# The effectiveness of acupressure therapy on anxiety:

# a scoping review

Stephanie Yifan Wang

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School of Clinical Science, Department of Oral Health

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# Abstract

Background: Mental health conditions such as anxiety and depression are considered the most common psychiatric disorders in the western world. Anxiety disorders are highly prevalent among the adult population; however, they remain underdiagnosed and under-treated because of their heterogeneity and the presence of various somatic symptoms. Pharmacological and psychological therapies are generally the first line of treatment for anxiety disorders. However, because of anxiety disorders' high recurrence and chronicity, the side effects and high costs associated with conventional treatment modalities can also lead to under-treatment. Acupressure is a non-invasive alternative to acupuncture and has demonstrated effectiveness in managing psychosomatic disorders. However, due to high clinical disparities in the method of clinical application of acupressure treatment within existing research, it is difficult to recommend the best practice for anxiety management.

Objective: The purpose of this dissertation is to explore and summarise the types of acupressure interventions, the most frequently used acupoints, methods of application, treatment time, and the effectiveness of such interventions in managing anxiety through a systematic scoping review.

Methods: The scoping review protocol was reported following the preferred reporting items for systemic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) and the Joanna Briggs Institute (JBI) manual for evidence synthesis guidelines, which was published in July 2022 and acted as the fundamental guide for the scoping review process. A total of six electronic databases (CINAHL, MEDLINE, Dentistry and Oral Sciences Source, AMED, PsycINFO, and Scopus), Google, and Google scholar were searched to identify eligible sources.

Results: A total of 76 studies were included in this review, with the publication range from 1987 to 2022. Three categories of acupressure intervention were noted within the included studies: acupressure on traditional acupoints, acupressure on auricular acupoints, and a combination of traditional and auricular acupoints. The most frequently used acupoints, application methods, the most common issues where

anxiety was treated with acupressure and the effectiveness of acupressure on anxiety management are identified.

Conclusions: Acupressure is an effective, non-invasive, low-cost alternative for reducing anxiety in various settings despite the discrepancies in the intervention protocol. Acupressure therapy in managing anxiety is highly recommended for routine nursing care in patients with complex medical conditions, emergency and pre-operative settings, students, and healthcare workers at risk of burnout. Further studies, systematic reviews and meta-analyses are required to provide a more in-depth understanding and recommendations on whether acupressure intervention using the most used acupoints identified from this review can effectively reduce other types of anxiety disorders, such as social or specific phobias.

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# List of Abbreviations

| | |
|---|---|
| BAIS | Beck Anxiety Inventory Score |
| BIS | Bispectral index |
| CAMs | Complementary and alternative medicines |
| CBT | Cognitive-behavioural therapy |
| CNS | Central nervous system |
| HADS-A | Hospital Anxiety and Depression Scale - Anxiety |
| GAD-7 | 7-Item Generalised Anxiety Disorder Scale |
| JBI | Joanna Briggs Institute |
| PCC | Population concept and context |
| PRISMA-ScR | Preferred reporting items for systemic reviews and meta-analyses extension for scoping reviews |
| RCT | Randomised controlled trial |
| SAS | Self-rated Anxiety Scale |
| STAI | State-Trait Anxiety Inventory |
| TEAS | Transcutaneous electrical acustimulation |
| TENS | Transcutaneous electrical nerve stimulation |
| TMD | Temporomandibular disorders |
| VAS-A | Visual Analogue Scale for Anxiety |
| VSS | Visual Stress Scale |

# List of Appendices

# Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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# Candidate Contribution of Co-authored Papers

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| **Chapter 3**<br><br>Wang, S. Y., Morse, Z, Kohut, S. The effectiveness of acupressure therapy on anxiety: a scoping review. | Wang 85%<br>  <br>Morse 10%<br>  <br>Kohut 5%<br>  |

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# Chapter 1 Introduction

## 1.1 Background

Mental health conditions such as anxiety and depression are considered the most common psychiatric disorders in the western world (Remes et al., 2016). Although anxiety and depression can present with overlapping symptoms, they are considered different clinical conditions and anxiety disorders are often comorbid with other mental health conditions (Bystritsky et al., 2013). Anxiety disorders are highly prevalent among the adult population; however, they remain under-diagnosed and under-treated because of their heterogeneity and the presence of various somatic symptoms (Bystritsky et al., 2013). Pharmacological and psychological therapies are generally the first line of treatment for anxiety disorders. However, because of anxiety disorders' high recurrence and chronicity, the side effects and high costs associated with conventional treatment modalities can also lead to under-treatment (Bystritsky et al., 2013; Roy-Byrne, 2015). Therefore, complementary and alternative medicines (CAMs), such as acupuncture and acupressure, have been widely investigated (Ravindran & da Silva, 2013). Alternative therapies such as acupuncture and acupressure are perceived to be more natural and cost-effective interventions and can produce a comparative or synergistic therapeutic effect for conventional treatments (Li et al., 2019; Pilkington et al., 2007; Ravindran & da Silva, 2013).

### 1.1.1 Anxiety Disorders

Anxiety can be defined as a subjective experience of deleterious mood disturbance, persistent feelings of apprehension, and emotional distress with developing physical symptoms. These include but are not limited to tachycardia, nervousness, excessive sweating, tension, fatigue, nausea, and vomiting (Roy-Byrne, 2015). The terminology 'anxiety disorders' is a generic term that can be sub-categorised into panic disorder, social anxiety disorders, specific phobias, generalised anxiety disorders, post-traumatic stress disorders, and obsessive-compulsive disorders. Among these subcategories of anxiety, specific phobias include but are not limited to the phobia of animals, the natural environment, blood-injections-injury, or situational phobia (Bandelow et al., 2017). Specific phobias also have the highest lifetime prevalence and are highly associated with daily role impairments, decreased quality of life, poor medical

attendance, delayed healing and deprived treatment outcomes. However, individuals who suffer from specific phobias rarely seek treatment. This is perhaps because specific phobias do not lead to severe functional impairment in numerous cases, although the phobia of blood-injections-injury is a leading cause of poor medical attendance (Bandelow et al., 2017; Kasper, 2006; Roy-Byrne, 2015).

Anxiety disorders tend to have a prolonged course with symptoms fluctuating in severity and are often comorbid with other anxiety disorders, mental disorders, substance abuse, and other general medical conditions (Bandealy et al., 2021; Kasper, 2006; Marciniak et al., 2005; Martin, 2003; Remes et al., 2016). They are, however, often under-diagnosed and under-treated in primary care (Arikian & Gorman, 2001; Bystritsky et al., 2013). Furthermore, anxiety disorders are major contributors to disabilities that can lead to severe mental and physical health outcomes and are associated with a high burden of illness (Bystritsky et al., 2013; Eaton et al., 2018; Kasper, 2006; Martin, 2003). In 2004, a survey in Germany reported that the cost associated with an anxiety disorder was approximately between 500 to 1600 euros per case, and the estimated total cost of anxiety disorders in the European Union was about 41 billion euros per year (Bandelow & Michaelis, 2015). Similarly, a later study led by Rovira et al. (2012) reported that the mean average total cost directly attributed to general anxiety disorders in Spain was about 1424 euros per year, with an additional average of 3765 euros because of the loss of productivity. In 2010, anxiety disorders contributed to approximately 26.8 million disability-adjusted life years, according to the Global Burden of Disease study (Whiteford et al., 2013).

A high-quality systematic review and meta-analysis carried out by Baxter et al. (2013) suggested an estimated global prevalence average of 7.3% for people with any anxiety disorders, while another systematic review of the reviews showed the prevalence of anxiety disorders varied between 3.8% to 25% globally (Remes et al., 2016). In 2019, the high prevalence of anxiety disorders was considered a serious global public health concern as it was ranked one of the most significant mental health-related causes of disability-adjusted life years and years lived with disability in the world (Xiong et al., 2022). However, a large European study reported only 20.6% of participants with an

anxiety disorder attended healthcare, and out of those who sought professional help, around 23.2% received no treatment (Bandelow et al., 2017).

In 2006, the New Zealand mental health survey showed that approximately 24.9% of New Zealanders reported experiencing a lifetime prevalence of any anxiety disorder. Moreover 14.8% had an episode of any anxiety disorder in the past twelve months, and 9.3% in the past month before the time of interview (Wells, 2006). Further reports estimated that a total cost of 12 billion dollars, or roughly 5% of the gross domestic product, was spent on severe mental illness. At the same time, anxiety is the most common symptom associated with a broader range of mental conditions (Ministry of Health, 2017). An additional 1.2 billion dollars of health and disability benefits were allocated to recipients whose primary barrier to work is mental illness (Ministry of Health, 2017). A longitudinal population-based cohort study by Richmond-Rakerd et al. (2021) examined the association between mental disorders and subsequential physical diseases among 2.3 million New Zealanders and suggested that the onset of any mental disorder peaks in young adulthood. In addition, individuals with mental disorders are more likely to develop chronic physical diseases and die younger than those without mental disorders (Richmond-Rakerd et al., 2021). The most recent cohort study, which explored the mental well-being of the New Zealand population during the COVID-19 pandemic, reported a significantly greater level of anxiety and depression than the population norm before the pandemic (Gasteiger et al., 2021). However, a substantial proportion of anxiety disorders are under-recognised and under-treated despite their significant impact and high prevalence (Kasper, 2006). A potential factor contributing to the under-diagnosis and treatment could be the lack of early recognition of certain types of anxiety. For example, people with panic disorders, general anxiety disorders and post-traumatic disorders are likely to be recognised and seek treatment compared to social anxiety disorders, specific phobias, and obsessive-compulsive disorders (Bandelow & Michaelis, 2015; Kasper, 2006).

### 1.1.2 Treatment for Anxiety

A previous epidemiological study suggested that only one in five participants with an anxiety disorder sought professional help. Among those who visited health care services, about 23.2% did not receive any treatment, 30.8% received pharmacological treatment only, 19.6% were treated with psychological interventions, and 26.5% were

treated with both interventions (Bandelow et al., 2017). This result was similar to the result from the World Health Organisation's study on psychological disorders in primary health care, which suggested that only half of the cases of anxiety disorders have been recognised, and only a third were treated with medications (Sartorius et al., 1996).

## Pharmacological Interventions

First-line pharmacological treatment for anxiety disorders often involves a selective serotonin uptake inhibitor with serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants, and benzodiazepines (Bandelow et al., 2017; Farach et al., 2012; Roy-Byrne, 2015; Starcevic, 2005). These agents are broadly effective but have not demonstrated equal efficacy across all anxiety disorders (Bandelow et al., 2017). However, because of the chronicity and high recurrence rate of anxiety disorders, the burden of side effects is a significant concern. Issues such as drug dependence, addictions, withdrawal, and chronic toxicity due to long-term administration of pharmacotherapy are especially concerning in long-term management. (Bandelow et al., 2017; Bystritsky et al., 2013; Roy-Byrne, 2015).

## Psychological Interventions

Evidence-based treatment guidelines for anxiety disorders reported comparative effectiveness for pharmacological interventions and psychological cognitive-behavioural therapy (CBT) (Otte, 2011). CBT combines behavioural and cognitive interventions based on applied science to decrease maladaptive behaviours and cognitions (Otte, 2011). Several meta-analyses demonstrated CBT's effectiveness and long-lasting benefits in managing anxiety and depression. Synergistic effects when CBT is combined with psychopharmacological therapy have also been shown. However, the cost-effectiveness and delivery of high-fidelity CBT can be more challenging than prescribing medication. (Otte, 2011; Twomey et al., 2015).

The effectiveness of CAMs for managing anxiety disorders in recent decades has been investigated (Bystritsky et al., 2013; Smith et al., 2019). The term 'complementary' refers to non-mainstream western therapeutics and practices used in conjunction with conventional medicine, while 'alternative' refers to remedies and approaches used instead of conventional medicine (Ernst, 2000). Typical examples of CAMs include

yoga, chiropractic, osteopathy, meditation, acupuncture, and relaxation techniques (Ravindran & da Silva, 2013; Smith et al., 2019). Integrating CAMs in modern medicine has become more popular, especially with an increasing number of individuals self-selecting CAMs as an adjunct or single treatment due to the benefit of minimal adverse effects for chronic illnesses (Yang et al., 2021).

## Acupuncture

Acupuncture treatment is an integral part of traditional Chinese medicine (TCM), where it was first described in an ancient Chinese classical medical text approximately 5000 years ago (Chon & Lee, 2013). The use of acupuncture has become more integrated into healthcare in Eastern and Western countries over the past decades (Cui et al., 2017). Acupuncture is a technique involving the insertion, manipulation, and stimulation of fine needles at specific locations on the body to produce therapeutic effects (Chon & Lee, 2013). According to TCM concepts, illnesses and diseases are caused by the imbalance, disturbance, or stagnation of the vital inner energy, also known as Qi (Holland, 2000). Acupoints are specific points chosen for acupuncture manipulation, located either on the skin's surface or underneath and along the meridians. These are regarded as the reflexive point of the micro-acupuncture systems defined in TCM (Li et al., 2015). Meridians are networks of energy channels where vital energy flows through the body, corresponding to the internal organs and reflecting the visceral conditions (Chon & Lee, 2013; Li et al., 2015). According to the meridian and organ theories of TCM, anxiety is caused by various factors, including the innate deficiency of the heart and kidney energy and the disruption in the flow of Qi, which leads to the imbalance and disturbance of the mind (Samuels et al., 2008). Therefore, when needles, pressure or heat stimulate specific acupoints, it can regulate the Qi flow in the body and restore homeostasis and health (De & De, 2015).

Acupuncture has been widely integrated into modern medical practice worldwide in the past few decades (Cho & Hwang, 2010; Madsen et al., 2009). It is regarded as a safe and cost-effective treatment modality for many health conditions and symptom relief (Chon & Lee, 2013; Jindal et al., 2008; Zhang et al., 2010). Western medical acupuncture is an adaptation of Chinese acupuncture, underpinned by principles of evidence-based medicine with the knowledge of anatomy, pathology, and neurophysiology (White, 2009). The analgesic effect induced by acupuncture

treatment has been widely accepted by conventional medicine to alleviate various pain syndromes, such as musculoskeletal pain, postoperative pain, and nausea and vomiting (Hopton & Macpherson, 2010; Li et al., 2015; Vickers, 2002; White, 2009; Xiang et al., 2017). Past investigatory studies suggested mechanistic theories of how acupuncture may ease pain and anxiety. For example, acupuncture can modulate spinal signal transmission and pain perception in the brain by inducing signals in the afferent nerve. By stimulating acupoints, a specific area of the brain responsible for descending inhibitory modulation is activated (Li et al., 2015). According to the gate control theory published in 1965 by Melzack and Wall, the positive stimuli on specific acupoints transmit impulses to the brain faster than unpleasant stimuli. Therefore, continuous stimulation by needle, pressure or heat on acupoints leads to the activation of myelinated nerve fibres, sending impulses to the central nervous system (CNS), shutting the neural gates for pain stimuli to improve the pain threshold (Chon & Lee, 2013; Mehta et al., 2017). In addition, magnetic resonance studies have confirmed the correlation between specific acupoints to a particular area in the brain, which may impact symptoms of adverse psychological conditions (Pilkington, 2010; Roberts et al., 2020). A review of brain imaging studies by He et al. (2015) suggests that acupuncture could induce hemodynamic changes in a wide cortico-subcortical network.

