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Effect of Isometric Exercise versus Hand Reflexology on Fatigue among Patients with Acute Myocardial Infarction: A Randomized Clinical Trial

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ABSTRACT

Objective: This study aimed to compare the effectiveness of isometric exercise versus hand reflexology on hemodynamic parameters and anxiety in patients with acute myocardial infarction (AMI).

Methods and Materials: A parallel-group randomized controlled design was used. A total of 88 participants were randomly allocated to three groups: the isometric exercise group (n = 26), the hand reflexology group (n = 29), and the control group (n = 33). Patients with AMI underwent a 25- to 30-minute isometric exercise session and a 10-minute hand reflexology session for 3 consecutive days. Demographic data and clinical variables were collected. Participants' anxiety was assessed in the three groups using the STAI scale, with three pretests and posttests. Data were analyzed using SPSS v26 and a parametric one-way ANOVA (Analysis of Variance) test, as well as non-parametric tests (Mann-Whitney U, Kruskal-Wallis, and Spearman correlation).

Findings: A statistically significant difference between the groups was reported in terms of all hemodynamic parameters (P < 0.001) after applying isometric exercise and hand reflexology. Also, a statistically significant difference between the groups was reported in relation to anxiety (P < 0.001).

Conclusion: The researchers concluded that isometric exercise and hand reflexology improve hemodynamic parameters significantly and reduce anxiety levels in patients with AMI. Therefore, nurses can use this easy, non-pharmacological, non-invasive, and low-cost method.

Keywords: Isometric exercise, hand reflexology, acute myocardial infarction, coronary care.

Introduction

Cardiovascular diseases (CVDs) relate to a variety of circulatory and cardiac conditions (Ahmad et al., 2020; Faleh & AL-Fayyadh, 2022). 90% of deaths from CVDs occur in middle- and low-income countries (Heidaranlu et al., 2021; Naghavi et al., 2024). Coronary artery disease (CAD), commonly referred to as ischemic heart disease, is the most common kind of CVD (AL-Mussawi & Baqer, 2024; Vaduganathan et al., 2022). In many nations, CAD is still a major cause of illness and mortality (Albadry & Hassen, 2024; Amini et al., 2021; Jasim et al., 2020; Salman & Salman, 2024).

According to current studies, ischemic heart disease (IHD) is a serious public health risk that is expected to rise globally (Al-zuhairy & Al-Jubouri, 2024; Shu et al., 2024). The 2019 Global Burden of Disease, Injuries, and Risk Factors Study estimated 197 million cases of IHD (Albadry & Hassen, 2024). In China, IHD caused 9.14 million deaths and 182 million disability-adjusted life years in 2019. From 1990 to 2021, IHD was the leading cause of death in North Africa, the Middle East, high-income countries, Central Europe, and Central Asia (Naghavi et al., 2024). Iraqi teenagers between the ages of 15 and 17 may be experiencing an increase in CAD. Hospital stays, therapeutic interventions, revascularization procedures, outpatient consultations, emergency care, and prescription drugs are all included among the costs associated with IHD (Gheorghe et al., 2018; Khan et al., 2019).

A reduction in coronary blood flow brings on Acute Myocardial Infarction (AMI). It may result in myocardial damage and ischemia, which can show up as a flattened and inverted T-wave and a rising or falling ST segment on the electrocardiogram (ECG). Arrhythmia and alterations in physiological indices, including fever, tachypnoea, hypertension, and hypotension, are among the problems that patients with AMI face (Pasyar et al., 2024). Some CAD patients report anxiety in addition to alterations in physiological markers (Rambod et al., 2020). As previously stated, patients with AMI who are admitted to the Cardiac Care Unit (CCU) may have a bad prognosis due to their numerous comorbidities and issues. As a result, it's critical to monitor these issues and offer solutions closely. Aromatherapy is one of the complementary and integrative health (CIH) treatments that have gained popularity recently (Rambod et al.,

2020). As well, reflexology (Rambod et al., 2019) has been thought to enhance health outcomes. Hand reflexology and isometric exercise (IE), a CIH therapy, have been considered in this study.

