Review Article

Role of Aromatherapy as a Natural Complementary and Alternative Therapy in Cardiovascular Disease: A Comprehensive Systematic Review

Hamdan I AlMohammed,1 Nada A Alanazi,2 Esraa Fahad Maghrabi,2 and Manar A Alotaibi3

1Department of Basic Science, Faculty of Medicine, Almaarefa University, Riyadh 11597, Saudi Arabia
2Faculty of Medicine, University Science Malaysia (USM), 16150 Kubang Kerian, Kelantan, Malaysia
3College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia

Correspondence should be addressed to Hamdan I AlMohammed; hamohammed@mcst.edu.sa

Received 10 April 2022; Accepted 18 April 2022; Published 20 May 2022

Academic Editor: Muhammad Zia-Ul-Haq

Copyright © 2022 Hamdan I AlMohammed et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Background. The purpose of this study was a comprehensive review of studies on the effect of aromatherapy with plant essential oils on the improvement of some conditions, for example, anxiety, stress, sleep quality, fatigue, and pain in people with cardiovascular disease. Materials and Methods. We carried out this systematic review based on the instructions of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Ethical agreement was not necessary as main data have not been collected. During March 2022, we searched the main English databases, for example, Google Scholar, Web of Sciences, EMBASE, EBSCO, ScienceDirect, Scopus, and PubMed/MEDLINE, with limitation to human clinical trials. For this study, no time limit was applied for the publication of articles. Results. Out of 1380 papers, 52 papers up to March 2022 were eligible for review in this systematic review. Based on the obtained results, the most widely used medicinal plants for aromatherapy in patients with cardiovascular diseases were Lavandula angustifolia (lavender, 55.7%), Rosa damascena (Damask rose, 11.5%), and Mentha piperita (peppermint, 5.8%), respectively. Most studies have been performed on the effect of aromatherapy on coronary angiography (21 papers, 40.4%), followed by artery bypass graft surgery (14 studies, 26.9%), and cardiac patients (5 studies, 9.6%). Most studies on the effect of aromatherapy in cardiovascular diseases were performed on anxiety (31 papers, 59.6%), sleep quality (8 studies, 15.4%), and hemodynamic parameters (6 studies, 11.5%), respectively. Conclusion. This study systematically reviewed the effects of aromatherapy in patients with cardiovascular diseases. The review of studies showed that lavender, Damask rose, and peppermint are the most frequent plants used for aromatherapy, whereas they significantly improved some illnesses and conditions, especially anxiety and sleep quality. Therefore, it can be concluded that cardiologist can used aromatherapy as a natural complementary and alternative therapy particularly with lavender, Damask rose, and peppermint to improve quality of life and some conditions such as anxiety and sleep quality.

1. Introduction

Cardiovascular disease (CVD), as a disease that implicates heart and blood vessels, is considered as the highest rate of morbidity and mortality worldwide [1]. Based on the World Health Organization (WHO) reports, CVD results in about 18 million deaths, which accounts for more than 30% of all global deaths [2]. Anxiety as an ambiguous and unpleasant emotion of panic can affected several aspects of human life and is considered as one of the main difficulties in people’s lives [3]. Anxious patients may not be aware of the cause and source of their anxiety and may not know that the anxiety is due to a feeling of inner insecurity or is the result of an external situation in which they project their fear [3]. Today, it has been proven that stress and anxiety affect cardiovascular regulation and subsequently negatively affect cardiovascular parameters and tissue perfusion [4]. Studies in recent years continue to show that stress and anxiety can
have negative effects on cortisol levels, heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure, respiratory crises, etc. [5]. In addition to cardiovascular complications, depending on the severity and duration of exposure to stress and anxiety, a person may be prone to certain diseases such as sleep disorders, neurological diseases, high blood pressure, MS, and even a weakened immune system [6]. In people with cardiovascular disease, the presence of some certain factors such as high treatment costs and poor prognosis of the disease causes stress and anxiety in patients [7]. Therefore, maintaining mental health and controlling anxiety in patients is very important.

Today, the use of synthetic drugs is no longer the best way to reduce patients’ anxiety due to its many side effects. For this reason, there are many strategies, including methods available in complementary medicine, that can help control patients’ anxiety [8]. One of these useful methods in complementary medicine is aromatherapy, which in recent years and in different parts of the world has received much attention compared to other complementary medicine treatments [9]. In aromatherapy, plant-derived volatile extracts and essential oils, which contain natural chemical compounds with potential medicinal effects, are used to treat diseases [10]. According to studies, during aromatherapy, plant odor, by acting on the olfactory nerve cells and subsequently activating the limbic system, can accelerate the secretion of various neurotransmitters such as enkephalin, endorphins, noradrenaline, and serotonin, and ultimately the effect. We have a reduction in patient anxiety and stress [11].

In recent years, many studies have been conducted on aromatherapy with some essential oils as a noninvasive intervention in the treatment of some diseases such as improving anxiety in patients undergoing surgery, hemodialysis, mental disorders, etc. [11, 12]. In addition to several studies, it has been shown to have a positive and therapeutic effect of aromatherapy in reducing anxiety in patients with cardiovascular disease [13]. However, a comprehensive review study about the potential effects of aromatherapy in various cardiovascular diseases such as ischemia, open heart surgery, and angiography has not yet been made, so the purpose of this study was a comprehensive review of studies on the effect of aromatherapy with plant essential oils on the improvement of some conditions, for example, anxiety, stress, sleep quality, fatigue, and pain in people with cardiovascular disease.

2. Materials and Methods

We carried out this systematic review based on the instructions of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [14]. Ethical agreement was not necessary as main data have not been collected.