A review of systematic reviews and meta-analyses on the effectiveness of acupuncture on anxiety reported that most of the studies concluded that the acupuncture-receiving groups showed more effective management of anxiety when compared to the sham acupuncture groups or conventional medicine (Li et al., 2019). Similarly, a review of randomised controlled trials (RCT) on acupuncture treatment to reduce pre-operative anxiety by Bae et al. (2014) concluded that acupuncture therapy could effectively reduce anxiety before surgery compared to the nontreatment or sham acupuncture group. However, a recent meta-analysis by Allan et al. (2018) suggested that the difference between the acupuncture and placebo or sham acupuncture groups, using the State-Trait Anxiety Inventory (STAI) score, was not clinically or statistically significant because of the limited high-quality trials included in the analysis. However, a review of placebo interventions suggests that sham acupuncture interventions might be associated with greater therapeutic effects than pharmacological and other physical placebos (Linde et al., 2010). In addition, a study by Karst et al. (2007) compared

auricular acupuncture's effectiveness in managing pre-operative dental anxiety to intranasal midazolam. The conclusion was that both interventions were equally effective, and no adverse events were observed in the acupuncture group.

## Acupressure

Acupressure therapy is the direct application of pressure to body parts with non-piercing devices or pressure bands to stimulate acupoints (Au et al., 2015; Harris, 1997). It is a non-invasive alternative that shares common characteristics and mechanisms with traditional needle acupuncture, demonstrating symptom management effectiveness (Lee & Frazier, 2011). The therapeutic effect is delivered by stimulating acupoints with sustained pressure to induce sensations such as soreness, numbness, and distention without penetrating the skin (Beal, 2000; Harris, 1997). The biochemical mechanism of acupressure and acupuncture involves the stimulation of acupoints that leads to complex neurohormonal responses in the hypothalamic-pituitary-adrenocortical axis (Kuo et al., 2016). It is stated that the co-occurrence of anxiety and fatigue may be due to dysregulation of the hypothalamic–pituitary–adrenal axis, notably by reducing elevated cortisol levels (Kuo et al., 2016). Acupressure stimulation can down-regulate the overproduction of cortisol and increase the endorphin and serotonin transmittance at the CNS, facilitating relaxation response and improving physical performance (Moyer et al., 2011). In addition, studies also confirmed that pressure stimulation on acupoints could regulate the sympathetic and parasympathetic nervous systems and promote relaxation (Lin et al., 2022).

Several studies have revealed the efficacy of acupressure therapy for symptom relief in insomnia, premenstrual syndrome, dysmenorrhoea, during and after labour, reduction of nausea and vomiting, and reducing fatigue prior to and post-treatment (Au et al., 2015; Bazarganipour et al., 2017; Cho et al., 2021; Lee & Frazier, 2011; Song et al., 2015). For example, studies that examined the efficacy of acupressure used in the management and prevention of nausea and vomiting in pregnant women reported a significant reduction in nausea and vomiting in the acupressure intervention groups compared to control or placebo groups (Heazell et al., 2006; Steele et al., 2001; Tara et al., 2020). Similarly, the RCT conducted by Dibble et al. (2007) examined the efficacy of acupressure on Neiguan (PC6), a single acupoint intervention for managing chemotherapy-induced nausea and vomiting. They concluded that acupressure is a

valuable adjunct to pharmaceutical interventions for delayed nausea and vomiting in chemotherapy patients.

### Effects of acupressure on anxiety

Previous studies also suggested that acupressure therapy can significantly reduce anxiety scores. For example, one study evaluated the effects of acupressure on six meridian acupoints to reduce stress, fatigue and anxiety of shift-work nurses, demonstrating that stress ($p = 0.043$), fatigue ($p < 0.001$) and anxiety ($p = 0.004$) decreased significantly compared to the control group (Cho et al., 2021). Another study that evaluated the effectiveness of a single acupressure intervention on two acupoints for women with premenstrual syndromes also reported a significant difference in anxiety scores ($p > 0.05$) after acupressure intervention compared with the placebo group (Bazarganipour et al., 2017).

The effect of acupressure on anxiety has been widely investigated. For example, a randomised, placebo-controlled study examined the impact of 10-minutes of finger acupressure on Yintang (EX-HN3) (also known as Extra-1 point) on pre-operative anxiety and bispectral index (BIS) (Agarwal et al., 2005). Anxiety was measured by the visual stress scale (VSS) on the day before surgery, at the start and the end of the intervention, and half an hour after acupressure release. The study showed a significant reduction in anxiety in the intervention group at the end of the acupressure application compared to the control group. This was supported by a study led by Fassoulaki et al. (2007), which concluded that acupressure on Yintang (EX-HN3) effectively reduced the BIS and VSS values during transportation to the hospital and pre-operatively. A preliminary review conducted by Kwon and Lee (2018) analysed five RCTs that examined the effect of either acupuncture or acupressure on Yintang (EX - HN3) as a single-point intervention to alleviate anxiety. Four of the five included RCTs used traditional acupuncture as the intervention group. The result consistently suggested a significant reduction in anxiety scores after acupuncture. An RCT by Huang and Tang (2009) reported a significant decrease in anxiety scores after applying finger acupressure on Yintang (EX - HN3) in pre-operative participants. In addition, the post-intervention heart rate and blood pressure in the acupressure group were significantly lower than in the control group. Similar findings were consistent among several

reviews and studies, thus supporting the efficacy of acupressure as an alternative to acupuncture in anxiety management.

Non-invasive auricular acupressure as an alternative to auricular acupuncture has demonstrated effectiveness in anxiety management. It is described as a reflexive treatment for various physical, emotional, and neurological dysfunctions by vagal regulation (He et al., 2012). Mechanism studies suggested that by auricular stimulation, the autonomic and the CNS could be modified via the projections from the auricular branch of the vagus nerve to the nucleus of the solitary tract (He et al., 2012). Kober et al. (2003) examined the efficacy of auricular acupressure in anxiety reduction in a prehospital transportation setting. This study suggested that applying auricular acupressure on the relaxation point can significantly reduce anxiety scores compared to individuals in the sham intervention group. A double-blinded, randomised and controlled pilot study by Kao et al. (2012) indicated that auricular acupressure could improve anxiety in peri-and early postmenopausal women. This result was further supported by Chueh et al. (2018) where the effect of auricular acupressure on sleep quality, anxiety, and depressed mood in undergraduate nursing students was evaluated. A four-week application of auricular acupressure by attaching a magnetic pellet to the relaxation point, reduced anxiety and improved sleep quality. Similarly, a later study on the effectiveness of auricular acupressure on the relaxation point in behavioural healthcare demonstrated a significant improvement in anxiety scores after treatment (Olshan-Perlmutter et al., 2019). These findings were consistent, suggesting that auricular acupressure is potentially an effective alternative to auricular acupuncture for anxiety.

In 2015, an overview of seven RCTs examined acupressure's effects on adults' anxiety. The findings showed consistency in lowering anxiety scores in acupressure groups immediately after the intervention compared to the sham acupressure or placebo groups (Au et al., 2015). This result was further supported by a recent systematic review conducted by Chen et al. (2022). They reviewed twenty-seven studies that involved participants diagnosed with anxiety and were managed using any type of acupressure therapy in the active intervention group. Overall, most past studies and reviews revealed that acupressure is an effective intervention that can help alleviate anxiety, either when used alone or as an additional therapy.

### 1.1.3 Rationale for Scoping Review

Although the findings from many studies and reviews showed consistency in the effectiveness of acupressure in reducing anxiety, there is substantial heterogeneity among the studies. There were numerous differences in the intervention methods, including the selection of acupoints, treatment durations, the technique of acupressure application, the frequency of measure and the type of anxiety measurement scale.

The selection of acupoints varies by number and location. For example, many studies used multiple acupoints in the acupressure intervention. For instance, Beikmoradi et al. (2015) examined the effectiveness of acupressure in cancer participants using nine acupoints. In contrast, several studies concluded the acupressure on Yintang (EX - HN3) alone showed a significant reduction in anxiety scores compared to the control or sham groups (Agarwal et al., 2005; Fassoulaki et al., 2007; Huang & Tang, 2009). The location of acupoints also varied; some studies used acupoints on the body only, some used only auricular acupoints, and others used a combination of body and auricular points in the acupressure intervention. Additionally, several techniques and items of equipment were used for the acupressure, such as pressing or manipulating with finger pressure, using herb seeds, and magnetic or plastic beads. For example, some used finger pressure with massage on Yintang (EX - HN3) for 20 minutes, while others applied pressure by placing a plastic bead on the same acupoint for the same time, delivering comparative results (Beikmoradi et al., 2015; Wang et al., 2005). Moreover, there was no consistency in the treatment duration and frequency of acupressure intervention, with a significant variation from a single intervention to multiple sessions per day or interventions over a few weeks. The duration of acupressure application also varied between three minutes to 12 hours per day over a few weeks.

Although past studies and reviews have investigated and demonstrated the effectiveness of acupressure on anxiety, there was limited evidence to recommend whether acupressure is an effective intervention for all types of anxiety. Several RCTs focused on pre-operative anxiety among patients with serious illnesses (Agarwal et al., 2005; Bang & Park, 2020; Kober et al., 2003). Some examined the effectiveness of acupressure in general anxiety disorders (Klausenitz et al., 2016; Olshan-Perlmutter et al., 2019). However, limited information exists to recommend whether acupressure is

effective on other subcategories of anxiety disorders. Therefore, a scoping review that focuses on exploring and analysing the variations and efficacy of all types of acupressure interventions used in anxiety management would be beneficial in helping to establish the best protocols for clinical implementation.

## 1.2 Purpose of Research

This research aims to synthesize and provide a broad overview of the current knowledge and protocols on acupressure interventions and evaluate their effectiveness on anxiety management.

## 1.3 Research Questions

- What are the types of acupressure-related interventions used to help reduce anxiety?
- What are the most frequently used acupressure points, time duration and frequency of treatment?
- How effective are these acupressure interventions in reducing anxiety?
- What research gaps exist within the current literature?
- What recommendations can be made for future research?

## 1.4 Dissertation Structure

This dissertation is presented in traditional format two and comprises four chapters. In accordance with the Auckland University of Technology's requirement for format two, the dissertation contains two chapters (two and three) developed for journal publication. The manuscripts in these chapters are presented as they have been submitted to or prepared for publication in journals. Therefore, repetition of some information occurs. A prelude at the beginning of each chapter demonstrates the link between contents and creates a smooth flow throughout the dissertation.

Chapter 1 includes the introduction and rationale for the dissertation topic. Chapter 2 is the published scoping review protocol. Chapter 3 presents the scoping review, and Chapter 4 presents an overall discussion of limitations, recommendations for further research, and a concluding statement.

# Prelude to Chapter 2

A protocol was developed before commencing the systematic scoping review on the effectiveness of acupressure therapy on anxiety. The protocol pre-defines the objectives, methods, and reporting of the review. It acts as a guideline and provides transparency in the review process.

# Chapter 2 The effectiveness of acupressure therapy on anxiety: a scoping review protocol

## 2.1 Abstract

*Background*: Anxiety disorders are highly prevalent and are considered the most common psychiatric condition globally. Acupressure is a non-invasive alternative to acupuncture and has demonstrated effectiveness in managing psychosomatic disorders. However, due to high clinical disparities within existing research, it is difficult to recommend the best acupressure practice for anxiety management. This manuscript details the protocol for scoping the available evidence, mapping key concepts and identifying gaps for future research.

*Methods*: This protocol is designed following the preferred reporting items for systemic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) and the Joanna Briggs Institute (JBI) manual for evidence synthesis guidelines. Six electronic databases (MEDLINE, CINAHL, AMED, PsycINFO, Dentistry and Oral Science Source, and Scopus) and two other search engines (Google and Google Scholar) will be searched for all relevant primary and secondary studies, grey literature, and other sources concerning the effectiveness of acupressure on anxiety. The sources retrieved will be independently assessed by two reviewers utilising the eligibility criteria defined by the population concept and context (PCC) framework. A PRISMA-ScR flowchart will be applied to track the number of identified, included, and excluded sources. Extracted data and variables will be presented in a data extraction table. The synthesised results are further augmented with narrative explanations.

*Conclusions*: The review's findings can assist in identifying priorities for future research and provide recommendations for the best protocols for clinical implementation.

*Keywords*: Acupressure, acupoint, auricular acupressure, meridian, anxiety disorders.

## 2.2 Introduction

Mental health conditions such as anxiety and depression are considered the most common psychiatric disorders in the western world (Remes et al., 2016). Anxiety can be defined as a subjective experience of deleterious mood disturbance, persistent feelings of apprehension, and emotional distress with developing physical symptoms including but not limited to tachycardia, nervousness, excessive sweating, tension, fatigue, nausea, and vomiting (Roy-Byrne, 2015). The term 'anxiety disorders' is a generic term that can be subcategorised into panic disorder, social phobia, specific phobias, generalised anxiety disorders, post-traumatic stress disorders, and obsessive-compulsive disorders. These are the most prevalent mental disorders in adults compared to other psychiatric conditions (Bystritsky et al., 2013; Eaton et al., 2018; Jorm et al., 2004; Kasper, 2006). Among these subcategories of anxiety, specific phobia includes but is not limited to, the phobia of animals, natural environment, blood-injections-injury, or situational phobia also have the highest lifetime prevalence and are highly associated with daily role impairments and decreased quality of life. Specific phobias are strong predictors for other anxiety disorders, and it is a leading cause of poor medical attendance, such as avoidance of the dentist or medical treatments, delayed healing, and deprived treatment outcomes (Eaton et al., 2018; Kasper, 2006; Wardenaar et al., 2017).