According to a study, IE enhances hemodynamic parameters (Patel et al., 2022) and reduces anxiety (Shakoor et al., 2025). Reflexology reduces pain and fatigue in long-term illnesses such as cancer (Rambod et al., 2019). However, it remains to be seen whether IE and hand reflexology can be useful during the acute stage of CVDs such as AMI. Reflexology decreased anxiety, according to a review of the research (Vardanjani et al., 2013) carefully controlled physiological metrics like blood pressure (BP) (Moeini et al., 2011)) respiration, (Abbaszadeh et al., 2018; Khalili et al., 2016) heart rate, (Elsayed et al., 2019) Saturation Level (SPO2) (Elsayed et al., 2019) and pain (Kardan et al., 2020) in patients with acute coronary syndrome who are having coronary angiography and coronary artery bypass graft (CABG) surgery. Nevertheless, research has shown that reflexology does not affect physiological markers in individuals undergoing CABG surgery (Ebadi et al., 2015).

The efficiency of reflexology in physiological parameters was the subject of conflicting findings in this research. Furthermore, they did not address the current study question, which was centred on AMI, and they showed that only a small number of studies have examined the efficacy of reflexology and IE in AMI patients. Reflexology for three consecutive days decreased chest pain in AMI, according to a study (Sayari et al., 2021). Furthermore, no research has examined the impact of IE and hand reflexology on hemodynamic parameters and anxiety in AMI patients. Therefore, the current study assessed the impact of IE and hand reflexology on hemodynamic parameters and anxiety in patients with AMI to enhance evidence-based treatment regarding their efficacy.

Methods and Materials

Study Design

A parallel-group randomized controlled design. The researcher can use this design to find the best cause-and-effect relationship between the independent variable (IE and hand reflexology) and the dependent variable (hemodynamic parameters and anxiety). They can also see how the IE and hand reflexology affect hemodynamic

parameters and anxiety among AMI patients and figure out which intervention works best.

The study was conducted at Al-Diwaniyah government hospital, which includes Al-Diwaniyah Teaching Hospital and Cardiac Catheterization and Surgery Center. The study sample will consist of AMI patients inside the CCU.

Participants

Study sample collected from patients present at Al-Diwaniyah government hospital in Al-Diwaniyah city with AMI and receiving care. Inclusion criteria were as follows: patients with AMI who were able to speak and understand Arabic and were over 18 years of age. Exclusion criteria were the AMI patient with complications requiring cardiopulmonary resuscitation,

such as a pulse rate below 60, a hearing defect, a visual problem, a decreased level of consciousness, diabetic peripheral neuropathy, drug addiction, and hepatitis C and B.