2.1. Search Strategy. During March 2022, we searched the main English databases, for example, Google scholar, Web of Sciences, EMBASE, EBSCO, ScienceDirect, Scopus, and PubMed/MEDLINE, with limitation to human clinical trials. For this study, no time limit was applied for the publication of articles. The search strategy and keywords/MeSH terms including “Cardiovascular Diseases,” “Angiography,” “Heart Failure,” “Myocardial Ischemia,” “Heart Surgery,” “Coronary Bypass Surgery,” “Aromatherapy,” “Lavender,”
## Table 1: List of studies about the effect of aromatherapy on cardiovascular diseases.

| Authors            | Cardiovascular disease | Plant                          | Factor                             | Intervention                                                                 | Outcome                                                                                       | Reference |
|--------------------|------------------------|--------------------------------|------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------|
| Aalami et al.      | Acute coronary syndrome| *Matricaria recutita* and neroli (6:2:0.5) | Sleep quality                     | Three consecutive nights                                                    | Hybrid aromatherapy caused a significant improvement in the sleep quality in patients with the acute coronary syndrome. Aromatherapy with orange essence declined the anxiety levels after coronary angiography by 36.26 ± 7.65. | [15]      |
| Abdi et al.        | Coronary angiography   | Orange essence                 | Anxiety                            | Two drops for 20 minutes                                                   | Aromatherapy with orange essential oil significantly improved the sleep quality. Followed by the aromatherapy with lavender and rose essential oil, a significant reduction was observed in the time of extubation time, pain severity, and anxiety level in patients. Lavender aromatherapy had no significant effect on decreasing mental stress where it improved the systolic blood pressure. | [16]      |
| Asgari et al.      | Coronary angiography   | Bitter orange                  | Sleep quality                      | Two to three deep breaths                                                  | Hybrid aromatherapy caused a significant improvement in the sleep quality in patients with the acute coronary syndrome. Aromatherapy with orange essence declined the anxiety levels after coronary angiography by 36.26 ± 7.65. | [17]      |
| Babatabar Darzi et al. | Artery bypass graft surgery | Lavender and damask rose | Surgical site pain severity, extubation time, and anxiety | Two drops after triggering of the first inspiration | Aromatherapy with bitter orange essential oil significantly improved the sleep quality. Followed by the aromatherapy with lavender and rose essential oil, a significant reduction was observed in the time of extubation time, pain severity, and anxiety level in patients. Lavender aromatherapy had no significant effect on decreasing mental stress where it improved the systolic blood pressure. | [18]      |
| Bikmoradi et al.   | Artery bypass graft surgery | Lavender                        | Anxiety                            | Two drops for 20 minutes on the second and third days after surgery       | Aromatherapy with damask rose essential oil, a significant decline was reported in the anxiety level. After hybrid aromatherapy with lavender, *M. recutita*, and neroli essential oil caused a significant reduction in the anxiety level, whereas it improved the vital signs and sleep quality in undergoing coronary angiography. Although the lavender aromatherapy had no significant effect on in the physiological indicators, it significantly improved the quality sleep in coronary artery bypass graft patients. | [19]      |
| Bikmoradi et al.   | Coronary angiography   | Damask rose                    | Anxiety                            | Five drops for 20 minutes                                                  | Aromatherapy with damask rose essential oil, a significant decline was reported in the anxiety level. After hybrid aromatherapy with lavender, *M. recutita*, and neroli essential oil caused a significant reduction in the anxiety level, whereas it improved the vital signs and sleep quality in undergoing coronary angiography. Although the lavender aromatherapy had no significant effect on in the physiological indicators, it significantly improved the quality sleep in coronary artery bypass graft patients. | [20]      |
| Cho et al.         | Coronary angiography   | Lavender, *M. recutita*, and neroli essential oil | Anxiety, vital signs, and sleep quality | Two drops for 10 deep breaths, before and after PCI | Aromatherapy with damask rose essential oil, a significant decline was reported in the anxiety level. After hybrid aromatherapy with lavender, *M. recutita*, and neroli essential oil caused a significant reduction in the anxiety level, whereas it improved the vital signs and sleep quality in undergoing coronary angiography. Although the lavender aromatherapy had no significant effect on in the physiological indicators, it significantly improved the quality sleep in coronary artery bypass graft patients. | [21]      |
| Davari et al.      | Artery bypass graft surgery | Lavender                        | Sleep Quality and Physiological Indicators | For 10 hours | Aromatherapy as five drops for 30 minutes after surgery improved the patient’s blood pressure. | [22]      |
| Ebrahimi Hosein Abadi | Artery bypass graft surgery | Lavender                        | Hemodynamic Indices               | 5 drops for 30 minutes after surgery                                      | Lavender aromatherapy as five drops for 30 minutes after surgery improved the patient’s blood pressure. | [23]      |
| Authors                        | Cardiovascular disease                                      | Plant                  | Factor         | Intervention                                                                 | Outcome                                                                                                                                                                                                 |
|-------------------------------|--------------------------------------------------------------|------------------------|----------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emami-Sigaroudi et al.        | Artery bypass graft surgery                                 | Lavender and damask rose | Sleep quality  | Two drops every night for 5 consecutive nights at 22:00.                      | Although aromatherapy caused an improvement in the duration, efficiency, and disturbances of sleep, no significant alteration was observed compared with the control group. Aromatherapy of artery bypass graft surgery patients with Damask rose essential oil significantly declined the anxiety level. Lavender aromatherapy in patients with myocardial infarction considerably reduced the overt and covert anxiety in the patient. The sleep quality of patients was considerably improved followed by aromatherapy with damask rose essential oil. Lavender aromatherapy results in a considerable decrease in anxiety levels and pain intensity in patients. | [24]                                                                                                                                   |
| Fazollahpour-Rokni et al. Rose| Artery bypass graft surgery                                 | Damask rose             | Anxiety        | Three drops for 10 minutes one night and one hour before surgery              | Lavender aromatherapy significantly improved the fatigue severity in the patients with heart failure. Lavender aromatherapy declined the anxiety score by 54.73.                                                                 | [25]                                                                                                                                   |
| Ganjloo et al.                | Myocardial infarction                                       | Lavender                | Anxiety        | Three drops for 20–30 min, 3 times a day for 3 days                         | Lavender aromatherapy significantly induced the pain perception intensity on the 30 and 60-minute phases after intervention. Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [26]                                                                                                                                   |
| Hajibagheri et al.            | Cardiac patients                                            | Damask rose             | Sleep quality  | Three drops for three subsequent nights                                      | Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [27]                                                                                                                                   |
| Hasanzadeh et al.             | Artery bypass graft surgery                                 | Lavender                | Anxiety        | 1–2 drops for 20 minutes                                                    | Lavender aromatherapy significantly improved the fatigue severity in the patients with heart failure. Lavender aromatherapy declined the anxiety score by 54.73.                                                                 | [28]                                                                                                                                   |
| Hasanzadeh et al.             | Heart failure                                               | Lavender                | Fatigue        | Three drops for 15 days                                                      | Lavender aromatherapy significantly improved the fatigue severity in the patients with heart failure. Lavender aromatherapy declined the anxiety score by 54.73.                                                                 | [29]                                                                                                                                   |
| Heidari et al.                | Artery bypass graft surgery                                 | Lavender                | Anxiety        | Two drops for 20 minutes                                                    | Lavender aromatherapy significantly induced the pain perception intensity on the 30 and 60-minute phases after intervention. Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [30]                                                                                                                                   |
| Heidari Gorji et al.          | Artery bypass graft surgery                                 | Lavender                | Pain perception | Two drops 15 minutes                                                         | Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [31]                                                                                                                                   |
| Hosseini et al.               | Artery bypass graft surgery                                 | Lavender                | Anxiety        | Two drops for 20 minutes                                                    | Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [32]                                                                                                                                   |
| Jodaki et al.                 | Cardiac patients                                            | Damask rose             | Anxiety and sleep quality         | Five drops for three consecutive nights                                    | Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [33]                                                                                                                                   |
| Karadag et al.                | Patients in coronary ICU                                     | Lavender                | Anxiety        | Two drops for 2% essential oil, for 15 nights                               | Lavender aromatherapy significantly decreased the anxiety and plasma cortisol levels. After aromatherapy with Damask rose essential oil a five drops for three consecutive nights, a significant improvement in the sleep quality and anxiety level was observed. Aromatherapy significantly reduced the anxiety level in the patients in coronary ICU. | [34]                                                                                                                                   |
| Authors            | Cardiovascular disease | Plant                                      | Factor                                      | Intervention                  | Outcome                                                                 | Reference |
|--------------------|------------------------|--------------------------------------------|---------------------------------------------|-------------------------------|-------------------------------------------------------------------------|-----------|
| Kim et al.         | Coronary angiography   | Lavender, Bergamot, and ylang-ylang        | Anxiety, state of sleep, and satisfaction of sleep | Three drops for 5 minutes   | After aromatherapy with combination of bergamot, lavender and ylang-ylang reduced anxiety levels by 39% and improved sleep satisfaction. Peppermint oil aromatherapy in patient candidates for angiography significantly declined the level of anxiety from 51.9 ± 5.12 to 47.9 in comparison with the control group. After aromatherapy with peppermint essential oil a significant reduction was observed in nausea and vomiting after open heart surgery. Lavender and peppermint aromatherapy significantly improved the fatigue severity in the cardiac patients. Followed by lavender aromatherapy, the sleep quality was significantly improved in the ischemic heart disease patients. In patients with cardiac ischemia, lavender aromatherapy considerably declined the anxiety level in comparison with the control group. Significantly improved the hemodynamic parameters and also declined the anxiety level. | [35]      |
| Koohestani et al.  | Coronary angiography   | Peppermint oil                             | Anxiety                                     | 0.2 ml for 20 minutes        |                                                                                                     | [36]      |
| Maghami et al.     | Artery bypass graft surgery | Peppermint                                 | Nausea and vomiting                         | Two drops 30 min before tracheal extubation, 4 h, and 8 h after endotracheal tube removal.           |                                                                                                     | [37]      |
| Mahdavikian et al. | Cardiac patients       | Lavender and peppermint                     | Fatigue                                     | Three drops for 7 nights     |                                                                                                     | [38]      |
| Mirbastegean et al.| Myocardial infarction  | Lavender                                   | Anxiety                                     | Three drops for 30 min 3 times a day for 3 days |                                                                                                     | [39]      |
| Moeini et al.      | Cardiac ischemia       | Lavender                                   | Sleep quality                               | Three nights, each time 9 hours |                                                                                                     | [40]      |
| Moradi et al.      | Cardiac ischemia       | Lavender                                   | Anxiety                                     | Two drop for 20 min during the second and third day of hospitalization |                                                                                                     | [41]      |
| Moradi et al.      | Coronary angiography   | Bitter orange                              | Anxiety                                     | Four ml for 15–20 minutes    |                                                                                                     | [42]      |
| Najafi et al.      | Myocardial infarction  | Lavender                                   | Anxiety                                     | Three drops for 20 min twice a day for two days |                                                                                                     | [43]      |
| Nematollahi et al. | Acute coronary syndrome| Lavender, M. recutita, and neroli (6 : 2 : 0.5) | Anxiety                                     | For three consecutive nights at 21:00 p.m. | Lavender aromatherapy in patients with myocardial infarction considerably declined the anxiety level. Aromatherapy with mixture of lavender, M. recutita, and neroli (6 : 2 : 0.5) results in a significant reduction in the anxiety level in patients with the acute coronary syndrome. | [44]      |
Table 1: Continued.