Anxiety disorders tend to have a prolonged course with symptoms fluctuating in severity and are often comorbid with other anxiety disorders, mental disorders, substance abuse, and other general medical conditions (Bandealy et al., 2021; Kasper, 2006; Marciniak et al., 2005; Martin, 2003; Remes et al., 2016). Despite the high prevalence, anxiety disorders are often under-diagnosed and under-treated in primary care (Arikian & Gorman, 2001). Furthermore, anxiety disorders are major contributors to disabilities that can lead to severe mental and physical health outcomes and are associated with a high burden of illness (Bystritsky et al., 2013; Eaton et al., 2018; Kasper, 2006; Martin, 2003). In 2010, anxiety disorders contributed to approximately 26.8 million disability-adjusted life years, according to the Global Burden of Disease study (Whiteford et al., 2013). A high-quality systematic review and meta-analysis reported by Baxter suggested an estimated global average prevalence of 7.3% for people with any anxiety disorders. In contrast, another systematic review of reviews

indicated the prevalence of anxiety disorders varied between 3.8% to 25% globally (Remes et al., 2016). In 2019, the high prevalence of anxiety disorder was considered a serious global public health concern and one of the world's leading mental health-related causes of disability-adjusted life years (Xiong et al., 2022). For example, the New Zealand mental health survey showed that in 2006, approximately 24.9% of New Zealanders reported experiencing a lifetime prevalence of any anxiety disorder, while 14.8% had anxiety for at least twelve months, and 9.3% were affected for up to a month (Wells, 2006). Further reports estimated a total cost of 12 billion dollars, roughly 5% of the gross domestic product, was spent on severe mental illness. An additional 1.2 billion dollars of health and disability benefits were allocated to recipients whose primary barrier to work is mental illness (Ministry of Health, 2017).

Several evidence-based treatment guidelines for anxiety disorders reported comparative effectiveness for pharmacological interventions and cognitive-behavioural therapy, which also mentioned that prolonged use of antipsychotic drugs could lead to severe adverse effects and addictions (Bandelow et al., 2015; Jorm et al., 2004; Nathan & Gorman, 2015). In addition, the effectiveness of complementary and alternative medicines (CAM) in managing anxiety disorders has also been investigated in the past few decades (Bystritsky et al., 2013; Smith et al., 2019). The term complementary refers to non-mainstream therapeutics and practices used in conjunction with conventional medicine, while alternative refers to remedies and approaches used instead of conventional medicine. Integrating CAMs in modern medicine has become more popular, especially with an increasing number of individuals self-selecting CAM as an adjunct or single treatment due to the benefit of minimal adverse effects for chronic illnesses (Yang et al., 2021). Typical examples of CAM include yoga, chiropractic, osteopathy, meditation, acupuncture, and relaxation techniques (Smith et al., 2019).

Acupressure therapy is the practice of the direct application of pressure by body parts, non-piercing devices or pressure bands to stimulate acupoints (Au et al., 2015; Harris, 1997). It is a non-invasive alternative that shares common characteristics and mechanisms with traditional needle acupuncture. The therapeutic effect is delivered by stimulating acupoints with sustained pressure to induce sensations such as soreness, numbness, and distention without penetrating the skin (Beal, 2000; Harris,

1997). The biochemical mechanism of acupressure involves the stimulation of acupoints that leads to complex neurohormonal responses in the hypothalamic-pituitary-adrenocortical axis, leading to the overproduction of cortisol and increasing endorphin and serotonin transmittance in the central nervous system that facilitates relaxation responses and improves physical performance (Moyer et al., 2011). In addition, studies confirmed that pressure stimulation on acupoints could regulate the sympathetic and parasympathetic nervous systems and promote relaxation (Lin et al., 2022).

Several earlier studies have revealed the efficacy of acupressure therapy for symptom relief in insomnia, premenstrual syndrome, dysmenorrhoea, during and after labour, reduction of nausea and vomiting, and reducing fatigue prior to and post-treatment (Au et al., 2015; Bazarganipour et al., 2017; Cho et al., 2021; Lee & Frazier, 2011; Song et al., 2015). Findings from these studies also suggested that acupressure therapy can significantly reduce anxiety scores. For example, one study evaluated the effects of acupressure on six meridian acupoints to reduce the stress, fatigue and anxiety of shift-work nurses, demonstrating that stress ($p = 0.043$), fatigue ($p < 0.001$) and anxiety ($p = 0.004$) decreased significantly in comparison to the controlled group (Cho et al., 2021). These results are comparable with another study that examined the effects of applying acupressure at the EX - HN3 point on pre-operative anxiety (Agarwal et al., 2005). Similarly, a double-blind, randomised, controlled trial examined acupressure therapy's effects on anxiety management in cancer patients. A total of nine acupoints were used, and the result of the acupressure interventions group indicated a significant decreasing trend in the mean state anxiety score measured over time (Beikmoradi et al., 2015).

Despite the high degree of clinical heterogeneity from past research in areas such as study populations, targeted types of anxiety, acupoints location and techniques used, treatment period, frequencies and durations for intervention and measurement time used, the review of past literature suggests that acupressure is an effective intervention to alleviate anxiety (Chen et al., 2022). However, the differences between the types of acupressure interventions and the reported effectiveness of the subcategories of anxiety disorders have not been investigated. A scoping review will allow further investigation into all types of non-invasive acupressure therapy by

examining the differences in the application of intervention and evaluating the effectiveness of acupressure therapy and acupoints used for various subcategories of anxiety.

## 2.3 Methods

The protocol and scoping review will follow the PRISMA-ScR and JBI manual for evidence synthesis guidelines (Aromataris & Munn, 2020; Tricco et al., 2018).

A preliminary search of MEDLINE, the Cochrane database of systematic reviews, JBI evidence synthesis, cumulative index to nursing and allied health literature (CINAHL) and PubMed was conducted on the 30th March 2022, and no existing scoping review was located or is currently underway investigating the effectiveness of acupressure therapy on anxiety disorders.

### 2.3.1 Eligibility criteria

This scoping review will focus on studies evaluating the effectiveness of non-piercing acupressure used as a sole intervention for anxiety management to identify gaps of knowledge within existing evidence. The eligibility criteria for the existing literature are defined by the population concept and context (PCC) framework outlined by JBI (Aromataris & Munn, 2020). The PRISMA flow diagram will present any excluded studies (Figure 1) (Page et al., 2021).

#### Inclusion Criteria

*Population*

The scoping review will focus on existing English literature that had human participants of all age groups, geographical locations, and settings with any anxiety disorders and treated with acupressure interventions, used as the sole intervention or single addition to conventional treatments, in any part of the body while skin is not penetrated. Outcomes include measures of anxiety score such as the State Trait Anxiety Inventory, Visual Analogue Scale for Anxiety, Visual Stress Scale, Beck Anxiety Inventory Score, Self-rated Anxiety Scale, or any other commonly recognised anxiety measurement to evaluate the effectiveness of acupressure-related therapy as there is no globally unified standard. Additional findings include other common physiological indicators,

including blood pressure, respiratory rate, heart rate and pain-related scores are also evaluated.

*Concept*

Any non-invasive (skin is not pierced) acupressure interventions used to alleviate anxiety will be considered and evaluated in this review.

*Context*

The context of the review is not limited to any geographical location, setting, ethnicity, culture, age or gender factors.

*Types of evidence sources*

The review will focus on sources of information, including primary and secondary research studies, reviews (not limited to systematic reviews and meta-analyses), guidelines, and grey literature to include any unpublished and ongoing trials and reports pertaining to the effectiveness of acupressure interventions on anxiety until April 2022.

Exclusion criteria

Primary and secondary studies, guidelines, webpages, and reports that examined the effectiveness of acupressure in combination with other therapeutic interventions will not be included in the scoping review. Studies, letters, blogs, book reviews, editorials, commentaries, and brochures in languages other than English will be excluded from this study.

### 2.3.2 Search strategy

The three-step search strategy recommended by JBI will be applied for the scoping review. First, an initial limited search was conducted utilising the EBSCO health database to review the topic of interest. The retrieved articles provided an overview of relevant text words included in the title, abstract, and index terms, which offered better insight and understanding of the keywords to be used in the systematic search. Before the second search commenced, an experienced librarian from Auckland University of Technology with expertise in health sciences assisted with the search. This allowed a complete search strategy to be developed with identified keywords and index terms that could be adapted to other databases.

The second search utilises the refined search strategy and is applied to each database (CINAHL, MEDLINE, Dentistry and Oral Sciences Source, AMED, PsycINFO, and Scopus). This is to ensure the numbers of identified sources remain consistent across all databases, which will be presented in a PRISMA-ScR flow chart in the final review (Figure 1)(Page et al., 2021). A completed electronic search terms, keywords, and database search combinations are presented in Table 1.

The final search will involve identifying additional credible sources from the reference lists of all articles and sources included in the review. Additional searches will be conducted through Google and Google Scholar, and the first 100 sources from each search engine will be screened to identify eligible relevant sources.

### 2.3.3 Selection of sources of evidence

All sources identified from the search will be exported to EndNote and uploaded to Rayyan (a web-based collaboration and research tool), and exact duplicates will be removed.

The title and abstracts identified by the search strategy will be screened simultaneously by two reviewers, and eligibility will be assessed using inclusion and exclusion criteria for the review. Full text and citation details of potentially relevant sources will be retrieved for further evaluation by both reviewers. Any disagreement that arises during the data selection and extraction process will be communicated and discussed between the two parties until a consensus is met. If an agreement cannot be achieved, then a third party will adjudicate.

Once the review has been completed, the number of sources of evidence identified from the search, screened, assessed for eligibility, excluded, and included in the final review, will be presented in the PRISMA-ScR flowchart (Figure 1)(Page et al., 2021). Brief explanations for full text excluded will also be recorded and reported in the scoping review.

### 2.3.4 Data extraction

A data extraction table (Table 2) designed by the reviewers will be used to record and assimilate extracted data from eligible sources. The first reviewer will extract all relevant information and variables using the data extraction table, and the second

reviewer will check and verify the accuracy of the data collected. During the charting process, if unforeseen valuable data can be charted, the data extraction table may be revised in agreement with the reviewers. Amendments to the data extraction table will be recorded and reported in the scoping review. Any disagreements that arise during the data-extracting process will be resolved by discussion between the two reviewers.

This scoping review will not critically evaluate the limitations and risk of bias in evidence sources. Instead, the authors are intended to map key concepts, summarise existing research findings and evidence available, and provide a broad overview of existing literature to identify priorities for future research.

## 2.4 Data analysis and presentation

An overview of the concepts, themes, key findings, and recommendations will be organised and analysed by theme. Distributions of existing studies will be mapped out in tabular and diagrammatic form, and the results of identified sources will be synthesised and reviewed in a narrative format.

## 2.5 Discussion

To our knowledge, there has not been a scoping review specifically investigating the types of acupressure intervention used and the effects on anxiety. The scoping review aims to provide a broad overview of existing literature on acupressure-related interventions, providing insight into the differences in the application and associated effectiveness in the management of anxiety. A limitation of this protocol is the inclusion of original published research articles in the English language only. Therefore, this scoping review may be affected by excluding the Chinese databases where acupressure is widely applied in traditional Chinese medicine. This protocol was established based on the PRISMA-ScR and JBI guidelines. The results could further help identify gaps in knowledge and provide guidance and recommendations for future research.

## 2.6 Conclusion

Although acupressure interventions have been widely adopted as an alternative therapy for many health conditions, there is no consensus on the types and

effectiveness of acupressure interventions on anxiety management. This paper presents a protocol for a scoping review that is intended to identify and map the types of non-invasive (non-piercing) acupressure intervention and their effectiveness on anxiety in the existing research literature. Findings from this scoping review will provide insight into the evidence available, and research gaps will be identified to guide future studies.

### 2.6.1 Acknowledgements

The authors would like to thank Andrew South, Liaison Librarian at the Auckland University of Technology with expertise in health research, for their assistance in developing the search strategy for this study.

### 2.6.2 Declarations

Funding: None.

Conflict of interest: None declared.

Ethical approval: Not required.

**Figure 1**

*The PRISMA 2020 flow diagram for systematic reviews*

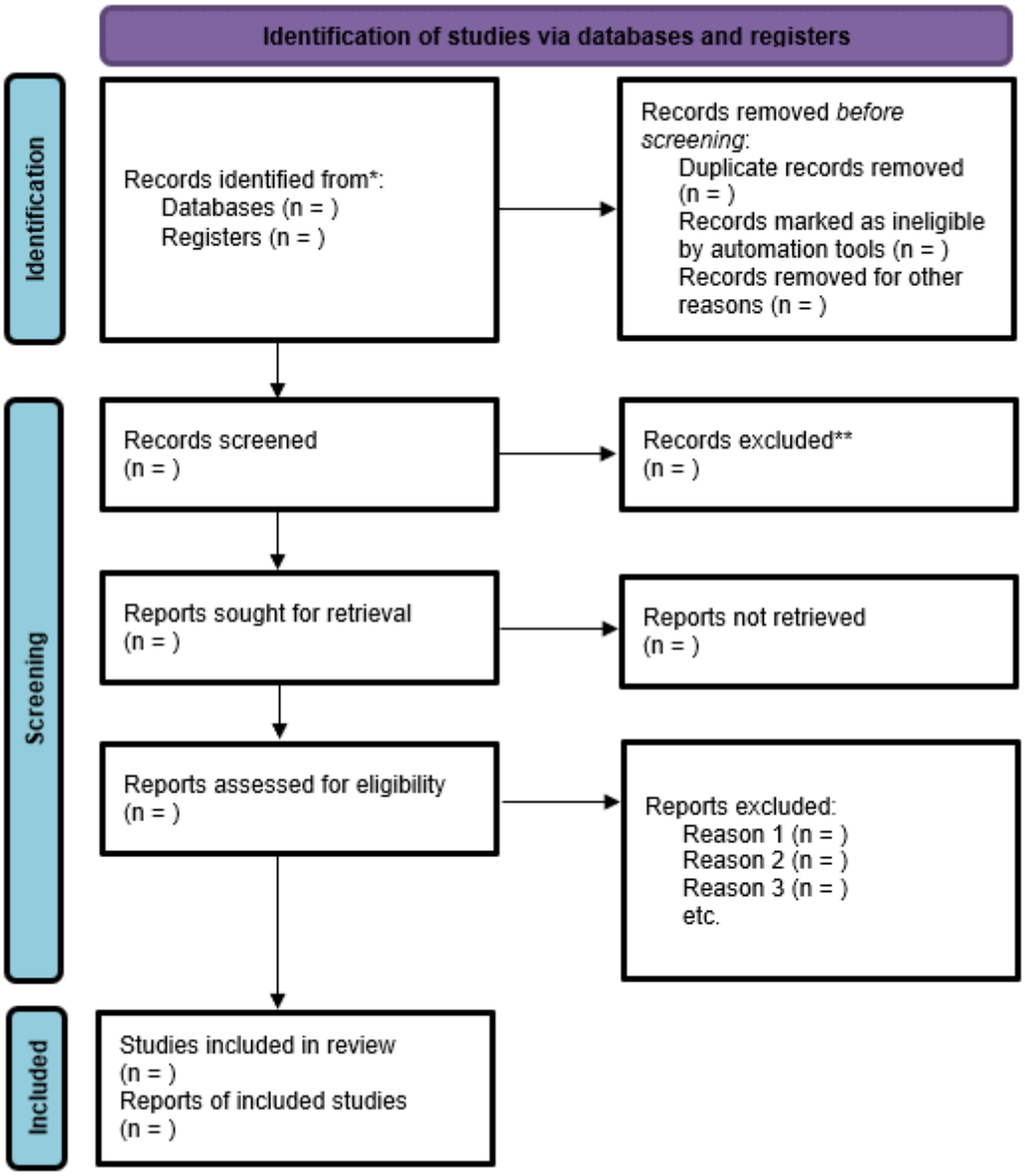

**Table 1**

*Search Strategy for EBSCO Health*

| Search Strategy | |
|---|---|
| #1 | acupressure OR acupoint* |
| #2 | anxiety* OR phobia* OR stress* OR anxious* |
| #3 | #1 AND #2 |

**Table 2**

*Data extraction table*

| | Data Extraction |
|---|---|
| 1 | Author(s) |
| 2 | Year of publication |
| 3 | Aim/purpose of the study |
| 4 | Study population and sample size |
| 5 | Methodology/method |
| 6 | Diagnosis (method) |
| 7 | Acupressure intervention (details of acupoints) |
| 8 | Control |
| 9 | Duration and frequency of intervention |
| 10 | Outcome measure |
| 11 | Adverse event |
| 12 | Key findings |
| 13 | Implications for practice |
| 14 | Suggestions for future research |

# Prelude to Chapter 3

A systematic search through six electronic databases and Google and Google scholar following the developed scoping review protocol commenced in July 2020. The scoping review is aimed to provide a broad overview of the current knowledge on the effectiveness of acupressure in anxiety management.