Sampling method

The procedure involves a simple random sampling of patients with AMI. The envelope should contain two colors: white for the intervention and black for the control. Minimum sample size: -26 for each group, anticipated effect size (Cohen's d) 0.8, which is considered a large effect size, desired statistical power level (0.8), and probability level 0.05. Because of the randomization process, the total sample size was 88 for the IE, hand reflexology, and control groups Figure 1.
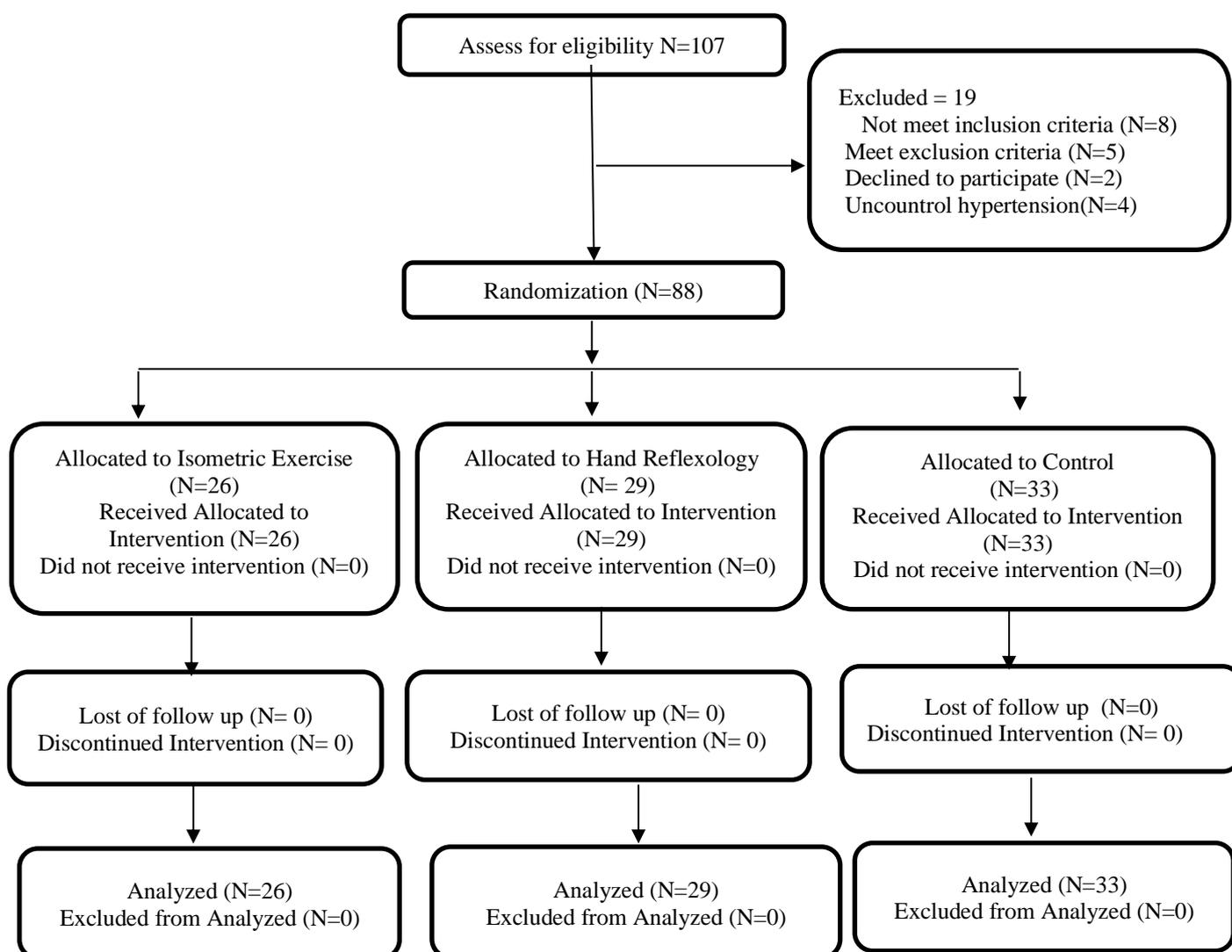

Figure 1.

CONSORT Flow Diagram of Participants in the Study

Instruments

Demographic and clinical data: -first section contains the participant's age, sex, educational level, occupation, marital status, and economic status. The second section contains (Naghavi et al., 2024) items, including systolic BP, diastolic BP, HR, and blood oxygen saturation (Spo2). The third section, the State-Trait Anxiety Inventory, was developed by Spielberger et al. (1983). Several studies have used self-report STAI for adults to evaluate the level of anxiety (Amiri et al., 2020; Ferede et al., 2022). The STAI has been used in more than 8,000 research studies across different disciplines and has been translated into more than 60 languages and dialects (Bahammam, 2016). The STAI scale is a reliable and valid tool, with internal consistency coefficients ranging from 0.86 to 0.95 (Amiri et al., 2020). This tool consists of 40 items in two parts: Form Y-1 consists of 20 items (to assess state anxiety), and Form Y-2 consists of 20 items (to assess trait anxiety).

Procedeure

The researcher obtains consent from all participants to gather the research data. The researcher engages with study participants admitted to the CCU to obtain their consent to participate and to explain the study's objectives. The study started in September 2024, with data collection initiated on June 13, 2025. Patients with AMI are randomly assigned to three groups: the IE group, the hand reflexology group, and the control group. The researcher employed hemodynamic parameters and the STAI with all patients to evaluate anxiety levels and the completion of study procedures via objective methods.