| Authors          | Cardiovascular disease | Plant       | Factor          | Intervention | Outcome                                                                                      | Reference |
|------------------|------------------------|-------------|-----------------|--------------|----------------------------------------------------------------------------------------------|-----------|
| Otaghi et al.    | Coronary angiography   | Lavender    | Sleep quality   | 15 drops for 24 hours, every 8 hours       | Lavender aromatherapy had no significant effect on the sleep quality in patients undergoing coronary angiography when compared with the control group. | [45]      |
| Panjalizadeh B   | Coronary angiography   | Lavender    | Anxiety         | Five drops for 5 min 12 hours and 30 minutes before angiography | Lavender aromatherapy results in no considerable effect on decreasing anxiety in coronary angiography patients. | [46]      |
| Patsalis et al.  | Cardiac patients       | Lavender    | Anxiety         | Three drops 30 min                          | Lavender aromatherapy in the cardiovascular patients considerably declined the anxiety level. Followed by lavender aromatherapy a significant decrease in the hemodynamic parameters (e.g., blood pressure and respiratory rate) was observed. | [47]      |
| Pourmirzaie et al.| Coronary angiography   | Lavender    | Hemodynamic indexes | Two drops for 20 minutes          | Lavender aromatherapy considerably declined the level of anxiety from 45.71 to 39.53. After lavender aromatherapy, a significant improvement in the sleep quality was observed in patients undergoing coronary angiography. A considerable reduction was observed in the anxiety level (7.23 to 6.80) and heart rate followed by lavender aromatherapy with lavender. Significantly improved the heart rate and anxiety on the 4th day after the intervention | [48]      |
| Pourmovahed et al.| Artery bypass graft surgery | Lavender  | Anxiety         | Two drops for 20 minutes                   | | | | |
| Rafi et al.      | Coronary angiography   | Lavender    | Sleep quality   | 15 drops for 24 h before intervention       | | | | |
| Rajai et al.     | Artery bypass graft surgery | Lavender  | Anxiety         | Two drops on the morning of surgery         | | | | |
| Rambod et al.    | Myocardial infarction  | Lemon       | Blood pressure and heart rate | Five drops for 5 minutes                   | | | | |
| Seifi et al.     | Artery bypass graft surgery | Lavender  | Anxiety         | Two drops for 20 minutes on the second and third days after surgery | | | | |
| Shirzadegan et al.| Acute myocardial infarction | Geranium aroma | Anxiety       | 20 min a day on two consecutive days. | | | | |
| Authors            | Cardiovascular disease | Plant                          | Factor          | Intervention                                | Outcome                                                                                                           | Reference |
|--------------------|------------------------|--------------------------------|-----------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------|
| Soleimani et al.   | Cardiac patients       | Peppermint                      | Anxiety         | 100% peppermint essential oil for 1 h       | After aromatherapy with peppermint essential oil, a considerable decline was observed in anxiety level in cardiac patients in emergency department, when compared with the control group. Hybrid aromatherapy with lavender, ylang-ylang, and neroli oil. Results in a significant reduction in stress score and systolic blood pressure. | [55]      |
| Song et al.        | Coronary angiography   | Lavender, ylang-ylang, and neroli oil | Stress and blood pressure | Three drops for deep breaths | Hybrid aromatherapy with lavender, ylang-ylang, and neroli oil. Results in a significant reduction in stress score and systolic blood pressure. | [56]      |
| Tahmasebi et al.   | Coronary angiography   | Lavender                        | Anxiety         | Two drops for 3 minutes                     | Aromatherapy caused a significant reduction in the anxiety level of patients. Followed by aromatherapy, a significant improvement in the anxiety and hemodynamic, and physiologic parameters was observed. After aromatherapy with lavender, a significant reduction was observed in the pulse number, respiratory rate, and the systolic and diastolic blood pressure. | [57]      |
| Tahmasebi et al.   | Coronary angiography   | Lavender                        | Anxiety and systolic blood pressure, pulse rate, and respiratory rate | Three drops for 3 minutes | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and physiologic parameters was observed. After aromatherapy with lavender, a significant reduction was observed in the pulse number, respiratory rate, and the systolic and diastolic blood pressure. | [58]      |
| Tahmasebi et al.   | Coronary angiography   | Lavender                        | Vital sign      | Three drops for 3 minutes                  | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and physiologic parameters was observed. After aromatherapy with lavender, a significant reduction was observed in the pulse number, respiratory rate, and the systolic and diastolic blood pressure. | [59]      |
| Tazakori et al.    | Coronary angiography   | Damask rose                     | Anxiety         | 15 drops for 3 times every 8 hours         | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and also declined the anxiety level. Followed by the lavender aromatherapy, the level of anxiety and stress scores was significantly declined by 30.7 and 9.6, respectively. Followed by aromatherapy with Melissa essential oil, a considerable decline was observed in stress level, arterial pressure, and heart rate 5 min after aromatherapy. In coronary angiography patients, lavender aromatherapy results in a significant reduction in the anxiety level. | [60]      |
| Teymouri et al.    | Coronary angiography   | Lavender                        | Anxiety         | Two drops for 20 minutes                   | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and also declined the anxiety level. Followed by the lavender aromatherapy, the level of anxiety and stress scores was significantly declined by 30.7 and 9.6, respectively. Followed by aromatherapy with Melissa essential oil, a considerable decline was observed in stress level, arterial pressure, and heart rate 5 min after aromatherapy. In coronary angiography patients, lavender aromatherapy results in a significant reduction in the anxiety level. | [61]      |
| Veiskaramian et al.| Acute coronary syndrome| Melissa                         | Stress          | Two drops, 10–90 nights                    | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and also declined the anxiety level. Followed by the lavender aromatherapy, the level of anxiety and stress scores was significantly declined by 30.7 and 9.6, respectively. Followed by aromatherapy with Melissa essential oil, a considerable decline was observed in stress level, arterial pressure, and heart rate 5 min after aromatherapy. In coronary angiography patients, lavender aromatherapy results in a significant reduction in the anxiety level. | [62]      |
| Ziyaeifard et al.  | Coronary angiography   | Lavender                        | Anxiety         | Five drops for 5 min                       | Aromatherapy caused a significant reduction in the anxiety and hemodynamic, and also declined the anxiety level. Followed by the lavender aromatherapy, the level of anxiety and stress scores was significantly declined by 30.7 and 9.6, respectively. Followed by aromatherapy with Melissa essential oil, a considerable decline was observed in stress level, arterial pressure, and heart rate 5 min after aromatherapy. In coronary angiography patients, lavender aromatherapy results in a significant reduction in the anxiety level. | [63]      |
2.2. Selection of Studies. At first, all papers were imported into EndNote X10 (Thomson Reuters, New York, NY, USA), and duplicate publications were omitted. The titles, summary or both, of every paper were independently checked by two review authors to assess which papers should be evaluated further. The authors then examined and read full texts of all potentially eligible papers that adequately encountered the inclusion criteria for more analysis. Disagreements were resolved through consent or judged by a third review author.