# Chapter 3 The effectiveness of acupressure therapy on anxiety: a scoping review

## 3.1 Abstract

*Objective*: This review aims to explore and summarise the types of acupressure interventions, the most frequently used acupoints, methods of application, treatment time, and the effectiveness of such interventions in managing anxiety.

*Methods***:** The scoping review protocol is designed following the preferred reporting items for systemic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) and the Joanna Briggs Institute (JBI) manual for evidence synthesis guidelines.

*Results***:** A total of 76 studies were included in this review, with the publication range from 1987 to 2022. Three categories of acupressure intervention were noted within the included studies: acupressure on traditional acupoints, acupressure on auricular acupoints, and a combination of traditional and auricular acupoints. The most frequently used acupoints, application methods, and their effectiveness on anxiety management are identified.

*Conclusions***:** Acupressure is an effective, non-invasive, low-cost alternative that effectively reduces anxiety in various settings despite the discrepancies in the intervention protocol. Acupressure therapy in managing anxiety is highly recommended for routine nursing care in patients with complex medical conditions, emergency and pre-operative settings, students, and healthcare workers at risk of burnout. Further studies, systematic reviews and meta-analyses are required to provide a more in-depth understanding and recommendations on whether acupressure intervention using the most used acupoints identified from this review can effectively reduce other types of anxiety disorders, such as social or specific phobia.

*Keywords:* Acupuncture, Acupoint, Anxiety disorders, Auricular acupressure, Pressure points.

## 3.2 Introduction

Mental health conditions such as anxiety and depression are considered the most common psychiatric disorders in the western world (Remes et al., 2016). Anxiety can be defined as a subjective experience of deleterious mood disturbance, persistent feelings of apprehension, and emotional distress with developing physical symptoms including but not limited to tachycardia, nervousness, excessive sweating, tension, fatigue, nausea, and vomiting (Roy-Byrne, 2015). Anxiety disorders are a generic term that can be subcategorised into panic disorder, social phobia, specific phobias, generalised anxiety disorders, post-traumatic stress disorders, and obsessive-compulsive disorders. These are the most prevalent mental disorders in adults compared to other psychiatric conditions (Bystritsky et al., 2013; Eaton et al., 2018; Jorm et al., 2004; Kasper, 2006). Among these subcategories of anxiety, specific phobia includes but is not limited to, the phobia of animals, natural environment, blood-injections-injury, or situational phobia also have the highest lifetime prevalence and are highly associated with daily role impairments and decreased quality of life. Specific phobias are strong predictors of other anxiety disorders, and it is a leading cause of poor medical attendance, such as avoidance of the dentist or medical treatments, delayed healing, and deprived treatment outcomes (Eaton et al., 2018; Kasper, 2006; Wardenaar et al., 2017).

Acupressure therapy is the direct application of pressure by body parts, non-piercing devices, or pressure bands to stimulate acupoints (Au et al., 2015; Harris, 1997). It is a non-invasive alternative that shares common characteristics and mechanisms with traditional needle acupuncture. The therapeutic effect is delivered by stimulating acupoints with sustained pressure to induce sensations such as soreness, numbness, and distention without penetrating the skin (Beal, 2000; Harris, 1997). The biochemical mechanism of acupressure involves the stimulation of acupoints that leads to complex neurohormonal responses in the hypothalamic-pituitary-adrenocortical axis, leading to the overproduction of cortisol and increasing endorphin and serotonin transmittance in the central nervous system that facilitates relaxation responses and improves physical performance (Moyer et al., 2011). In addition, studies confirmed that pressure stimulation on acupoints could regulate the sympathetic and parasympathetic nervous systems, promote relaxation and reduce anxiety (Lin et al., 2022).

This review aims to explore and summarise the types of acupressure interventions, the most frequently used acupoints, methods of application, treatment time, and the effectiveness of such interventions in managing anxiety based on the systematic review of current literature. The findings will be presented in tabular form, accompanied by narrative explanations. In addition, the research and practical implications will be identified and discussed.

## 3.3 Methods

### 3.3.1 Research protocol and registration

The scoping review was written based on the guidance of the protocol designed by the authors according to the PRISMA-ScR and JBI manual for evidence synthesis guidelines (Aromataris & Munn, 2020). The protocol of this scoping review was published and is in the public domain (Wang & Morse, 2022).

### 3.3.2 Eligibility criteria

This scoping review will focus on studies, articles and reports which examined the effectiveness of non-piercing acupressure as a sole intervention for anxiety management to identify gaps of knowledge within existing evidence. The PCCframework outlined by JBI defined the eligibility criteria for the existing literature (Aromataris & Munn, 2020). In addition, the PRISMA flow diagram (Figure 2) will present any excluded studies (Page et al., 2021).

#### Inclusion Criteria

*Population*

The scoping review will focus on existing English literature that had human participants of all age groups, geographical locations, and settings with any anxiety disorders and treated with acupressure interventions, used as the sole intervention or single addition to conventional treatments, in any part of the body where the skin is not penetrated. Outcomes include measures of anxiety scores such as the Spielberger's State-Trait Anxiety Inventory (STAI), Visual Analogue Scale for Anxiety (VAS-A), Beck Anxiety Inventory Score (BAIS), Hospital Anxiety and Depression Scale - Anxiety (HADS-A), Self-rated Anxiety Scale (SAS), 7-Item Generalised Anxiety Disorder Scale (GAD-7) or any other commonly recognised anxiety measurement to evaluate the effectiveness of

acupressure-related therapy as there is no globally accepted standard. In addition, other common physiological indicators, including blood pressure, respiratory rate, heart rate and pain-related scores, are also to be evaluated.

*Concept*

Any non-invasive (skin is not pierced) acupressure interventions used to alleviate anxiety will be considered and evaluated in this review.

*Context*

The context of the review is not limited to any geographical location, setting, ethnicity, culture, age, or gender factors.

*Types of evidence sources*

This scoping review will include both experimental and quasi-experimental study designs, RCTs, non-randomised controlled trials, before and after studies, primary and secondary research studies, prospective and retrospective cohort studies, qualitative studies, opinion and recommendation papers, guidelines, and grey literature to include any unpublished and ongoing trials and reports about the effectiveness of acupressure interventions on anxiety until July 2022.

Exclusion criteria

Primary and secondary studies, guidelines, webpages, and reports that examined the effectiveness of acupressure in combination with other therapeutic interventions or the use of transcutaneous electrical nerve stimulation (TENS) and transcutaneous electrical acustimulation (TEAS), which involves applying a low-intensity electrical current to acupuncture points without puncturing the skin will not be included in the scoping review. Studies, letters, blogs, book reviews, editorials, commentaries, and brochures in languages other than English, and full text of identified sources that were not retrievable, will be excluded from this study.

### 3.3.3 Information sources and search strategy

The three-step search strategy recommended by JBI was applied for the scoping review. First, an initial limited search was conducted utilising the EBSCO health database to review the topic of interest. The retrieved articles provided an overview of relevant text words in the title, abstract, and index terms, offering better insight and understanding of the keywords used in the systematic search. Before the second

search commenced, an experienced librarian from the Auckland University of Technology with expertise in health sciences assisted with the search. This allowed a complete search strategy to be developed with identified keywords and index terms that could be adapted to other databases.

The second search utilised the refined search strategy and was applied to each database (CINAHL, MEDLINE, Dentistry and Oral Sciences Source, AMED, PsycINFO, and Scopus). This ensures that the numbers of identified sources remain consistent across all databases. The completed electronic search terms, keywords, and database search combinations are presented in Table 3.

The final search involved screening for additional credible sources from the reference lists of all articles and sources included in the review. Additional searches were conducted through Google and Google Scholar, and the first 100 sources from each search engine were screened to identify eligible relevant sources.

### 3.3.4 Selection of sources

All sources identified from the search were exported to EndNote X9 and uploaded to Rayyan (a web-based collaboration and research tool). Initially, exact duplicates were removed, and the titles of the identified sources were read. Then, two reviewers screened the abstracts simultaneously, and eligibility was assessed using inclusion and exclusion criteria for the review. Finally, the full text and citation details of relevant sources were retrieved, and both reviewers further evaluated the eligibility for inclusion. Any disagreement during the data selection and extraction process was discussed between the two parties until a consensus was met.

### 3.3.5 Data extraction

The data collection process began by pilot testing the data extraction tables outlined in the protocol in ten articles. The initial data extraction table (Table 2) was modified to contain all the necessary information to address all research questions. The changes made to the initial data extraction tables were discussed by both reviewers. The modified tables are outlined in Table 4 and Table 5.

A Microsoft Excel spreadsheet was used to extract the necessary information. Disagreements at any stage of the data extraction process were resolved through

discussion by both reviewers. The first reviewer extracted data on article characteristics (e.g., author, year, country), contextual characteristics (e.g., study design, setting, sample size), anxiety measures, acupressure intervention characteristics (e.g., acupoints, method, duration and frequency), adverse events, and key findings of the included studies into Table 4. Table 5 was used for information on the implications and suggestions for future research. The second reviewer verified the accuracy of the collected data.

### 3.3.6 Synthesis of results

The results of included studies are summarised in tabular form and further illustrated using charts accompanied by a narrative explanation and discussion of the results.

**Table 3**

*Completed electronic search strategy*

| Search strategy | |
|---|---|
| #1 | acupressure OR acupoint* |
| #2 | anxiety* OR phobia* OR stress* OR anxious* |
| #3 | #1 AND #2 |

**Table 4**

*Modified data extraction table part 1*

| Author, Year, Country | Design, Sample size | Study population | Anxiety measures | Acupressure interventions | | | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | |
| | | | | | | | | |

**Table 5**

*Modified data extraction table part 2*

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| | | |

## 3.4 Results

There were 2476 records identified through the six databases, Google and Google Scholar, and 301 articles were assessed for eligibility. Seventy-six articles met the inclusion criteria and were included in this scoping review. Details of the study selection process, including the number of sources of evidence identified from the search, screened, assessed for eligibility, excluded, and included in the final review. A brief explanation for the full text excluded was recorded and presented in the PRISMA-ScR flowchart (Figure 2).

### 3.4.1 Characteristics of the included studies

The articles included in this review have a publication range from 1987 to 2022. Studies were conducted in 20 different countries, mainly from Iran (n = 21) and Taiwan (n = 9), followed by China (n = 6), Turkey (n = 6), Austria (n = 5), India (n = 5), USA (n = 5), Korea (n = 4), and Malaysia (n = 4) and other countries with smaller numbers of publications. Details of the number of publications by country are presented in Figure 3. As seen in Figure 4, the number of publications and studies relating to the effectiveness of acupressure therapy on anxiety showed an increasing trend since 2005 and peaked in 2021 (n = 17). This might suggest the amplified awareness of anxiety disorders after the COVID-19 pandemic. The details of each study characteristics of all 76 included sources are presented in Appendix A and Appendix B.

The included sources were further categorised into acupressure intervention using only traditional acupoints located on the body trunk, head, and limbs (n = 49), only auricular acupoints (n = 22), and a combination of traditional and auricular acupoints (n = 5). The number of acupoints used in the studies varies from a single-point unilateral or bilateral application to multiple points applications. Thirty-one out of 76 included studies (40%) examined the effectiveness of a single acupoint on anxiety reduction regardless of the location of the points. Additionally, 15 studies (20%) used two acupoints, 22 studies (29%) used up to five acupoints, five studies (7%) used six or more, and a few studies (4%) did not specify the number and location of acupoints used in the acupressure intervention. The methods of application outlined in the studies can be classified as using finger or thumb pressure (n = 44), vaccaria or mustard seeds with medical tape or adhesive sticker (n = 12), mixed material acupressure beads

with a medical tape or adhesive sticker (n = 16), and acupressure wristband (n = 3). The details of the most used acupoints and application methods identified from the literature are outlined in Table 6 and Table 7.

In terms of the effectiveness of acupressure therapy on anxiety, only seven studies (9%) showed either no statistical significance in the reduction or improvement in anxiety measures after acupressure intervention or revealed no statistically significant differences between the intervention, sham, or control groups (Bang & Park, 2020; Boon et al., 2022; Lewis, 1987; Mącznik et al., 2017; Oviedo et al., 2021; Ozkan & Balci, 2020). Interestingly, the study conducted by Borimnejad et al. (2012), which investigated the effects of acupressure on pre-operative anxiety reduction in school-aged children, showed a significant change in anxiety levels after acupressure on a sham acupoint ($p < 0.007$). However, the true acupressure group did not show a positive effect in reducing pre-operative anxiety. Nevertheless, most of the sources included in this scoping review (89%, n = 69) revealed a positive effect of acupressure in either reducing anxiety measures or anxiety-related physiological indicators with minimal adverse events noted. Discomfort at the site of acupressure application, soreness of the finger, intra-dialytic hypotension, dizziness, and headache were noted in the included studies (Bang & Park, 2020; Hmwe et al., 2015; Hoang et al., 2022).