Isometric Exercise Intervention Protocol

Each participant in the IE group performs the isometric neck exercise; the AMI patient lies supine and applies a downward force to a pillow with the back of the head. An isometric back exercise involves a hook-lying position, in which the AMI patient presses the lower back downward onto a towel roll placed beneath it. For the isometric hip exercise, the AMI patient lies supine and alternately presses both heels downward onto a towel roll placed under the heels. Isometric knee exercise is performed in a long-sitting position, where the AMI patient applies downward pressure onto a towel roll placed under both knees, alternately. Each contraction lasted 10 seconds, with 10 repetitions and two IE

sessions over a period of three days. Each IE session lasted between 25 and 30 minutes.

Hand Reflexology Intervention Protocol

To prepare for the reflexology intervention, the researcher first performs an overall warming-up massage on both hands to stimulate general blood circulation, relax the tissues, and help the volunteer feel more physically and mentally at ease. After the overall massage, the researcher applies a concentrated reflexology treatment to specific reflex areas. With the help of a standardized reflexology chart, the researcher identifies and maps out the reflex areas for the solar plexus, pituitary gland, heart, and groin areas (hip joint). These areas are generally on the palm, based on hand reflexology. Each reflex point is stimulated for a period of about two minutes through the use of a thumb-walking technique. This involves bending the first knuckle of the researcher's thumb to form a firmer contact surface, and then using the thumb in a caterpillar-like motion over the reflex point. The researcher uses consistent, moderate pressure, and the thumb is slowly and steadily moved in an up-and-down or circular motion. The pressure must be sufficient to stimulate the reflex point but not be so strong as to be uncomfortable for the participant. During the session, care is taken to listen for the participant's feedback, paying attention to comfort and correct pressure application.

Ethical Considerations

The proposal was initially examined by the scientific committee of the adult nursing department before being authorized by the council of the College of Nursing/University of Baghdad. The study's protocol will be examined by members of the University of Baghdad's College of Nursing research ethics committee. The Declaration of Helsinki serves as our ethical framework for this study. Registered on 2025-8-6, the protocol was submitted to the Registry in clinicaltrials.gov with the ID (NCT07109960). The Ministry of Planning was also given a thorough overview and protocol for the study. Comprehensive Statistical Evaluation is also necessary to secure permission from the Al-Diwaniyah government hospital, which includes Al-Diwaniyah Teaching Hospital and Cardiac Catheterization and Surgery Center. When individuals volunteer to participate in this study, the researcher obtains their verbal or written consent. All

information, including name, occupation, and residence, will remain confidential.

Findings and Results

The study's findings show that, for the majority of groups, over half of the participants were within the (48-60) age group with mean age (58 ± 10, 53 ± 2, 57± 8) in the IE group, hand reflexology group, and control group, respectively.

Table 1

Comparison between Isometric Exercise, Hand Reflexology, and Control Groups in relation to patients' demographic data

Demographic Variables	Groups	Isometric Exercise Group		Hand Reflexology Group		Control Group		Significant test	P. value
		F.*	%	F.	%	F.	%	χ^2= 8.615	0.013
Age Groups	35-47	2	7.7	8	27.6	5	15.2		
	48-60	14	53.8	14	48.3	16	48.5		
	≥ 60	10	38.5	7	24.1	12	36.4		
	Total	26	100.0	29	100.0	33	100.0		
	M.± SD	58.27±9.82		53.62±2.16		57.67± 8.20			
Sex	Male	14	53.8	20	69.0	25	75.8	χ^2= 0.154	0.695
	Female	12	46.2	9	31.0	8	24.2		
	Total	26	100.0	29	100.0	33	100.0		
Educational level	Read and write	8	30.8	9	31.0	12	36.4	χ^2= 7.385	0.287
	Primary school	4	15.4	3	10.3	4	12.1		
	Intermediate school	3	11.5	3	10.3	1	3.0		
	Preparatory school	3	11.5	1	3.4	7	21.2		
	Diploma	3	11.5	4	13.8	3	9.1		
	Bachelor	4	15.4	6	20.7	5	15.2		
	Postgraduate studies	1	3.8	3	10.3	1	3.0		
	Total	26	100.0	29	100.0	33	100.0		
Occupation	Free job	5	19.2	9	31.0	11	33.3	χ^2= 2.615	0.455
	Retired	4	15.4	5	17.2	10	30.3		
	Employee Governmental	8	30.8	7	21.2	8	24.2		
	Privat	1	3.8	2	6.9	0	0.00		
	Mixed	0	0.00	1	3.4	0	0.00		
	Housewife	8	30.8	5	17.2	4	12.1		
	Total	26	100.0	29	100.0	33	100.0		
Social status	Single	2	7.7	0	0.00	0	0.00	χ^2= 24.769	0.000
	Married	17	65.4	23	79.3	27	81.8		
	Divorced	1	3.8	2	6.9	1	3.0		
	Widow	6	23.1	0	0.00	4	12.1		
	Separated	0	0.00	4	13.8	1	3.0		
	Total	26	100.0	29	100.0	33	100.0		
Monthly income	Sufficient	5	19.2	9	31.0	5	15.2	χ^2= 12.077	0.002
	Insufficient	17	65.4	16	55.2	17	51.5		
	Barely sufficient	4	15.4	4	13.8	11	33.3		
	Total	26	100.0	29	100.0	33	100.0		