2.3. Eligibility Criteria. In this study, the inclusion criteria of publications were as follows: full and peer-reviewed clinical trials assessing the effect of aromatherapy on patients with cardiovascular diseases were included in this study. We excluded basic experimental studies, nonclinical trial studies, studies that are presented as abstracts and only in congresses as preceding papers, and editorial papers without full text. In the next step, studies with week methodology, insufficient data, unsuitable analysis, discrepancy between methods and results, too much emphasis on important of results, and confusing presentation were excluded from this review (Figure 1).

2.4. Data Extraction. The extracted and required data were included authors’ name (last name of first author), type of cardiovascular disease, the name of plant that was used, type of factor evaluated (e.g., anxiety, sleep quality, and hemodynamic parameters), intervention method, outcome of study, and reference.
3. Results

Out of 1380 papers, 52 papers up to March 2022 were eligible for review in this systematic review with the extracted required information existing in Tables 1. Based on the obtained results, the most widely used medicinal plants for aromatherapy in patients with cardiovascular diseases were Lavandula angustifolia (lavender, 55.7%), Rosa damascena (Damask rose, 11.5%), and Mentha piperita (peppermint, 5.8%), respectively. Figure 2 depicted the used medicinal plants for aromatherapy in patients with cardiovascular diseases. As shown in Figure 3, most studies have been performed on the effect of aromatherapy on coronary angiography (21 papers, 40.4%), followed by artery bypass graft surgery (14 studies, 26.9%), and cardiac patients (5 studies, 9.6%). Most studies on the effect of aromatherapy in cardiovascular diseases were performed on anxiety (31 papers, 59.6%), sleep quality (8 studies, 15.4%), and hemodynamic parameters (6 studies, 11.5%), respectively (Figure 4).