**Figure 2**

*The PRISMA 2020 flow diagram of the study selection process.*

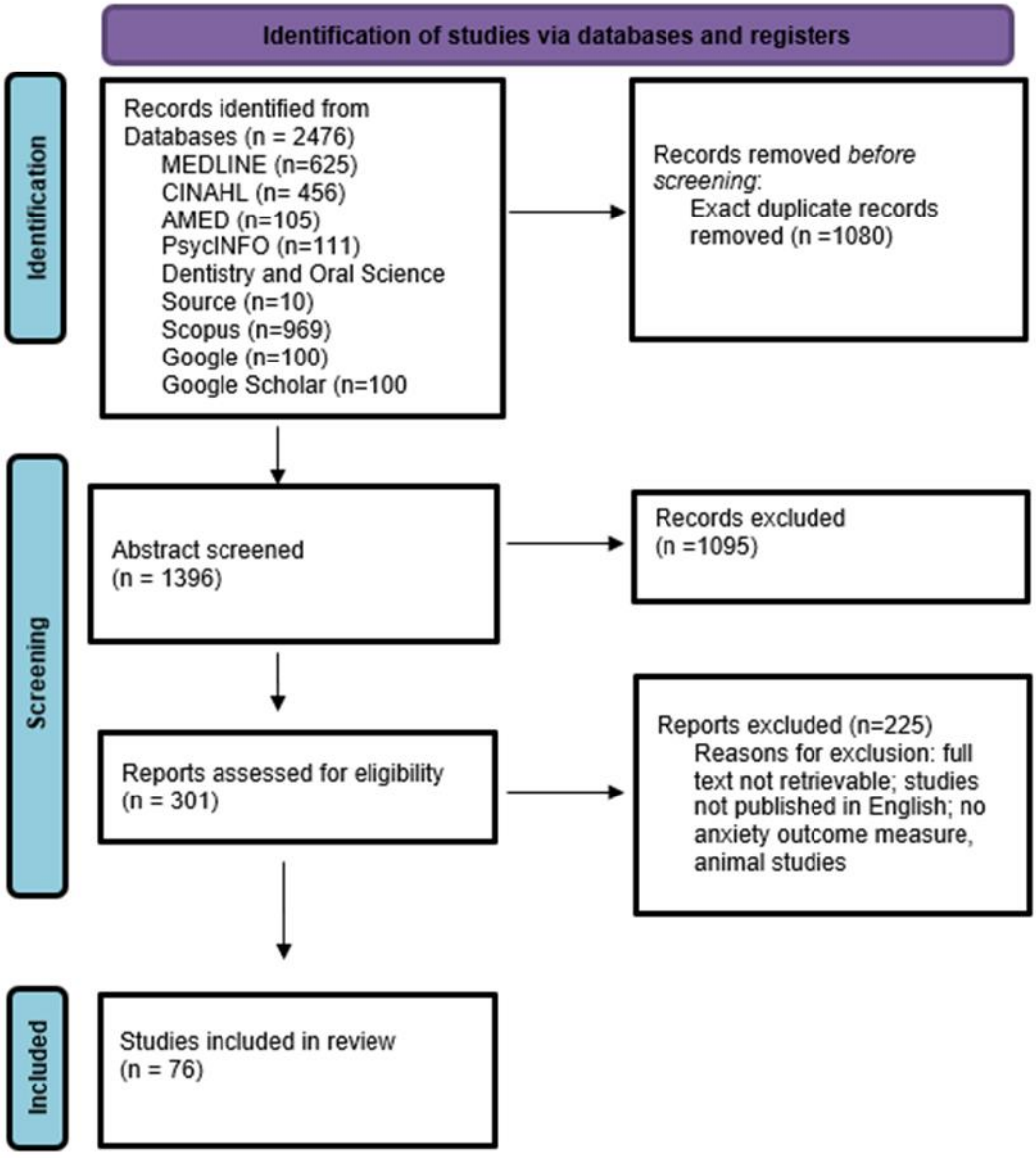

**Figure 3**

*Number of publications by country*

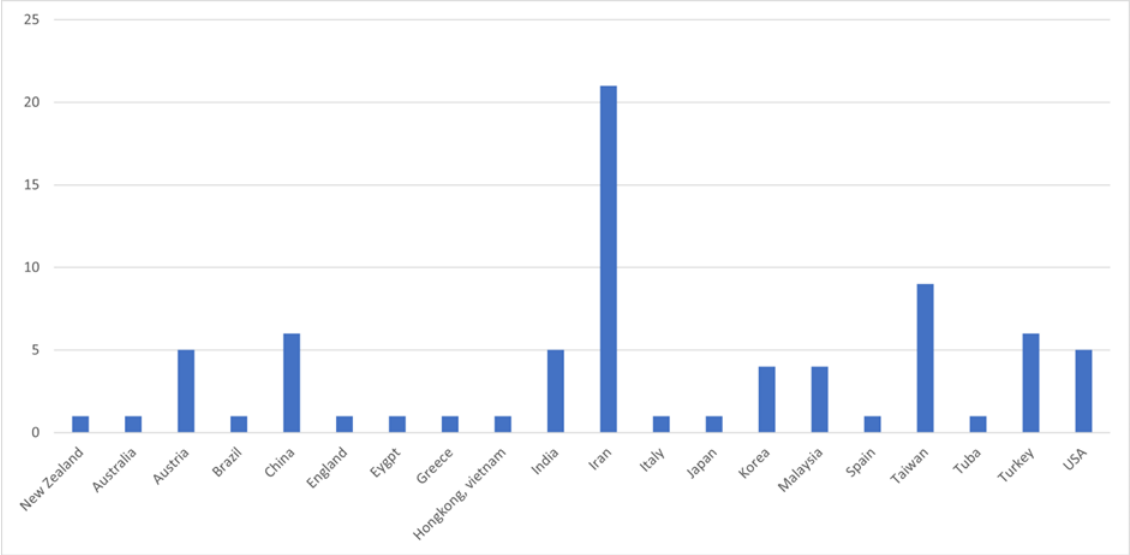


**Figure 4**

*Number of publications by year*

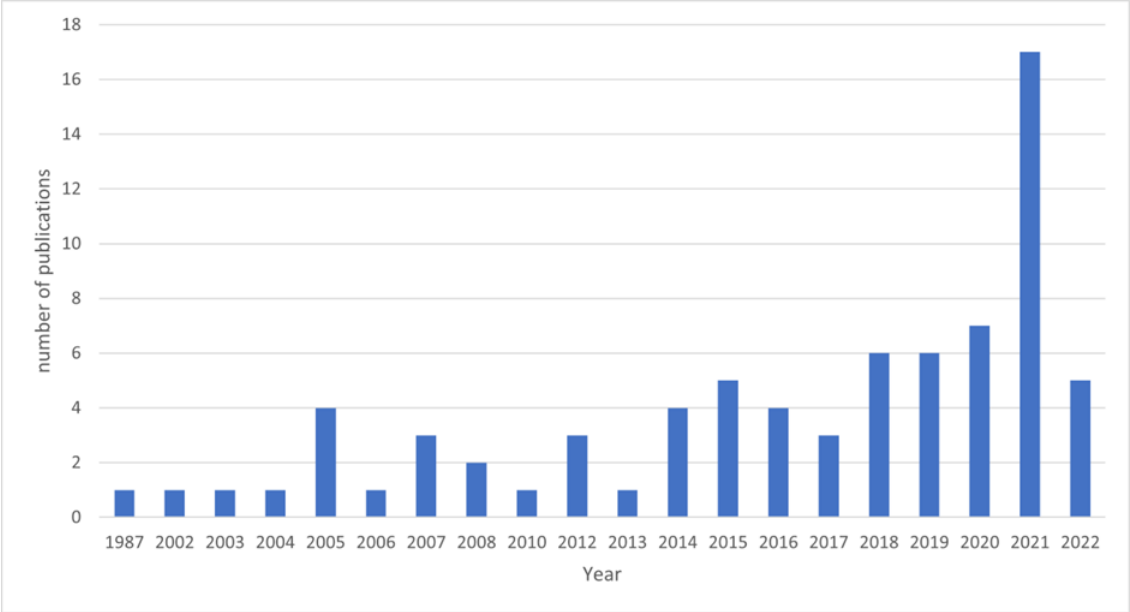

**Table 6**

*Most used traditional and auricular acupoints from identified sources*

| Traditional acupoints | Number of studies | Auricular acupoints | Number of studies |
|---|---|---|---|
| Shenmen (HT 7) | 16 | Shenmen auricular | 18 |
| Yintang (EX-HN3) | 16 | Relaxation point | 5 |
| Neiguan (PC 6) | 12 | Sympathetic point | 5 |
| Hegu (LI 4) | 15 | Heart point | 5 |
| Taichong (LR 3) | 4 | Endocrine point | 3 |

**Table 7**

*Most used acupressure application methods identified from included sources*

| Method | Number of studies |
|---|---|
| Finger or thumb pressure | 44 |
| Vaccaria/mustard seed with medical tape | 12 |
| Acupressure bead with medical tape | 16 |
| Wristband | 3 |

### 3.4.2 Key findings of the included studies

#### The effectiveness of acupressure therapy on anxiety based on methods

*Studies of acupressure therapy on anxiety management using body acupoints*

A total of 49 studies and articles investigated the effects of acupressure therapy on anxiety reduction using acupoints located on the body's trunk, limbs, and head, excluding the auricular area. Among these, 19 studies conducted in Iran examined the effect of traditional acupressure on anxiety management under various circumstances. Thirteen studies assessed the effects of acupressure on a single traditional acupoint in anxiety reduction. Three of those studies evaluated the effectiveness of acupressure on Yintang, located at the midpoint between the medial extremities of the eyebrows, which is a commonly used acupoint for treating insomnia, anxiety, and agitation (Deadman, 2007). Applying acupressure on Yintang showed a significant difference between the level of anxiety before and after the intervention in the acupressure group among children undergoing tonsillectomy ($p$ = 0.002) (Borji et al., 2019). This result was supported by the study conducted by Pouy et al. (2019), which also

observed a significant difference in post-intervention anxiety scores on pre-operative anxiety of mothers with a child undergoing tonsillectomy. However, Borimnejad et al. (2012) found no significant difference in anxiety levels observed in the acupressure group. However, they revealed a statistically significant difference between anxiety levels at baseline and 30 minutes after applying pressure at the sham point ($p < 0.007$) on children undergoing elective surgeries. Despite the discrepancies in the results of the studies mentioned above, eight other studies which examined the effects of body acupressure on other single acupoints reported a statistically significant reduction in anxiety levels in acupressure intervention groups compared to the control groups (Akbarzadeh et al., 2015; Bastani, 2016; Dehghanmehr et al., 2019; Kafaei-Atrian et al., 2016; Masoudi et al., 2022; Mirzaee et al., 2021; Mohammadifard et al., 2021; Samadi et al., 2018).

Four studies conducted in Taiwan also examined the effect of body acupressure on anxiety reduction in adolescent girls, post-cesarean section women, hospitalised patients undergoing thoracoscopic surgery, and patients diagnosed with chronic obstructive pulmonary disease (Chen & Chen, 2010; Chen et al., 2005; Hsu et al., 2022; Wu et al., 2004). The study carried out by Chen et al. (2005) demonstrated a significant reduction of post-operative anxiety and pain perception of cesarean experience by bilateral application of finger acupressure on Neiguan (PC6), as well as a statistically significant difference in respiration ($F = 16.39$, $p = 0.000$), pulse ($F = 8.84$, $p = 0.004$), systolic pressure ($F = 11.84$, $p = 0.001$), and diastolic pressure ($F = 8.01$, $p = 0.006$) between the experimental group and the control group post-intervention.

The effectiveness of acupressure on multiple body acupoints also demonstrated positive effects on anxiety reduction. For example, a study examined the effectiveness of acupressure on five acupoints applied to participants with minor injuries in a prehospital transport setting. At the end of transportation, it reported significantly less pain and anxiety in the true acupressure groups (Kober et al., 2002). Similarly, another study reported that acupressure applied by attaching vaccaria seeds with sticky medical tape achieved a statistically significant difference in STAI scores pre and post-intervention between the experimental and control groups. The vaccaria seeds were affixed and left in situ on Shenmen (HT7) and Neiguan (PC6) for two days with 20 minutes of finger pressure stimulation, three times per day (Hsu et al., 2022). This was

supported by another study conducted by Lang et al. (2007), which reported that acupressure on Baihui (GV20) and Hegu (LI4) in the treatment group resulted in significantly lower pain (treatment group 36.6 ± 11.0, control group 56.0 ± 13.3) and anxiety (treatment group 34.9 ± 22.2, control group 53.4 ± 19.7) VAS-A scores, and lower heart rate (69.9 ± 12.5, 90.4 ± 6.2 beats/min) compared to the control group.

Despite the variation in the number of acupoints used among these studies, most have reported that participants in groups that received acupressure on true acupoints experienced a significant decrease in anxiety score after the intervention compared to baseline values.

*Studies of acupressure at auricular points on anxiety management*

The anxiolytic and analgesic effects of auricular stimulation by traditional acupuncture have been widely investigated. Auricular acupressure as a non-invasive alternative has also shown effectiveness in anxiety management (Kober et al., 2003; Kuo et al., 2016; Luo et al., 2016; Mora et al., 2007). This review included 22 studies that examined the effects of auricular acupressure on anxiety management under several circumstances.

In 1987, a study investigated the effect of acupressure at the relaxation point on one ear in patients undergoing elective surgeries. The study demonstrated a significant reduction in sweating ($p$ <0.005) in the auricular acupressure group, although the changes in anxiety were not significant between groups (Lewis, 1987). In contrast, three other studies which examined bilateral auricular acupressure at the relaxation point concluded that participants of auricular acupressure groups showed lower state and trait anxiety scores or reported feeling less anxious post-intervention (Kober et al., 2003; Luo et al., 2016; Mora et al., 2007). Furthermore, five studies that investigated the effects of Shenmen auricular point also showed a statistically significant decrease in post-intervention anxiety measures in the true acupressure groups compared to the control (Chueh et al., 2018; Kuo et al., 2016; Olshan-Perlmutter et al., 2019; Tseng et al., 2021).

Several studies explored the effectiveness of acupressure on anxiety using multiple auricular points. For example, a study examined the effects of acupressure on sleep quality and anxiety in patients after cardiac surgery using five auricular points. It concluded that the experimental group had a significantly higher level of sleep

satisfaction among the different intervention periods. However, there were no statistically significant differences in either state ($F = 0.243$, $p = 0.701$) or trait anxiety (x2 = 27.220, $p = 0.335$) (Bang & Park, 2020). Whereas a study that evaluated the role of auricular acupressure applied at five points with mustard seeds in the treatment of temporomandibular disorders (TMD) and anxiety reported a significant reduction ($p < 0.01$) in post-intervention anxiety measure in the auricular acupressure group compared to the control group (Iunes et al., 2015). This was supported by another study, which reported that auricular acupressure at three points decreased pre-operative state anxiety (Qu et al., 2014). Similarly, a study by (Luo et al., 2021) concluded that auricular acupressure effectively alleviated anxiety in patients with COVID-19.