F= frequency, %= percent, M. = Mean, SD= standard deviation, X2= A Chi-square test, P. value= probability value

Table 2

Differences Between Isometric Exercise, Hand Reflexology, and Control Group in related to Systolic Blood Pressure

Days	SBP	Isometric Exercise Mean rank	Hand Reflexology Mean rank	Control Mean rank	Kruska-Wallis H	Df	P.value
1st day	Before Intervention	39.29	45.59	47.65	1.654	2	0.437
	After Intervention	38.31	45.34	48.64	2.443	2	0.295
2nd day	Before Intervention	34.27	39.05	57.35	13.934	2	0.001
	After Intervention	33.19	38.98	58.26	16.108	2	0.001
3rd day	Before Intervention	28.19	34.48	66.15	38.873	2	0.001
	After Intervention	27.35	32.60	68.47	47.413	2	0.001

N= number of participants, DF= Degree of Freedom, P. value= probability value

Table 3

Mann-Whitney Test of Differences for Each Group of Intervention with Control Group in related to Systolic Blood Pressure

Groups	SBP	
1st day	Before	After
Isometric Exercise and Control	.219	.155
Hand Reflexology and Control	.733	.583
Isometric Exercise and Hand Reflexology	.347	.247
2nd day		
Isometric Exercise and Control	.001	.001
Hand Reflexology and Control	.003	.001
Isometric Exercise and Hand Reflexology	356	.241
3rd day		
Isometric Exercise and Control	.000	.001
Hand Reflexology and Control	.000	.001
Isometric Exercise and Hand Reflexology	.268	.235

Table 4

Differences Between Isometric Exercise, Hand Reflexology, and Control Groups related to Diastolic Blood Pressure

Days	DBP	Isometric Exercise Mean rank	Hand Reflexology Mean rank	Control Mean rank	Kruska-Wallis H	Df	P.value
1st day	Before Intervention	35.85	50.22	46.29	4.650	2	0.98
	After Intervention	34.62	46.62	50.42	5.900	2	0.52
2nd day	Before Intervention	30.54	44.50	55.50	14.007	2	0.001
	After Intervention	29.8	42.24	58.64	19.884	2	0.000
3rd day	Before Intervention	27.44	39.47	62.36	29.004	2	0.000
	After Intervention	27.10	39.28	62.80	30.735	2	0.000

N= number of participants, DF= Degree of Freedom, P. value= probability value

Table 5

Mann-Whitney Test of Differences for Each Group of Intervention with Control Group in related to Diastolic Blood Pressure

Groups	DBP	
1st day	Before	After
Isometric Exercise and Control	.125	.033
Hand Reflexology and Control	.561	.424
Isometric Exercise and Hand Reflexology	.034	.046
2nd day		
Isometric Exercise and Control	.001	.001
Hand Reflexology and Control	.048	.004
Isometric Exercise and Hand Reflexology	.018	.020

3rd day		
Isometric Exercise and Control	.000	.001
Hand Reflexology and Control	.000	.001
Isometric Exercise and Hand Reflexology	.024	.050