4. Discussion

From last centuries, aromatherapy as a natural complementary and alternative therapy has been broadly used for treating various diseases and conditions [10]. In recent years, aromatherapy, which uses essential oils, has taken more attention due to its high efficacy, popularity, and extensive use. [65]. Essential oils as highly concentrated products derived from various parts of plants (e.g., leaves, root, and flowers) are composed of phytochemicals such as phenols, terpene, aldehydes, and esters, which can provide characteristic odors [66]. The external application and inhalation of oils are the main basics of aromatherapy for treating a number of mental disorders and illnesses [67]. Previous
Another plant used in aromatherapy in cardiovascular patients is the *Mentha piperita*, which also called peppermint. Reviews showed that this plant has various pharmacological properties, for example, anxiolytic, analgesic, sedative, and sleep quality enhancer [76]. Recent clinical trials reported the potent effects of peppermint in aromatherapy for treating some illness and conditions such as anxiety, fatigue, stress, depression, and pain through affecting the olfactory pathways of the brain, decrease anxiety, relieve pain, relaxation increase, regulating pulse rate, and improving sleep quality [77]. Although studies reported the possible mechanisms of plant essential oils in aromatherapy, more studies are required to elucidate the main mechanism in various pathways [78].

5. Conclusion

This study systematically reviewed the effects of aromatherapy in patients with cardiovascular diseases. The review of studies showed that lavender, Damask rose, and peppermint are the most frequent plants used for aromatherapy, whereas they significantly improved some illnesses and conditions, especially anxiety and sleep quality. Therefore, it can be concluded that cardiologist can used aromatherapy as a natural complementary and alternative therapy particularly with lavender, Damask rose, and peppermint to improve quality of life and some conditions such as anxiety and sleep quality.

Data Availability

All data generated or analyzed during this study are included in this published article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

The authors would like to thank the Research Supporting Program (TUMA—Project 2021–33) Almaarefa University, Riyadh Saudi Arabia, for supporting this work.