*Studies using a combination of body and auricular acupoints on anxiety management*

Four studies evaluated the effectiveness of acupressure on anxiety using a combination of body acupoints and auricular points. The effectiveness of Yintang (EX - HN3) and auricular Shenmen on pre-operative anxiety was investigated by Valiee et al. (2012). The result revealed a reduction in the level of pre-operative anxiety for both experimental and control groups ($p < 0.001$) and a statistically significant difference between the mean of vital signs before and after the intervention in the acupressure group ($p < 0.001$). Another study that assessed the effect of acupressure on children's dental anxiety concluded that acupressure on Yintang and auricular Shenmen effectively alleviates dental anxiety in children undergoing scaling and restorative procedures (Avisa et al., 2018). Similarly, a study conducted by Tsay et al. (2005) examined the effectiveness of acupressure on patients with chronic obstructive pulmonary disease with a combination of two traditional acupoints and an auricular point. The results of this demonstrated statistically significant post-intervention improvement in dyspnoea ($p = 0.009$), anxiety ($p = 0.011$) and physiological indicators ($p < 0.0001$) in the acupressure group compared to the control group. Another study, which investigated the effects of acupressure on hospitalised cancer patients, supported this finding. The intervention groups used nine acupoints, including traditional and auricular points. The post-intervention mean anxiety score was significantly lower than the baseline ($p = 0.001$) (Beikmoradi et al., 2015).

Furthermore, an article published by Yang et al. (2021) based on secondary data analysis also recommended using several body acupoints for calming the mind based on the Chinese medicine theory, combined with auricular Shenmen and auricular relaxation point for the management of anxiety during COVID-19.

## The effectiveness of most used traditional and auricular acupoints on anxiety

### *Traditional acupoints*

According to the classical acupuncture theory, acupoints are the specific points reflecting visceral conditions. The traditional acupoints are located along the meridians, which run through the head, body trunk and the extremities of the limbs. According to TCM theory, the meridians are pathways that facilitate energy flow throughout the body. Therefore, stimulation of a specific acupoint can regulate the function of internal organs and the autonomic nervous system (Li et al., 2013).

As presented in Table 6, the most used traditional acupoints identified from all sources included for this review were Shenmen (HT7) and Yintang (EX - HN3), followed by Neiguan (PC6), Hegu (LI4) and Taichong (LR3). It is important to note that Shenmen and Yintang are the most frequently used traditional points for anxiety and anxiety-related symptoms. They had a higher appearance in studies that used single-point acupressure as the active treatment b and have a high occurrence in studies that used multiple points in the true acupressure intervention group.

The effectiveness of Yintang (EX - HN3) on anxiety was discussed earlier in the paper. Similarly, Shenmen (HT7) also showed its significance in reducing anxiety levels in several studies. Kanza Gul and Solt Kirca (2020) conducted a double-blinded randomised clinical trial that investigated the effectiveness of bilateral acupressure application on Shenmen (HT7) on acute pre-operative anxiety. This study showed a significantly lower mean post-intervention anxiety score in the acupressure treatment group compared to the baseline. This result was supported by a later study that used the same acupoints to examine the effects of acupressure on amniocentesis anxiety in pregnant women. It concluded that the mean scores of state anxiety were significantly lower in the acupressure group compared to the control group ($p < 0.001$), which had no intervention (Mohammadifard et al., 2021).

*Auricular acupoints*

Auricular acupressure stimulates reflex points on the external ear, which has demonstrated effectiveness in managing pain, stress and insomnia (You et al., 2019; Zhao et al., 2020). The most frequently used auricular points for managing anxiety were identified and summarised in Table 6. Based on this review, Shenmen auricular point (Figure 5) is the most frequently used auricular acupoint to manage anxiety.

Acupressure, using only auricular acupoints demonstrated its efficacy in anxiety management. Kuo et al. (2016) concluded that auricular acupressure at Shenmen auricular acupoint successfully significantly reduced the mean cortisol levels (mean difference = 4mg/dl, $p < 0.05$), heart rate (mean difference = 9.2 beats/min, $p < 0.001$), anxiety symptoms (mean difference = 3.8, $p < 0.01$), and fatigue symptoms (mean difference = 7.1, $p < 0.01$) in post caesarean section women. This result was supported by Olshan-Perlmutter et al. (2019), which revealed a statistically significant improvement in participants' anxiety following auricular acupressure at Shenmen acupoint compared to the baseline value. Other auricular points, including relaxation and a combination of other auricular points, also demonstrated effectiveness in anxiety management. However, a study by Oviedo et al. (2021) found that neither auricular acupressure nor auricular acupuncture resulted in lower pain of anxiety scores in the participants compared to the control group, which received a placebo patch. Similarly, the study by Lewis (1987) also reported no significant differences between the auricular acupressure group and the other groups, which received standard treatment with diazepam and progressive relaxation when pressure was applied to the relaxation point on one ear in participants undergoing elective surgery.

**Figure 5**

*Location of Shenmen auricular acupoint*


## 3.5 Discussion

### 3.5.1 Principal findings

Most studies and articles in the scoping review reported positive effects of acupressure therapy on anxiety despite the discrepancy in the acupoint used, method, and duration of pressure application. The efficacy of acupressure on anxiety was demonstrated in a wide range of study settings.

#### Pre-operative anxiety

Many studies have concluded that acupressure therapy can be a viable alternative to reduce pre-operative anxiety. In several studies, a single session of acupressure intervention effectively reduced pre-operative anxiety. For example, Kanza Gul and Solt Kirca (2020) concluded that acupressure at Shenmen (HT7) acupoint for ten minutes before surgery resulted in a statistically significant decrease in the post-intervention anxiety scores (38.30 ± 4.45) compared with the control group (52.48 ± 7.30) ($p < 0.001$). Another study also concluded that continuous acupressure intervention for 30 minutes effectively reduced pre-operative anxiety in hemodialysis patients (Dharwal et al., 2020). This agreed with the study conducted by Valiee et al. (2012), which used acupressure on a combination of traditional and auricular acupoints for 10 minutes prior to abdominal surgery. Comparably, the acupressure on Yintang (EX - HN3) and Shenmen auricular acupoint effectively reduced dental anxiety

in children undergoing scaling and restorative procedures (Avisa et al., 2018). In addition, the study which examined the effectiveness of a single acupressure therapy session also showed a positive effect on the reduction of anxiety in mothers with a child undergoing tonsillectomy (Pouy et al., 2019).

### Anxiety related to trauma and injuries

A study by Kober et al. (2002) examined the effectiveness of acupressure on pain and anxiety in patients with minor injuries. The result revealed a significant reduction in pain, anxiety, and heart rate and greater satisfaction in the acupressure intervention groups ($p < 0.01$) at the end of transportation to hospital. In the following year, the study further investigated the effectiveness of auricular acupressure on stress and anxiety during ambulance transportation and reported an effective reduction in the level of anxiety and pain (Kober et al., 2003). This result was further supported by Lang et al. (2007). They reported that acupressure during hospital transportation effectively reduced pain and anxiety in patients with isolated distal radial fractures. However, a study conducted in New Zealand that examined the effectiveness of acupressure in decreasing pain and anxiety in acutely injured athletes revealed no difference between the acupressure treatment group and the control group, which did not receive any intervention in the level of anxiety (Mącznik et al., 2017).

### Anxiety related to complex and chronic medical conditions

Acupressure therapy also showed an effective reduction in medical-related anxiety. Several studies revealed positive effects of acupressure on anxiety levels in patients with complicated medical conditions, such as patients with cancer, coronary heart disease, chronic obstructive pulmonary disease, insomnia, osteoarthritis, pregnancy, and elderly patients (Akbarzadeh et al., 2015; Ali et al., 2022; Beikmoradi et al., 2015; Genç & Tan, 2015; Nordio & Romanelli, 2008; Rani et al., 2020; Tseng et al., 2021; Zick et al., 2018).

### General anxiety

Several studies reported the effectiveness of acupressure therapy on general anxiety. Sun et al. (2019) investigated the effectiveness of auricular acupressure on children with nail-biting habits, reporting a significant reduction in the anxiety score post-intervention and demonstrated efficacy in habit reversal treatment. The efficacy of

acupressure therapy in anxiety reduction was also investigated in healthcare workers at a high risk of burnout. Olshan-Perlmutter et al. (2019) reported a statistically significant improvement in the level of anxiety ($p < 0.05$) in nurses following auricular acupressure at the Shenmen point compared to baseline. A study by Iunes et al. (2015) also reported an effective reduction of anxiety in university students with TMD with auricular acupressure. This result was supported by another study that examined the effectiveness of acupressure on Yintang (EX - HN3) and Shenmen (HT7) to reduce anxiety in nursing students. They demonstrated that anxiety scores were significantly reduced post-intervention in the experimental group (Yildirim & Akman, 2021).

### Effects of acupressure therapy on physiological indicators related to anxiety

This review also noted the effects of acupressure therapy on the physiological indicators in participants with anxiety. Kuo et al. (2016) reported that post-intervention results of the participants in the auricular acupressure group had significantly lower mean cortisol levels (mean difference = 4mg/dl, $p < 0.05$), heart rate (mean difference = 9.2 beats/min, $p < 0.001$), anxiety symptoms (mean difference = 3.8, $p < 0.01$), and fatigue symptoms (mean difference = 7.1, $p < 0.01$) than those who were assigned to the control groups. A later study also supports this by examining auricular acupressure's effects on outpatient nurses' stress, anxiety, and depression. The result also reported a statistically significant reduction in the cortisol level post-intervention, although no significant difference was noted between the true acupressure and sham acupressure groups (Lee et al., 2021). In addition, the effects of acupressure on lowering heart rate were also noted in other studies (Lang et al., 2007; Luo et al., 2016; Wang et al., 2022).

### Discrepancies in the acupressure intervention protocol

Although acupressure therapy has demonstrated its effectiveness in anxiety management by reviewing existing literature, finding an identifiable pattern in the intervention protocol was challenging. This is due to the variation in the location, number of acupoints used, and the method, duration, and frequency of acupressure application.

Despite the high heterogeneity, the review of past literature revealed Yintang (EX - HN3) and Shenmen (HT7) are the most frequently used traditional acupoints in

alleviating anxiety. In contrast, auricular Shenmen acupoints had the highest occurrence in the included sources.

In terms of application methods, manually applying pressure with a thumb or finger remains the most common technique. Often, this is used in addition to the passive pressure provided by acupressure beads or seeds. However, there is considerable variation in the specifics of this approach. These variations include the duration and intensity of finger pressure applied on top of the seeds or beads, the type of stimulation (either direct vertical pressure or rotational massage), and the frequency of acupoint stimulation throughout the day or treatment duration.

Unfortunately, the optimal method, duration, and frequency of acupressure application in managing anxiety were inconclusive. As mentioned in earlier sections, many studies have concluded that a single session of acupressure intervention effectively reduces anxiety. In contrast, other studies achieved effective anxiety reduction with either multiple sessions or using passive acupressure to help alleviate anxiety through several weeks or months of treatment.

Meanwhile, it is essential to note that acupressure therapy has shown a statistically significant reduction in anxiety levels in a wide range of settings, despite the discrepancy in the intervention protocol. This might suggest that the intervention protocol may be modified according to the clinical settings or medical conditions. For example, a minimum of a single 10 minutes session with finger-tip pressure in a pre-operative setting could effectively reduce pre-operative anxiety (Kanza Gul & Solt Kirca, 2020).

## 3.6 Implications for practice

The scoping review findings suggest that acupressure interventions are beneficial for managing anxiety. Acupressure interventions are recommended not only to emergency physicians, nurses, paramedics, firefighters, or emergency medical technicians but also to non-academic personnel, students, and individuals who suffer from anxiety disorder to help reduce anxiety levels in a broader range of settings. Numerous studies suggest that acupressure can be used pre-operatively, during hospital transportation, or as in-hospital nursing care to help ease anxiety as it is an

easy-to-learn, non-invasive and low-cost technique that can be easily incorporated into the routine care for patients with complex medical conditions (Abadi et al., 2018; Avisa et al., 2018; Hsu et al., 2022; Kober et al., 2002). The application of acupressure can also be taught to individuals in person or via telecommunication to help alleviate anxiety in non-clinical settings, as it does not require a lot of tools or specific facilities to implement (Kafaei-Atrian et al., 2016; Kim, 2020). Another benefit of this technique is the safety of the application. In addition, this review also suggests that acupressure is safe to implement with minimal adverse effects, which did not require any medical intervention to resolve.

## 3.7 Suggestions for future research

The scoping review aimed to provide an overview of current research on the use of acupressure therapy in treating anxiety. However, the review showed a lack of consistency in the intervention protocol and methods and a deficit of studies investigating and comparing the anxiolytic effect of the most used acupoints regarding a specific type of anxiety disorder. Future studies should therefore use larger sample sizes and be adequately powered, multicentre, double-blinded, and placebo-controlled trials to explore the mechanism of the most used acupoints for anxiety management. In addition, the study on mechanisms of a specific acupoint indicated for anxiety reduction would be beneficial to inform a standard protocol for implementing acupressure intervention on a specific anxiety disorder or symptom relief. Apart from that, the majority of the included studies focused on anxiety related to medical conditions or general anxiety rather than other types of anxiety disorders, such as specific phobias. Therefore, further studies, systematic reviews and meta-analyses are required to comment on whether acupressure stimulation on the most used acupoints identified from this review effectively reduces other types of anxiety disorders, such as social or specific phobias.

## 3.8 Conclusions

Acupressure is an effective, non-invasive, low-cost alternative that has shown effectiveness in reducing anxiety in various settings despite the discrepancies in the intervention protocol. The types of acupressure can be categorised into using only traditional acupoints, auricular acupoints or a combination of both. Yintang (EX - HN3),

Shenmen (HT7), and auricular Shenmen are the most used traditional and auricular acupoints. Acupressure therapy in managing anxiety is highly recommended for routine nursing care in patients with complex medical conditions, emergency and pre-operative settings, and students and healthcare workers at risk of burnout.

Additional research, including comprehensive reviews and meta-analyses, is needed to better understand and offer guidance on whether acupressure treatments, focusing on the most common acupoints identified in this review, can effectively alleviate other forms of anxiety disorders, such as social anxiety or specific phobias.

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# Chapter 4 Discussion and conclusions

Studies concerning the effectiveness of acupressure on anxiety suggested that pressure stimulation on specific acupoints could regulate the sympathetic and parasympathetic nervous systems, reduce serum cortisol levels, promote relaxation and reduce anxiety (Lin et al., 2022). Therefore, this dissertation intends to provide a broad overview of the current knowledge on the effectiveness of acupressure and aims to identify the most used protocol for anxiety management through a systematic scoping review guided by the developed protocol outlined in Chapter 2.

The results of the scoping review presented in Chapter 3 showed an increasing trend in the number of publications since 2015, and peaked in 2021. This may suggest an increased recognition of anxiety disorders and the use of CAMs to manage anxiety. The majority of the literature reported a positive effect of acupressure therapy on anxiety reduction. Many of these studies were conducted in medical settings or involved individuals with a medical condition. Despite its heterogeneity in the acupressure application methods and acupoints selected in the studies, acupressure therapy showed its efficacy in alleviating anxiety levels in the pre-operative setting and amongst participants with a complex or chronic illness.