Table 6

Differences Between Isometric Exercise, Hand Reflexology, and Control Group related to Heart Rate

Days	HR	Isometric Exercise Mean rank	Hand Reflexology Mean rank	Control Mean rank	Kruska-Wallis H	Df	P.value
1st day	Before Intervention	45.25	49.34	39.65	2.261	2	0.323
	After Intervention	44.94	44.05	44.55	0.17	2	0.992
2 nd day	Before Intervention	40.4	39.60	52.32	4.967	2	0.083
	After Intervention	37.94	39.17	54.35	7.892	2	0.019
3rd day	Before Intervention	36.60	37.81	56.61	77.918	2	0.003
	After Intervention	29.73	35.81	63.77	30.998	2	0.001

N= number of participants, DF= Degree of Freedom, P. value= probability value

Table 7

Mann-Whitney Test of Differences for Each Group of Intervention with Control Group in relation to Heart Rate

Groups	HR	
1st day	Before	After
Isometric Exercise and Control	.860	.346
Hand Reflexology and Control	.854	.164
Isometric Exercise and Hand Reflexology	.478	.980
2 nd day		
Isometric Exercise and Control	.047	.011
Hand Reflexology and Control	.069	.026
Isometric Exercise and Hand Reflexology	.820	.953
3rd day		
Isometric Exercise and Control	.003	.001
Hand Reflexology and Control	.004	.001
Isometric Exercise and Hand Reflexology	.859	.296

Table 8

Differences Between Isometric Exercise, Hand Reflexology, and Control Group related to Oxygen Saturation

Days	SPO2	Isometric Exercise Mean rank	Hand Reflexology Mean rank	Control Meanrank	Kruska-Wallis H	Df	P.value
1st day	Before Intervention	38.40	42.52	51.05	3.965	2	0.138
	After Intervention	40.27	46.57	46.02	1.057	2	0.589
2 nd day	Before Intervention	47.35	50.40	37.08	4.729	2	0.094
	After Intervention	47.83	50.72	36.41	5.545	2	0.063
3rd day	Before Intervention	50.06	52.62	32.98	11.071	2	0.004
	After Intervention	50.29	53.83	31.74	14.002	2	0.001

N= number of participants, DF= Degree of Freedom, P. value= probability value

Table 9

Mann-Whitney Test of Differences for Each Group of Intervention with Control Group in relation to Oxygen Saturation

Groups	SPO2	
1st day	Before	After
Isometric Exercise and Control	.409	.057
Hand Reflexology and Control	.966	.175
Isometric Exercise and Hand Reflexology	.525	.326
2 nd day		

	.064	.065
Isometric Exercise and Control	.064	.065
Hand Reflexology and Control	.075	.038
Isometric Exercise and Hand Reflexology	.430	.556
3rd day		
Isometric Exercise and Control	.009	.004
Hand Reflexology and Control	.003	.001
Isometric Exercise and Hand Reflexology	.656	.526

Table 10

Differences Between Isometric Exercise, Hand Reflexology, and Control Group Related to Anxiety

Days	Anxiety	Isometric Exercise Mean ±SD	Hand Reflexology Mean ±SD	Control Mean ±SD	F	Df	P.value
1st day	Before Intervention	112.12±24.401	106.45±17.870	106.42±20.126	.683	2	.508
	After Intervention	104.77±23.175	101.45±16.483	103.09±12.184	.249	2	.780
2nd day	Before Intervention	96.73± 23.523	93.48±14.884	102.36±8.514	2.391	2	.098
	After Intervention	86.23±18.945	83.79±15.296	101.94±8.573	14.355	2	.001
3rd day	Before Intervention	78.04±18.512	75.66±14.756	100.94±8.430	30.398	2	.001
	After Intervention	66.73±23.518	66.55±15.983	100.88±8.912	43.697	2	.001

N= number of participants, Sd= stander deviation, DF= Degree of Freedom, P. value= probability value

Table 11

Mann-Whitney Test of Differences for Each Group of Intervention with Control Group in related to anxiety

