further research is needed to standardize the duration, pressure points, and frequency of interventions, as well as explore the long-term effects and underlying neurophysiological mechanisms. With appropriate implementation, acupressure may not only improve patient comfort but also has the potential to reduce the economic burden on the health system through reduced medication use. Therefore, acupressure is worthy of consideration as part of a multidisciplinary approach to post-invasive procedure pain management.

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