References

[1] A. K. Malakar, D. Choudhury, B. Halder, P. Paul, A. Uddin, and S. Chakraborty, "A review on coronary artery disease, its risk factors, and therapeutics," *Journal of Cellular Physiology*, vol. 234, no. 10, pp. 16812–16823, 2019.
[2] G. A. Roth, G. A. Mensah, C. O. Johnson et al., "Global burden of cardiovascular diseases and risk factors, 1990–2019: update from the GBD 2019 study," *Journal of the American College of Cardiology*, vol. 76, no. 25, pp. 2982–3021, 2020.
[3] T. Bansal and A. Joon, "Preoperative anxiety—An important but neglected issue: a narrative review," *Indian Anaesthetists Forum*, vol. 17, no. 2, pp. 37–42, 2016.
[4] F. Thibaut, "Anxiety disorders: a review of current literature," *Dialogues in Clinical Neuroscience*, vol. 19, no. 2, pp. 87–88, 2017.
[5] B. O. Olatunji, J. M. Cisler, and D. F. Tolin, “Quality of life in the anxiety disorders: a meta-analytic review,” Clinical Psychology Review, vol. 27, no. 5, pp. 572–581, 2007.
[6] P. J. Tully, N. J. Harrison, P. Cheung, and S. Cosh, “Anxiety and cardiovascular disease risk: a review,” Current Cardiology Reports, vol. 18, no. 12, pp. 120–128, 2016.
[7] T. Müller-Tasch, B. Löwe, N. Lossnitzer et al., “Anxiety and self-care behaviour in patients with chronic systolic heart failure: a multivariate model,” European Journal of Cardiovascular Nursing, vol. 17, no. 2, pp. 170–177, 2018.
[8] B. Bandelow, S. Michaelis, and D. Wedekind, “Treatment of anxiety disorders,” Dialogues in Clinical Neuroscience, vol. 19, no. 2, pp. 93–107, 2017.
[9] M. Gong, H. Dong, Y. Tang, W. Huang, and F. Lu, “Effects of aromatherapy on anxiety: a meta-analysis of randomized controlled trials,” Journal of Affective Disorders, vol. 274, pp. 1028–1040, 2020.
[10] B. Cooke and E. Ernst, “Aromatherapy: a systematic review,” British Journal of General Practice, vol. 50, no. 455, pp. 493–496, 2000.
[11] D. I. Sánchez-Vidaña, S. P. C. Ngai, W. He, J. K. W. Chow, B. W. M. Lau, and H. W. H. Tsang, “The effectiveness of aromatherapy for depressive symptoms: a systematic review and meta-analysis,” Evidence-Based Complementary and Alternative Medicine, vol. 2017, Article ID 5869315, 21 pages, 2017.
[12] W. Maddocks-Jennings and J. M. Wilkinson, “Aromatherapy practice in nursing: literature review,” Journal of Advanced Nursing, vol. 48, no. 1, pp. 93–103, 2004.
[13] S. Turan Kavradim, S. To¨ y¨ oz, and Z. Ozer, “Effectiveness of lavender essence inhalation on anxiety and haemodynamic variables for patients with cardiovascular disease: a systematic review and meta-analysis,” International Journal of Clinical Practice, vol. 75, no. 11, Article ID e14593, 2021.
[14] M. J. Page, J. E. McKenzie, P. M. Bossuyt et al., “The PRISMA 2020 statement: an updated guideline for reporting systematic reviews,” BMJ Clinical Research, vol. 372, p. n71, 2021.
[15] H. Aalami, H. M. Moghadam, M. B. Moghaddam, and J. Bazeli, “Effect of hybrid aromatherapy on sleep quality of patients with acute coronary syndrome admitted to cardiac care unit,” World Family Medicine Journal/Middle East Journal of Family Medicine, vol. 16, pp. 268–275, 2018.
[16] J. H. Abdı, S. Hejazi, H. Tahmasebi, and J. F. Abdı, “Effect of Aromatherapy with orange essential oils on anxiety in patients experiencing coronary angiography: a randomized control trial,” Journal of Urmsia Nursing and Midwifery Faculty, vol. 15, no. 11, pp. 806–814, 2018.
[17] M. R. Asgari, A. Vafaee-Moghadam, H. Babamohamadi, R. Ghorbani, and R. Esmaeili, “Comparing acupressure with aromatherapy using Citrus aurantium in terms of their effectiveness in sleep quality in patients undergoing percutaneous coronary interventions: a randomized clinical trial,” Complementary Therapies in Clinical Practice, vol. 38, Article ID 101066, 2020.
[18] H. Babatabar Darzi, A. Vahedian-Azimi, S. Ghasemi, A. Ebadı, T. Sathiyapalan, and A. Sahebkar, “The effect of aromatherapy with rose and lavender on anxiety, surgical site pain, and extubation time after open-heart surgery: a double-center randomized controlled trial,” Phytotherapy Research, vol. 34, no. 10, pp. 2675–2684, 2020.
[19] A. Bikmoradi, Z. Seifi, J. Poorolajal, M. Araghchian, R. Safaaryan, and K. Oshvandi, “Effect of inhalation aromatherapy with lavender essential oil on stress and vital signs in patients undergoing coronary artery bypass surgery: a single-blinded randomized clinical trial,” Complementary Therapies in Medicine, vol. 23, no. 3, pp. 331–338, 2015.
[20] A. Bikmoradi, G. Roshanaei, S. Moradkhani, and A. Fatahi, “Impact of inhalation aromatherapy with damask rose on anxiety of patients undergoing coronary angiography: a single-blind randomized controlled clinical trial,” Avicenna Journal of Nursing and Midwifery Care, vol. 28, no. 2, pp. 93–102, 2020.
[21] M. Y. Cho, E. S. Min, M. H. Hur, and M. S. Lee, “Effects of aromatherapy on the anxiety, vital signs, and sleep quality of percutaneous coronary intervention patients in intensive care units,” Evidence-Based Complementary and Alternative Medicine, vol. 2013, Article ID 381381, 6 pages, 2013.
[22] H. Davari, A. Ebrahimian, S. Rezayei, and M. Tourdeh, “Effect of lavender aromatherapy on sleep quality and physiological indicators in patients after cagb surgery: a clinical trial study,” Indian Journal of Critical Care Medicine, vol. 25, no. 4, pp. 429–434, 2021.
[23] S. Ebrahim Hosein Abadi, E. Paryad, A. Ghanbari Khanghah, A. Pardaran, E. Kazem Nezhad Leyli, and A. M. Sadeghi Mebodi, “Effects of aromatherapy using lavender oil on hemodynamic indices after coronary artery bypass graft surgery,” Journal of Holistic Nursing and Midwifery, vol. 28, no. 3, pp. 163–170, 2018.
[24] A. Emami-Sigaroudi, A. Salari, A. Nouriaeeed et al., “Comparison between the effect of aromatherapy with lavender and damask rose on sleep quality in patients undergoing coronary artery bypass graft surgery: a randomized clinical trial,” ARYA Atherosclerosis, vol. 17, no. 1, p. 9, 2021.
[25] F. Fazlollahpour-Rokni, S. A. Shoroﬁ, N. Mousavinasab, R. Ghafari, and R. Esmaeili, “The effect of inhalation aromatherapy with rose essential oil on the anxiety of patients undergoing coronary artery bypass graft surgery,” Complementary Therapies in Clinical Practice, vol. 34, pp. 201–207, 2019.
[26] J. Ganjloo, N. Mirbastegan, S. S. Najefi, and M. Rakhshani, “The effects of inhaling lavender oil on patients’ anxiety with myocardial infarction,” Journal of Sabzevar University of Medical Sciences, vol. 21, no. 6, pp. 1064–1072, 2019.
[27] A. Hajibagheri, A. Babaii, and M. Adb-Hejargheiri, “Effect of Rosa damascena aromatherapy on sleep quality in cardiac patients: a randomized controlled trial,” Complementary Therapies in Clinical Practice, vol. 20, no. 3, pp. 159–163, 2014.
[28] F. Hasanazadeh, N. M. Kashouk, S. Amini et al., “The effect of cold application and lavender oil inhalation in cardiac surgery patients undergoing chest tube removal,” EXCLI Journal, vol. 15, pp. 64–74, 2016.
[29] M. Hassanazadeh, Z. Farsi, and S. A. Sajadi, “Comparison of the effect of Sedamin and aromatherapy with Lavender on fatigue severity of patients with heart failure: a three arm randomized controlled trial,” Journal of Herbal Medicine, vol. 34, Article ID 100514, 2021.
[30] A. Heidari, S. H. Adeli, S. A. Tazyky et al., “The effect of lavender oil inhalation on anxiety and some physiological parameters of open-heart surgery patients,” Journal of Medical Ethics and History of Medicine, vol. 6, no. 0, pp. 1–6, 2013.
[31] M. A. Heidari Gorji, O. G. Ashrastaghi, V. Habibi, J. Y. Charati, M. A. Ebrahimzadeh, and M. Ayasi, “The effectiveness of lavender essence on sternotomy related pain intensity after coronary artery bypass grafting,” Advanced Biomedical Research, vol. 4, p. 127, 2015.
of anxiety and blood cortisol in candidates for open-heart surgery,” *Iranian Journal of Nursing and Midwifery Research*, vol. 21, no. 4, pp. 397–401, 2016.

[33] K. Jodaki, K. Abdi, R. Mohktari, H. Asayesh, V. Vandal, and M. Golitaleb, “Effect of rosa damascene aromatherapy on anxiety and sleep quality in cardiac patients: a randomized controlled trial,” *Complementary Therapies in Clinical Practice*, vol. 42, Article ID 101299, 2021.

[34] E. Karadag, S. Samancioglu, D. Ozden, and E. Bakir, “Effects of aromatherapy on sleep quality and anxiety of patients,” *Nursing in Critical Care*, vol. 22, no. 2, pp. 105–112, 2017.

[35] H.-Y. Kim and S. Lee, “Effects of aromatherapy on anxiety and sleep of inpatients with coronary angiography,” *Journal of Korea Society for Plants People and Environment*, vol. 17, no. 6, pp. 457–463, 2014.

[36] R. Koohestani Ein-O-Din, A. Faghhi, Z. Ahmadi, R. Jamhiri, S. Hosseini Teshnizi, and H. Farshidi, “The effect of inhalation of peppermint aroma on anxiety in patients undergoing coronary angiography,” *Hayat*, vol. 26, no. 3, pp. 266–279, 2020.