Groups	Anxiety	
1st day	**Before**	**After**
Isometric Exercise and Control	.344	.296
Hand Reflexology and Control	.996	.655
Isometric Exercise and Hand Reflexology	.327	.548
2nd day		
Isometric Exercise and Control	.207	.006
Hand Reflexology and Control	.007	.000
Isometric Exercise and Hand Reflexology	.514	.075
3rd day		
Isometric Exercise and Control	.000	.001
Hand Reflexology and Control	.000	.001
Isometric Exercise and Hand Reflexology	.598	.974

Discussion and Conclusion

The study's findings show that, for the majority of groups, over half of the participants were within (48-60) age group with mean age (58 ± 10, 53 ± 2, 57± 8) IE group, hand reflexology group, and control group respectively. Gu et al. (2016) research on PCI patients revealed a mean age of 58 (range: 50–62 years).

Concerning to patients' sex, the study findings showed that the high percent 14(53.8), 20(69.0), 25(75.8) of studied samples for IE group, hand reflexology group, and control group respectively were male. The researcher explains the result of the study, because males are riskier to heart attacks than females, (Gao et al., 2019) reported that the incidence of CVD is more

prevalence in male than female, as well as Mousa & Mansour (2020) stated that the majority of study sample of the patients undergoing for PCI was male.

Regarding the level of education, most of the groups of the current study were within "read and write" as follows, respectively: the IE group, the hand reflexology group, and the control group: 8 (30.8), 9 (31.0), and 12(36.4). The researcher believed this was due to the lack of interest in education in the past decades. Concerning occupation, most of groups of the study were within free job category respectively as follows hand reflexology Group, and Control group as high percent 9(31.0), 11(33.3) but IE group participants recorded highly as percent 8 (30.8) in governmental employee

category. Mansour et al., (2019) showed that most of patients within free job.

According to Social status, the findings reported that the vast majority of the study participants were married, as follows: 17 (65.4), 23 (79.3), and 27 (81.8) in the IE group, hand reflexology group, and control group, respectively. The study of (Isam & Hassan, 2023), indicated that (70%) of study sample was married. Finally, with respect to monthly income, most of the groups' participants were at an insufficient level, as follows: 17 (65.4), 16 (55.2), and 17 (51.5) for the IE group, hand reflexology group, and control group, respectively. The researcher explained this because the majority of the study sample could only read and write and were not employed, in addition to the lack of private sector activity. (Omar et al., 2021) reported that monthly income level of patients, was not sufficient (63.6%) for their monthly needs.

AMI is still one of the most prevalent cardiac emergencies treated globally and a very serious condition (Vogel et al., 2021). Regardless of the particular reperfusion technique used, delivering the best possible specialized care within the CCU is crucial to achieving excellent clinical outcomes. The management quality and monitoring procedures put in place during the CCU's initial phase have been directly connected to a large percentage of avoidable complications and adverse events that occur after myocardial infarction (Thygesen et al., 2007).

Every AMI patient must have their hemodynamic parameters and anxiety assessed by coronary care nurses to provide the necessary care to avoid complications and lessen impairments (Byrne et al., 2024). There are two approaches: pharmacological and non-pharmacological, according to current research. In the CCU, non-pharmacological methods are being utilized more frequently to reduce anxiety, stabilize physiological parameters, and enhance patient outcomes (Pasyar et al., 2024). Hence the current study was conducted to examine the effect of IE versus hand reflexology on hemodynamic parameters and anxiety among AMI patients.

According to the current study's findings, both the IE and hand reflexology groups showed an important decrease in systolic and diastolic blood pressure, pulse, and SpO_2 after implementing each intervention from the first to the third day in comparison to the control group.

Additionally, a significant difference was observed between the three groups during the first two days. This can be explained based on Barbosa et al. (2025) that evaluate how isometric resistance training affects blood pressure in persons with normotension, demonstrating a decrease in systolic and diastolic blood pressure, heart rate, mean arterial pressure, and an increase in Spo2. Although acute exercise raises blood pressure, they suggested causes such as the release of vasodilator chemicals, decreased oxidative stress, and enhanced autonomic balance.