Acupressure therapy is considered an effective, low-cost, easy-to-implement, non-invasive alternative to pharmacological or other traditional treatments for anxiety, showing minimal adverse effects. Therefore, acupressure interventions are recommended not only to emergency physicians, nurses, paramedics, firefighters, or emergency medical technicians but also to non-academic personnel, students, and individuals who suffer from anxiety disorder to help reduce anxiety levels in a broader range of settings.

The scoping review allowed the identification of the most used traditional and auricular acupoints and the most used application methods. However, the optimal standard protocol was inconclusive. This is because of the vast variation in the details of intervention procedures, especially the combinations of acupoint selections, duration, and frequency of the acupressure stimulation. For example, the study by Dharwal et al. (2020) used a single 30-minute session of acupressure on five different

traditional acupoints and reported an effective post-intervention reduction of the mean anxiety score. On the other hand, a study by Dehghanmehr et al. (2019) used a single traditional acupoint but applied acupressure for multiple sessions over a few weeks, reporting an effective reduction in post-intervention scores.

A lack of consistency in intervention protocols and methods and a deficit in studies comparing the anxiolytic effects of commonly used acupoints for specific anxiety disorders calls for further research. A systematic review and meta-analysis should focus on the effectiveness of a single, widely used acupoint for a particular type of anxiety to identify the optimal application method, duration, and frequency of intervention. This will help establish a standard practice protocol.

Future studies should have larger sample sizes and be multicentre, double-blinded, and placebo-controlled trials to demonstrate efficacy. Further exploration of the mechanisms underpinning acupressure for anxiety management is required. Study on the mechanisms of a specific acupoint indicated for anxiety reduction would be beneficial to inform a standard protocol for implementing acupressure intervention on a specific anxiety disorder or symptom relief.

This scoping review has some limitations, including language restrictions and the range of databases searched. Acupressure, an alternative to conventional acupuncture, has its roots in China and other East Asian countries and may have been studied in languages besides English. It would be advantageous to consider resources published in other languages to gain a more comprehensive understanding of acupressure's effectiveness in treating anxiety across diverse cultural contexts and settings. Furthermore, this review did not assess the quality of the clinical studies included, which may impact the reliability of the evidence supporting acupressure therapy's effectiveness.

In conclusion, this dissertation reviewed the effectiveness of acupressure therapy on anxiety to provide a broad overview of the current knowledge base on this topic. The results of this review suggest that acupressure therapy is a viable and effective non-invasive alternative intervention for anxiety reduction in various settings. This was the first scoping review, which also intended to map out the types of acupressure intervention used, the most used acupoints, application methods, duration and

frequency of intervention and the effectiveness in anxiety reduction to identify and recommend standard practice protocol. Unfortunately, a pattern was not identified, especially in the duration and frequency of acupressure application, due to the enormous variation among the included sources. Therefore, further research, including a systematic review and meta-analysis on more specific topics, such as the anxiolytic effects of a most used single acupoint indicated for anxiety reduction, is required to identify the most effective application methods, duration, and frequency.

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# Appendices

*Appendix A: Description of included articles on the effectiveness of acupressure therapy on anxiety.*