[37] M. Maghami, M. R. Afazel, I. Azizi-Fini, and M. Maghami, “The effect of aromatherapy with peppermint essential oil on nausea and vomiting after cardiac surgery: a randomized clinical trial,” *Complementary Therapies in Clinical Practice*, vol. 40, Article ID 101199, 2020.

[38] S. Mahdavikian, M. Fallahi, and A. Khatony, “Comparing the effect of aromatherapy with peppermint and lavender essential oils on fatigue of cardiac patients: a randomized controlled trial,” *Evidence-Based Complementary and Alternative Medicine*, vol. 2021, Article ID 9925945, 7 pages, 2021.

[39] N. Mirbostanegar, J. Ganji, M. Bakshandeh Bavrasad, and M. Rakhshani, “Effects of aromatherapy on anxiety and vital signs of myocardial infarction patients in intensive care units,” *IJUM Medical Journal Malaysia*, vol. 15, no. 2, pp. 37–42, 2016.

[40] M. Moeini, M. Khadibi, R. Bekhradi, S. A. Mahmoudian, and F. Nazari, “Effect of aromatherapy on the quality of sleep in ischemic heart disease patients hospitalized in intensive care units of heart hospitals of the Isfahan University of Medical Sciences,” *Iranian Journal of Nursing and Midwifery Research*, vol. 15, no. 4, pp. 234–239, 2010.

[41] K. H. Moradi, H. Ashtrarian, F. Darabi, A. M. Hashemian, and F. Saifi, “Survey on the effects of Lavender aromatherapy on the anxiety and vital signs of patients with ischemic heart diseases hospitalized in cardiac intensive care units,” *Journal of Clinical Research in Paramedical Sciences*, vol. 4, no. 4, pp. 301–310, 2016.

[42] K. Moradi, H. Ashtrarian, N. Y. Danzima et al., “Essential oil from citrus aurantium alleviates anxiety of patients undergoing coronary angiography: a single-blind, randomized controlled trial,” *Chinese Journal of Integrative Medicine*, vol. 27, no. 3, pp. 177–182, 2021.

[43] Z. Najafi, M. Taghadosi, K. Sharifi, A. Farrokhian, and Z. Taghrooobi, “The effects of inhalation aromatherapy on anxiety in patients with myocardial infarction: randomized clinical trial,” *Iranian Red Crescent Medical Journal*, vol. 16, no. 8, Article ID e15485, 2014.

[44] M. R. Nematollahi, J. Bazel, M. B. Moghaddam, and H. Aalami, “Effect of aromatherapy on anxiety in patients with acute coronary syndrome hospitalized in cardiac care unit,” *Bali Medical Journal*, vol. 6, no. 2, pp. 331–340, 2017.

[45] M. Otaghi, S. Qavam, S. Norozi, M. Borji, and M. Moradi, “Investigating the effect of lavender essential oil on sleep quality in patients candidates for angiography,” *Biomedical and Pharmacology Journal*, vol. 10, no. 1, 2017.

[46] B. Panjali-zadeh and M. Jalalzaydi, “The effect of aroma therapy with lavender oil and comparison with premedication in patients undergoing angiography,” *Journal of Biochemical Technology*, vol. 10, no. 2, pp. 138–142, 2019.

[47] P. G. Patsalis, A. B. Malik-Patsalis, H. G. Rauscher et al., “Efficacy of auricular acupuncture and lavender oil aromatherapy in reducing preinterventional anxiety in cardiovascular patients: a randomized single-blind placebo-controlled trial,” *Journal of Integrative and Complementary Medicine*, vol. 28, no. 1, pp. 45–50, 2022.

[48] M. Pourmizrazia, F. Taymouri, Z. Farsi, N. Rajai, and N. M. Mousavi, “The effects of inhaling lavender fragrance on hemodynamic indexes during sheath take out in patients after coronary angiography in a military hospital,” *Military Caring Sciences*, vol. 4, no. 1, pp. 30–38, 2017.

[49] Z. Pourmohamed, H. Zare Zardini, A. Vahidi, and E. Jafari Tadi, “The effect of inhalation aromatherapy on anxiety level of the patients before coronary artery bypass graft surgery (CABG),” *Journal of Rafsanjan University of Medical Sciences and Health Services*, vol. 15, no. 6, pp. 551–562, 2016.

[50] N. Rafi, A. Khodadadizadeh, M. S. Nematabad, and A. Reza, “The evaluation of the effect of aromatherapy with lavender essential oil on the quality of sleep of cardiac patients candidate for angiography,” *Pakistan Journal of Medical and Health Sciences*, vol. 14, no. 2, pp. 1143–1147, 2020.

[51] N. Rajai, S. A. Sajadi, F. Taymouri, A. Zareiyan, S. Sivasoti, and M. Malmir, “The effect of aromatherapy with lavender essential oil on anxiety and stress in patients undergoing coronary artery bypass graft surgery,” *Jundishapur Journal of Chronic Disease Care*, vol. 5, no. 4, 2016.

[52] M. Rambod, M. Rakhshan, S. Tohidinik, and M. H. Nikoo, “The effect of lemon inhalation aromatherapy on blood pressure, electrocardiogram changes, and anxiety in acute myocardial infarction patients: a clinical, multi-centered, assessor-blinded trial design,” *Complementary Therapies in Clinical Practice*, vol. 39, Article ID 101155, 2020.

[53] Z. Seifi, A. Beikmoradi, K. Oshvandi, J. Poorolajal, M. Aragchian, and R. Safaryan, “The effect of lavender essential oil on anxiety level in patients undergoing coronary artery bypass graft surgery: a double-blinded randomized clinical trial,” *Iranian Journal of Nursing and Midwifery Research*, vol. 19, no. 6, pp. 574–580, 2014.

[54] R. Shirzadegan, M. Gholami, S. Hasanvand, M. Birjandi, and A. Beiravand, “Effects of geranium aroma on anxiety among patients with acute myocardial infarction: a triple-blind randomized clinical trial,” *Complementary Therapies in Clinical Practice*, vol. 29, pp. 201–206, 2017.

[55] M. Soleimanian, L. S. Kashi, and M. mirmohamadkhani, “The effect of aromatherapy with peppermint essential oil on anxiety of cardiac patients in emergency department: a placebo-controlled study,” *Complementary Therapies in Clinical Practice*, vol. 46, Article ID 101533, 2022.