The result is validated by Harshini et al. (2021) that examined the acute effects of prolonged isometric and isotonic exercise on blood pressure and heart rate variability. It was discovered that isometric exercises dramatically reduced systolic and diastolic blood pressure during the post-exercise phase, whereas HR significantly increased in comparison to the resting condition.

From the researchers' point of view, IE doesn't require any specialized knowledge or tools and can be completed quickly and easily. Additionally, patients with AMI can benefit from this strategy. therapeutic methods to regulate sympathetic activity and prevent the negative effects of an overactive sympathetic nervous system in patient populations.

Similar findings were shown in the investigation conducted by Golitaleb et al. (2025) that examined how foot and hand reflexology affected anxiety and physiological indices (such as SBP, DBP, HR, and SpO2). Post-intervention evaluations showed that SBP and HR varied significantly between the groups, with both reflexology groups exhibiting lower values than the control. DBP and SpO2 did not, however, differ significantly between the groups.

Achieved comparable results in the investigation carried out by Kandemir & Oztekin (2019) who said that the hands, feet, and ears of every organ, gland, and body portion have reflected points. Reflexology massage improves the physiological signs in AMI patients by relieving tension and stress and fostering a sense of safety and security.

Similarly, the study carried by Khaledifar et al. (2017) who looked at how reflex treatment and massage therapy affected vital signs and tension prior to cardiac angiography found that some important indicators, such as diastolic blood pressure, heart rhythm, and breathing

rate, significantly improved. They discovered, however, that there was no discernible difference in systolic blood pressure.

The study's findings agree with research carried out by Rahmani Vasokolaei et al. (2019) that examined the effects of acupressure and hand reflexology on anxiety and vital signs in female patients with coronary artery disease. The results showed that both techniques had beneficial effects on vital signs, with statistically equal effects on the reduction of vital signs both immediately and 30 minutes after the intervention. The idea that hand reflexology is a useful technique for adjusting hemodynamic parameters in a population under stress is supported by this investigation.

According to the researchers, these results may be related to the fact that reflexology coactivates two branches of the autonomic nerve system, which may be advantageous for enhancing physiological parameters, lowering anxiety, and increasing hemostasis.

In relation to the mean score of anxiety, the present results exposed that a statistically significant difference among the mean anxiety scores in IE, hand reflexology, and the control group post applying each intervention. The study displays decrease in mean of anxiety score between intervention groups who exposed to IE and hand reflexology comparing to the control group.

The result is validated by Shakoor et al. (2025) that examined how a 10-week regimen of isometric handgrip exercises affected women with hypertension while they were under quarantine. The substantial psychological improvement attained with a straightforward isometric regimen offers concrete proof that isometric exercise can successfully lessen anxiety symptoms.

In agreement with the research carried by Ali et al. (2023) study demonstrated how hand reflexology might help patients undergoing coronary angiography with their worry, pain, and weariness. After using hand reflexology for two hours and three days, the study group's moderate anxiety scores dramatically dropped, demonstrating its efficacy in a particular high-stress clinical setting.

From the researchers' point of view, due to the unique challenges faced by AMI patients (significant hemodynamic and musculoskeletal instability, and positional needs), so we support the performance of IE and hand reflexology guided relaxation by coronary care nurses within CCU may be significant beneficial in this groups of patients.

Isometric exercise and hand reflexology helped patients with AMI feel less anxiety and have better hemodynamic values. It is a low-cost intervention that doesn't require any specialized tools unless nurses are given detailed instructions on how to use it and integrate it into their regular nursing practice. Using supplementary and integrative therapies Nurses' autonomy in making decisions and their confidence in providing patient care can both be enhanced by safe and nonpharmacologic approaches for the decrease of invasive procedures. Consequently, it is recommended that its instruction be integrated into both on-the-job training in coronary care units and academic nursing education. It is suggested that this study be repeated on patients with chronic illnesses and in additional healthcare settings.

Based on the results findings itb recommended that training program should be applied for coronary care nurses on IE and hand reflexology technique and use them as a part of usual routine nursing care for patients with AMI. Illustrated guide of IE and hand reflexology technique should be available on each coronary care unit. Future studies and repeating this study on a large sample size for generalization.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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