[56] E. J. Song and M. Y. Lee, “Effects of aromatherapy on stress responses, autonomic nervous system activity and blood pressure in the patients undergoing coronary angiography: a non-randomized controlled trial,” *Journal of Korean Academy of Nursing*, vol. 48, no. 1, pp. 1–11, 2018.

[57] H. Tahmasbi, G. Mahmoodi, V. Mokhberi, S. Hassani, H. Akbarzadeh, and N. Rahnamai, “The impact of aromatherapy on the anxiety of patients experiencing coronary angiography,” *Zahedan Journal of Research in Medical Sciences*, vol. 14, no. 3, pp. 51–55, 2012.
Evidence-Based Complementary and Alternative Medicine 13

[58] T. homeira, H. Darvishkhezri, H. Abdi, A. Abbasi, and N. Asghari, "The effect of Benson relaxation and aromatherapy on anxiety and physiological indicators in patients undergoing coronary angiography," Journal of Nursing and Midwifery Sciences, vol. 12, no. 12, pp. 1094–1103, 2015.

[59] T. homeira and S. Hasani, "The comparing the effect of aroma inhalation lavendola and Benson relaxation on condition of the vital sign patients experiencing coronary angiography," Journal of Nursing and Midwifery Sciences, vol. 14, no. 8, 2016.

[60] Z. Tazakori, S. Babaei, M. Karimollahi, M. M. Ahmadian-Attari, and F. Bayat, "The effect of oral damask rose extract on anxiety of patients undergoing coronary angiography," Journal of Health Care, vol. 18, no. 3, pp. 207–216, 2016.

[61] F. Teymouri, N. Rajai, Z. Farsi, and M. Pourmizrzi, "The effects of inhaling lavender fragrance on stress and anxiety during sheath take out in patients after coronary angiography," Journal of Medicinal Plants, vol. 4, no. 72, pp. 78–89, 2020.

[62] A. Veiskaramian, M. Gholami, S. Yarahmadi, P. Amanolahi Baharvand, and M. Birjandi, "Effect of aromatherapy with Melissa essential oil on stress and hemodynamic parameters in acute coronary syndrome patients: a clinical trial in the emergency department," Complementary Therapies in Clinical Practice, vol. 44, Article ID 101436, 2021.

[63] M. Ziaieefard, A. Zahedmehr, and R. Ferasatkish, "Effects of lavender oil inhalation on anxiety and pain in patients undergoing coronary angiography," Iranian Journal Heart, vol. 18, no. 1, pp. 44–50, 2017.

[64] M. Ziaieefard, R. Azarfarin, Z. Faritous, E. Dehdashian, A. Baghestani, and P. Ziaieefard, "Evaluation of lavender oil inhalation effects on blood pressure and heart rate in patients undergoing coronary angiography," Iran Hear J, vol. 18, no. 4, pp. 29–33, 2017.

[65] B. Ali, N. A. Al-Wabel, S. Shams, A. Ahamad, S. A. Khan, and F. Anwar, "Essential oils used in aromatherapy: a systemic review," Asian Pacific Journal of Tropical Biomedicine, vol. 5, no. 8, pp. 601–611, 2015.

[66] B. Adorjan and G. Buchbauer, "Biological properties of essential oils: an updated review," Flavour and Fragrance Journal, vol. 25, no. 6, pp. 407–426, 2010.

[67] C. Dobetsberger and G. Buchbauer, "Actions of essential oils on the central nervous system: an updated review," Flavour and Fragrance Journal, vol. 26, no. 5, pp. 300–316, 2011.

[68] W. N. Setzer, "Essential oils and anxiolytic aromatherapy," Natural product communications, vol. 4, no. 9, Article ID 1934578X0900400, 2009.

[69] D. Reis and T. Jones, "Aromatherapy: using essential oils as a supportive therapy," Clinical Journal of Oncology Nursing, vol. 21, no. 1, pp. 16–19, 2017.

[70] E. Basch, I. Foppa, R. Liebowitz et al., "Lavender (Lavandula angustifolia miller)," Journal of Herbal Pharmacotherapy, vol. 4, no. 2, pp. 63–78, 2004.

[71] V. López, B. Nielsen, M. Solas, M. J. Ramírez, and A. K. Jäger, "Exploring pharmacological mechanisms of lavender (Lavandula angustifolia) essential oil on central nervous system targets," Frontiers in Pharmacology, vol. 8, p. 280, 2017.

[72] J. A. Song, M. K. Lee, E. Min, M. E. Kim, G. Fike, and M. H. Hur, "Effects of aromatherapy on dysmenorrhea: a systematic review and meta-analysis," International Journal of Nursing Studies, vol. 84, pp. 1–11, 2018.

[73] H. Nunes and M. G. Miguel, "Rosa damascena essential oils: a brief review about chemical composition and biological properties," Trends in Phytochemical Research, vol. 1, no. 3, pp. 111–128, 2017.

[74] M. Nasiri, M. Torkaman, S. Feizi, and M. B. Bigdeli Shamloo, "Effect of aromatherapy with Damask rose on alleviating adults’ acute pain severity: a systematic review and meta-analysis of randomized controlled trials," Complementary Therapies in Medicine, vol. 56, Article ID 102596, 2021.

[75] M. Mirzaee Jirdehi, A. Monfared, F. Mansour Ghanaei, and E. Kazemnerhad Leili, "Damask rose aromatherapy and the anxiety of endoscopic candidate patients: a clinical trial," Journal of Holistic Nursing and Midwifery, vol. 31, no. 3, pp. 203–211, 2021.

[76] D. L. McKay and J. B. Blumberg, "A review of the bioactivity and potential health benefits of peppermint tea (Mentha piperita L.)," Phytotherapy Research, vol. 20, no. 8, pp. 619–633, 2006.

[77] B. P. Chumpitazi, G. L. Kears, and R. J. Shulman, "Review article: the physiological effects and safety of peppermint oil and its efficacy in irritable bowel syndrome and other functional disorders," Alimentary Pharmacology & Therapeutics, vol. 47, no. 6, pp. 738–752, 2018.

[78] T. K. H. Fung, B. W. M. Lau, S. P. C. Ngai, and H. W. H. Tsang, "Therapeutic effect and mechanisms of essential oils in mood disorders: interaction between the nervous and respiratory systems," International Journal of Molecular Sciences, vol. 22, no. 9, p. 4844, 2021.