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Abadi et.al, Iran, 2018. | RCT. | Pre-operative Cesarean Section, N=60. | STAI. | Yintang, HT-7. | Thumb pressure. | 5mins before surgery. | Sham. | Not indicated. | A significant difference between the mean anxiety scores of the two groups was observed after the intervention (p = 0.001). The synergistic effect of acupressure in HT-7 and Yintang points can reduce pre-operative anxiety and may relax in women before C-section. |
| Afrasiabi et al., USA, 2021. | A prospective randomised trial with an open, parallel-group design. | Health care workers, N=117. | STAI. | Unilaterally at the five standard acupoints (Shen men, sympathetic autonomic, lung, liver, and kidney) per the NADA protocol. | Auricular seed. | 5 sessions over 3 weeks. Each session lasted approximately 25 minutes. | | Not indicated. | Seed acupressure treatment (n = 14, 35.9%, one male, 13 females) was associated with a reduction in burnout (ANOVA, p = 0.04) and secondary traumatic stress (p = 0.03). |
| Agarwal et al., India, 2005. | RCT. | Elective surgery, N=76. | Visual stress scale (VSS), BIS. | Extra-1 (Yintang). | Thumb pressure. | 10mins. | Sham. | Not indicated. | Both pre-operative anxiety and BIS decreased significantly during acupressure application at an extra 1 point (p < 0.001). |
| Akbarzadeh et al., Iran, 2015. | RCT. | Pregnant women, N=150. | STAI. | BL32. | Thumb pressure. | 20mins at the beginning and end of the contraction. | Routine care. | Not indicated. | A statistically significant decrease in the supportive care and acupressure groups' state and trait anxiety scores after the intervention (at the end of the first stage) (P < 0.001). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Ali et al., Eygpt, 2022. | Quasi-experimental research. | Patient with coronary artery heart disease, N=80. | STAI. | LI4 and PC6. | Finger and thumb pressure. | 8-20 mins in 10 second pressure and 2-second resting period for each point. | Routine care. | Not indicated. | Both pain ($p<0.001$) and anxiety($p<0.001$) reduced significantly after intervention. |
| Amini et al., Iran, 2021. | RCT. | Iranian army soldiers, N=120. | STAI. | PC6, LI4. | Finger pressure. | 10 min, 3 times at 30 min intervals. | Sham. | Not indicated. | The mean anxiety score in PC6 group decreased significantly from 53.35±9.7 to 49.02±9.3 ($p = 0.005$). The mean anxiety score in the LI4 group also decreased significantly from 53.37±8.39 to 45.47±8.16 ($p<0.001$). |
| Avisa et al., India, 2018. | RCT. | Children between 8-12 y/o, N=375. | Modified Child dental anxiety scale face version. | Yintang, Shenmen (auricular). | Acupressure bead with tape. | Acupressure beads, 10 mins, passively. | Sham. | Not indicated. | Acupressure can be a viable alternative to reduce dental anxiety in children undergoing scaling and restorative procedures. |
| Aygin & Sen, Turkey, 2019. | RCT. | Patients after cardiac surgery, N=100. | VAS-A. | Heart 7 (H7), Pericardia 6 ( PC6), Gallbladder 20 (GB20), and Stomach 6 (ST6), bilateral. | Finger pressure. | Bilateral, 2 mins each acupoint, total of 16 minutes session was applied once a day for 3 days. | Standard care. | Not indicated. | Regression analysis showed that acupressure application was 92.7% effective in the decrease of postoperative anxiety ($p < 0.001$) |
| Bang & Park, Korea, 2020. | RCT. | Patients recovering from cardiac surgery, N=42. | STAI. | Five AA points: (Shenmen, sympathy, occiput, heart, and anterior lobe). | Vaccaria seed sticker. | Six days a week for two weeks. | Sham. | Discomfort at the site of acupressure. | The experimental group had a significantly higher level of sleep satisfaction among the different intervention periods ($\chi2 = 26.000$, $p < 0.001$). However, there were no statistically significant differences in either state ($F = 0.243$, $p = 0.701$) or trait anxiety ($x2 = 27.220$, $p = 0.335$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Barker et al., Austria, 2006. | RCT. | Patients with acute hip fracture, prehospital transport, N=38. | BP, HR , VAS-A. | Bilateral auricular Shenmen, hip, valium points. | Plastic beads covered with an opaque ear patch. | During hospital transportation. | Sham. | Not indicated. | Patients in the true intervention groups had less pain (F = 28, p = 0.0001) and anxiety (F = 4.3, p = 0.018) and lower heart rate (F = 18, p = 0.0001) on arrival at the hospital than did patients in the sham control group. |
| Bastani, , Iran, 2016. | RCT. | Women with gestational diabetes mellitus, N=60. | Maternal Anxiety Questionnaire (MAQ), and a Visual Analogue Scale for the Severity of Anxiety (**VASA**). | PC7-bilateral. | Thumb pressure. | 3 min, 3 times, bilateral (18 mins) a day, 3 days. | Sham. | Not indicated. | In the acupressure group, there were significant decreases between the pre and post-intervention mean scores in the anxiety on the MAQ and its severity on the VASA (p = 0.001). |
| Bazarganipour et al., Iran, 2017. | RCT. | University students with premenstrual syndrome, N=97. | HADS scale (for depression and anxiety). | LIV3, LI4. | Finger pressure. | 20mins, 14 days for 3 months. | Sham. | Not indicated. | There was a significant difference in anxiety score in the second and third cycles in LIV3 (9.73 ± 1.52 vs. 9.43 ± 1.13) and LI4 (10.20 ± 2.48 vs. 10.90 ± 6.33) compared with the placebo group (9.22 ± 2.02 vs. 8.72 ± 2.90) (p < 0.05). |
| Beikmoradi et.al, Iran, 2015. | RCT. | Hospitalised cancer patients, N=85. | STAI. | 1) Acupressure : Shenmen (auricular), LI4, LI10, HT7, LU9, DU20, REN6, Yintang, UB13. 2) Sham : 2cm from true acupoints. | Finger pressure. | 25 to 30-minute sessions (one session per day for 10 days) by the researcher, who pressed his or her thumb at each acupoint alternately for 2 minutes. | Routine care. | Not indicated. | The mean state anxiety score in the acupressure group before the intervention was 49.41 ± 7.07, and after applying acupressure, it decreased in session 5 to 45.30 ± 7.14 and in session 10 to 43.48 ± 6.82. (p=0.001). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Boon et. al, Malaysia, 2022. | RCT. | Patients scheduled for surgery under general anaesthesia, N=80. | VAS-A, HR, BP. | Bilateral shenmen auricular. | Vaccaria seed sticker. | 10 mins intervals, 3 times simultaneously with two subsequent digital pressure per second fifteen times, before induction of GA. | Sham. | Not indicated. | There was no significant reduction of pre-operative anxiety levels in both groups after auricular acupressure ($p = 0.879$). |
| Borimnejad et.al , Iran, 2012. | RCT. | 9-12 years old, undergoing elective surgery, N=80. | State-Trait Anxiety Inventory for Children (STAIC). | Yintang. | Acupressure bead. | Passive, 30 mins. | Sham . | Not indicated. | The results revealed significant differences between anxiety values at baseline and 30 minutes after applying pressure on the sham point ($P < 0.007$) but not the true acupressure group. |
| Borji et.al, Iran, 2019. | RCT. | Children undergoing tonsillectomy, 5-12 years. , N=144. | Modified Yale Pre-operative Anxiety Scale (mYPAS). | Yintang. | Finger pressure. | 3-4 kg of pressure, 15 mins intervention, before entering the operating room. | No intervention. | Not indicated. | A significant difference between the level of anxiety changes before and after the intervention in the acupressure group ($p = 0.002$), while no significant changes were observed in the control ($p = 0.546$) and sham ($p = 0.332$) groups. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Chen & Chen, Taiwan, 2010. | RCT. | Adolescent girls, N=134. | VAS-A. | 1) Zusanli 2)Hegu 3)Hegu, Sanyinjiao. | Thumb pressure. | 5 minutes each acupoint, 4 times (20 mins in total) initially, participant self-acupressure 20mins each day for the first 3 days of menstruation cycle at home for 6 months. | No intervention. | Not indicated. | Acupressure at matched points Hegu and Sanyinjiao reduced the pain, distress and anxiety typical of dysmenorrhoea. Acupressure at single point Hegu was found to reduce menstrual pain during the follow-up period effectively, but no significant difference was found for reducing menstrual distress and anxiety perception. Zusanli acupressure did not significantly reduce menstrual pain, distress and anxiety perception. |
| Chen et.al, Taiwan, 2005. | Quasi-experimental design. | Post-caesarean section women, N=104. | VAS-A, STAI, HR, BP. | Neiguan (PC6), bilateral. | Thumb pressure. | 3 acupressure treatments, night before CS, 2-4 hours after CS, 8-10hours after CS. Thumb pressure 3-5 kg , 6 second pressure 2 second release, for 5mins on each arm, repeat 4 times. | Standard care. | Not indicated. | There were significant differences between the control group and the experimental group on the VASA (F = 42.75, p = 0.000), STAI (F = 18.53, p = 0.000), and the VASP (F = 12.03, p =0.001). There were significant differences between the control group and the experimental group in respiration (F = 16.39, p = 0.000), pulse (F = 8.84, p = 0.004), systolic pressure (F = 11.84, p = 0.001), and diastolic pressure (F = 8.01, p = 0.006). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Cho et al., Korea, 2021. | Quasi-experimental pretest-posttest control group. | Shift-work nurses, N=59. | State Anxiety Inventory (SAI) of STAI. | GV 20, GB 12, GB 21, LI 11, SI 3, KI 1. | Finger pressure. | 15 min on six Meridian acupressure points, 2 min 30 s (10 times for 15 s at a time) on each Meridian point applied between 3~5 pm for3 days, after the day shift, by a trained researcher. | No intervention. | Not indicated. | The intervention group showed that their stress (t = 2.066, p= 0.043), fatigue (t = 4.590, p < 0.001), and anxiety (t = 2.984, p= 0.004) were significantly decreased compared to the control group. |
| Chueh et al., Taiwan, 2018. | One-group, quasi-experimental design with repeated measures. | Nursing students currently experiencing sleep disturbance, N=36. | Beck Anxiety Inventory. | Shenmen (Auricular). | Magnetic bead with tape. | Changed after a week, 4 weeks. | | Not indicated. | During the 4-week AA intervention, participants' sleep quality, anxiety, and depression were generally ameliorated, with overall improvement rates of 26.7%, 43.5%, and 25%, respectively. |
| Dehghanmehr et al., Iran, 2019. | Clinical trial. | Haemodialysis patients, N= 60. | STAI. | PC6. | Finger pressure. | 1 hour after dialysis, 3x a week for 4 weeks, finger pressure, rotationally at 3-4kg for 8 mins. | No intervention. | Not indicated. | There was a significant difference between the three groups in terms of anxiety after the intervention (P < 0.001). While patients who received acupressure reported the least amount of anxiety, the control group expressed the highest level of anxiety. |
| Dharwal et al., India, 2020. | RCT. | Haemodialysis patients, N=70. | DASS-42 (Anxiety-14 items). | 5 acupoints from foot to head (not specified). | Finger pressure. | 5 mins each point, 25 mins acupressure. | No intervention. | Not indicated. | Acupressure intervention for 30 minutes at once effectively reduced anxiety among patients undergoing hemodialysis. In post-test II the mean anxiety score was 6.20±2.54 and 18.80 ± 4.77 (t=13.79, p < 0.001). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Fassoulaki et al., Greece, 2007. | Clinical study. | Volunteers, N=12. | BIS, melatonin, β-endorphin, and VSS. | Extra-1 (Yintang), Sham. | Thumb pressure. | 10mins /treatment per day, 3 days. | No intervention. | Not indicated. | Acupressure on the extra 1 point decreased BIS and VSS values but did not affect the melatonin and β-endorphin levels. |
| Genc & Tan, Turkey, 2015. | A quasi-experimental model with a control group. | Stage 1-3 breast cancer patient, N=64. | Beck Anxiety Inventory. | PC6. | Wristband. | 5 days. | No intervention. | Not indicated. | The post-test mean anxiety score was lower in the experimental group compared to the control group, and the difference between the groups was statistically significant ($p<0.001$). |
| Gul & Kirca, Turkey, 2020. | RCT. | Pregnant women scheduled for cesarean section, N=82. | STAI. | HT7, bilateral. | | 1 hour before surgery, 10-minute intervention. | Standard care. | Not indicated. | The mean post-intervention anxiety score (38.30 ± 4.45) of the intervention group that underwent acupressure treatment was highly significantly lower than the group's preintervention score (49.13 ± 6.22; $p < 0.001$). |
| Hassanzadeh-Bashtian et al. , Iran, 2018. | A qualitative, conventional content analysis study. | Infertile female participants in the Milad IVF Center, N=14. | Interviews. | HT7, PC6. | Finger pressing. | 1-3mins, 12 sessions (4 by author, 8 by participant). | | Not indicated. | Most participants' experiences and perceptions of acupressure dealt with anxiety reduction and creating calm following acupressure. |
| Hmwe et al., Malaysia, 2015. | RCT. | Patient with hemodialysis, N=108. | Depression, Anxiety Stress Scales (DASS-21). | Shenmen HT7, Yingtang, GV29, KID3 Taixi. | Finger pressure. | Consistent finger pressure with rotational movements, 15mins, 3 times a week, 4 weeks. | Standard care. | Intra-dialytic hypotension (n = 11), dizziness (n = 6), palpitation (n = 2) and headache (n = 1). | The mean DASS total score in the acupressure group was 34.37±22.61 before the intervention and reduced to 27.04±20.3 after the intervention. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Hoang et al., Hongkong, vietnam, 2021. | RCT. | Cancer patients, N=114. | Hospital Anxiety and Depression Scale. | Baihui (GV20), Yintang(Ex-HN3), Fengchi (GB20), Neiguan (PC6), Shenmen HT7, Taichong LV3 ( bilatetal. | Finger pressure. | Participant training 30mins, self-acupressure (about 28 min in total) every night 30 to 60 min before going to bed for 4 weeks(28 days). | Enhanced Standard care. | Pain at acupoint (N=2), tired finger (n=2). | A significant reduction of insomnia and anxiety at T2 and T3 in TAP and at T2. |
| Honda et al., Japan, 2013. | Clinical study. | College students, N=49. | Tension-Anxiety (TA) subscale of the Japanese version. | 3 Acupoints on neck (bilateral). | Finger pressure. | 25 second each point. | No control. | Not indicated. | Individuals whose anxiety levels are not clearly high but mild can benefit significantly from a self-administered acupressure treatment course for reducing anxiety. |
| Hsu et al., Taiwan, 2022. | RCT. | Hospitalised patients undergoing thoracoscopic surgery, N=100. | (VAS)-A, STAI. | Shenmen(HT7) and Neiguan(PC6) acupoints. | Vaccaria seed with tape. | Acupressure 10sec at a time and 2sec release performed 20 times per acupoint, 3x a day for 2 days. | Routined care. | Not indicated. | All subjects had mild-to-moderate anxiety after surgery and showed a statistically significant decline in regression coefficients on the first and second days after the intervention ($\beta = -11.61$, $p = 0.002$; $\beta = -18.71$, $p < 0.001$). Similarly, for STAI-YI scores, the data showed a significant difference in the pre-test and post-test interactions between the two groups ($\beta = 4.72$, $p = 0.031$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Iunes et al., Brazil, 2015. | RCT. | Student with high levels of anxiety and TMD, N=44. | STAI. | Auricular: Shenmen, kidney, sympathetic, brain stem, and TMJ. | mustard seeds, which were attached to the skin with Micropore tape. | 10 sessions, twice a week (Monday and Thursday) for 6 weeks, with an alternate ear used each application volunteer was instructed to press each auricular point at least 5 times a day, applying pressure for 1 min to every point or until the pressure produced localised pain or discomfort. | Sham. | Not indicated. | Anxiety($p$<0.01) was significantly reduced in the AA group. |
| Kafaei-Atrian et al., Iran, 2016. | RCT. | Students with dysmenorrhea, N=77. | STAI. | LV 3 Taichong. | Finger pressure and acuhealth device. | The pressure was applied twice on each leg and four times (16 min) in a clockwise rotation. | Sham. | Not indicated. | Acupressure on LIV3 point caused a decrease in apparent anxiety (p < 0.05). |
| Kao et al. , Taiwan, 2012. | RCT | Postmenopausal women, N=44. | Hamilton Anxiety Rating Scale. | Bilateral Shenmen (auricular) and Subcortex points. | Magnetic ball placed on it. | After 3 meals and before sleep every day for 4 weeks. | Sham. | Not indicated. | The HAMA scores were higher at baseline than at 4 W in the AG and in the SG (p< 0.05). |
| Khoram et al., Iran, 2020. | RCT | Open-heart surgery patients, N=90. | STAI. | Shenment (HT7), Fengchi (GB20), Yintang (EX-HN3). | Thumb pressure of 4.5kg/cm2. | Acupressure twice in two consecutive days after admission to the ward. They received acupressure each time for 15 min (5 min each point). | Sham. | Not indicated. | STAI was statistically significant before (p < 0.001) and after the intervention (p < 0.010) in the test group. After completing the second phase of the intervention at the actual sites, systolic blood pressure (p = 0.007) and heart rate (p = 0.001) decreased significantly. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Kim, Malaysia, 2021. | N/A | N/A | N/A | Recommended acupoints: HT7, ST36, Taiyang, LI4, LR3, PC6,GB12,LI11,SI3 ,KI 1. | Finger pressure. | N/A | N/A | N/A | N/A |
| Kim, Malaysia, 2020. | RCT. | Participants from the same communities, N=80. | Hamilton Anxiety Rating Scale. | Shenmen (HT7), Zusanli (ST36), Neiguan (PC6), Taiyang, Hegu (LI4) and Taichong (LV3). | Finger pressure. | Acupressure self-practice for no longer than 40 minutes following the lecture. | Non-acupressure online communicatio n. | No adverse event. | The Hamilton Depression Rating Scale (6.29±1.65), Hamilton Anxiety Rating Scale (7.20±0.65), and anxiety score in well-being ONS-4 (3.34±0.38) were significantly lower. |
| Kober et al., Austria, 2002. | RCT. | Ambulance transport secondary to medical conditions, N=36. | VAS-A. | 1) True acupressure :LI4 (Hegu), PC9 (Zhongchong), PC6 (Neiguan), BL60 (Kunlun), and GV20 (Baihui).<br>2) Sham group. | Finger pressure. | Left passive until the end of the transportation. | No acupressure. | Not indicated. | Significantly less pain, anxiety, and heart rate and greater satisfaction in the “true points” groups ($P < 0.01$). |
| Kober et al., Austria, 2003. | RCT. | Trauma patient, N=60. | VAS-A. | Bilateral auricular relaxation point. | Small plastic ball (1-mm diameter) that was pressed on with ear patch. | 3 mins. | Sham. | Not indicated. | Ambulance patients who receive auricular acupressure are less anxious, anticipate less pain, and are more optimistic about the outcome of their illness. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Kuo et al., Taiwan, 2016. | RCT. | Women who underwent caesarean section, N=80. | STAI. | Shenmen (Auricular). | Vaccaria seed with tape, and intermittent finger pressure. | 3 mins, twice a day, at 9 am and 5 pm, left until the end of the study. | Standard care. | Not indicated. | Those who received auricular acupressure had significantly lower mean cortisol levels (mean difference = 4mg/dl, $p < 0.05$), heart rate (mean difference = 9.2 beats/min, $p < 0.001$), anxiety symptoms (mean difference = 3.8, $p < 0.01$), and fatigue symptoms (mean difference = 7.1, $p < 0.01$) than women in the control group at 5 days postpartum. |
| Lang et al., Austria, 2007. | RCT. | Patient with isolated fracture, N=32. | VAS-A. | GV20, LI4. | Finger pressure. | Application of acupressure for 3 minutes at each acupressure point (slight circulating pressure of approximately 20 lb, no crescendo or decrescendo, no massaging). | Sham. | Not indicated. | On arrival at the hospital, patients in treatment group had significantly lower pain (treatment group 36.6 ± 11.0 vs control group 56.0 ± 13.3) and anxiety (treatment group 34.9 ± 22.2 vs control group 53.4 ± 19.7) scores than those in the control group. Patients in the treatment group had a significantly lower heart rate than those in the control group (69.9 ± 12.5 vs 90.4 ± 6.2 beats/min), although there was no significant difference in blood pressure readings. |
| Lee & Park (requested), Korea, 2021. | RCT. | Nursing students, N=55. | Revised Test Anxiety Scale, Revised STAI. | Auricular: Shenmen point and endocrine point, bilateral. | Vaccaria seed with tape. | | Sham. | Not indicated. | Auricular acupressure therapy effectively decreased the test anxiety level; however, no differences were found in state anxiety or trait anxiety. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Lee et al., Korea, 2021. | RCT. | Outpatient nurses, N=54. | Perceived Stress Scale, STAI, beck depression inventory- II (BDI-II), blood (cortisol concentration, serotonin). | Unilateral: Shenmen, heart, occiput, anterior lobe. | Vaccaria seeds. | Five weeks, repeatedly press the seed-applied acupoints continuously for 5 mins. 4 times a day (7 a.m., 12 p.m., 5 p.m., and 10 p.m.) with adequate pressure to stimulate, (alternate ear between each week). | Placebo. | Not indicated. | Stress scores in the experimental group decreased significantly ($Z = 4.670$, $p < 0.001$) with auricular acupressure, but no statistically significant difference was found between the two groups ($Z = 1.711$, $p = 0.087$). Cortisol levels also significantly decreased in the experimental group ($Z = 2.328$, $p = 0.020$), but the difference in cortisol changes in the two groups was not statistically significant ($Z = -1.437$, $p = 0.151$). The anxiety scores decreased significantly in the experimental group ($Z = 5.273$, $p < 0.001$), and the placebo group's scores also significantly decreased ($Z = 2.181$, $p = 0.029$). |
| Lewis, Australia, 1987. | RCT. | Elective surgery patients, N=90. | Patient/Observer assessment of anxiety. Dose of induction anaesthesia, physiological measures. | Auricular: relaxation. | Silver metal bead and tape. | Pressed with finger pressure 1 hour prior to surgery. | 2)Diazepam 10mg. 3)Progressive relaxation. | Not indicated. | Anxiety between groups is not significant. Reduction in sweating (acupressure $p<0.005$) pulse rate(relaxation $p<0.01$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Luo et al., China, 2016. | RCT. | Women undergoing elective surgery, N=43. | STAI. | AA: bilateral relaxation point. | Magnetic bead with tape. | | Sham. | Not indicated. | The STAI-S scores showed lower state anxiety levels in both groups. However, patients in the AA group had significantly lower anxiety than those in the SA group (80.86 ± 12.16 vs. 91.95 ± 10.21, respectively; P = 0.002). Patients in the AA group showed lower HR and BP during acupressure intervention. Patients in the AA group showed significantly lower BIS values than those in the SA group at every time point after the intervention. |
| Luo et al., China, 2021. | Retrospective cohort study. | COVID-19 patients at isolation ward, N=84. | 7-Item Generalised Anxiety Disorder Scale (GAD-7). | AA: Jiaogan(AH6a), Shenmen(TF4), Pizhixia(AT4), Neifenmi (TF2). | Vaccaria seeds with tape. | Stimulated for 1min every 4-6 hours, 15-30mins before bedtime, seeds replaced and added to the other ear every 3 days. | Standard care. | No adverse event. | The intervention with APP effectively alleviated anxiety in patients with COVID-19. |
| Macznik et al., New Zealand, 2017. | RCT. | Athletes who sustained a sport-related musculoskeletal injury on the day, N=79. | VAS-A. | 1) ACU: LI4.<br>2) Sham. | Thumb pressure. | 3 mins, dominant hand. | No intervention. | Not indicated. | The acupressure group reported 11 mm less pain (95% CI: 5-17) on average than the sham acupressure group and 9 mm less (95% CI: 3-16) than the control group as a result of the intervention ($p < 0.05$). There was no difference between groups in anxiety levels or in any of the secondary outcome measures. There were no statistically significant differences in proportions between groups for the variable of “anxiety relief” (p = 0.466, Fisher exact test). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Mansoorzadeh et al., Iran, 2014. | RCT. | Patient undergoing coronary angiography, N=70. | VAS-A. | Yintang, Shenmen (HT7). | Thumb pressure. | Rotary moves with an average 20-25 times per minute for 10 minutes. | Sham. | Not indicated. | There was a significant difference between the level of VAS anxiety of the angiography blade and its level immediately after the patients entered the angiography ward and before they were injected with medication ($p < 0.001$). |
| Masoudi et al. , Iran, 2022. | RCT. | Pregnant women, N=150. | STAI. | BL32. | Thumb pressure. | During contractions for 30 min. | No intervention. | Not indicated. | After the intervention, the anxiety score was reduced by 34.8% in the acupressure group. |
| Mirzaee et al., Iran, 2021. | RCT. | Women in labour, N=90. | STAI, VAS-A. | 1) LI 4, bilateral 2) LI4 with ice, bilaterally. | 1)Finger pressure bilateral, 2)With an ice bag. | During contraction. | No intervention. | Not indicated. | Women in the group of acupressure without ice experienced less anxiety in comparison with acupressure with ice ($p = 0.04$). The result suggested that women receiving both acupressure with ice ($p = .005$) or without ice ($p < 0.001$) experienced less labour pain in comparison with the control group. |
| Mohammadi fard et al., Iran, 2021. | RCT. | pregnant women candidates for amniocentesis, N=56. | STAI. | HT7, bilateral. | Finger pressure, massage. | 5mins each hand, 30mins before amniocentesis, daily for 10 days. | No intervention. | Not indicated. | Immediately and 10 days after amniocentesis, the mean scores of state anxiety were significantly lower in the acupressure group compared to the control group ($P < 0.001$). The results of repeated measures analysis showed that the mean changes in state anxiety varied over time ($P < 0.001$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Acupoints | Method | Duration/ frequency | | | |
| Mora et al. (requested), Austria, 2007. | RCT. | Patients with renal calculi transported by ambulance, N= 100. | VAS-A. | Auricular: relaxation bilateral. | Plastic bead with sticker. | During transportation to the hospital. | Sham. | Not indicated. | The relaxation group had significantly decreased anxiety scores upon arrival at the hospital and lower anticipation of pain scores. The Post-Intervention Anxiety visual analogue scale demonstrated the significant superiority of the true treatment group (19.5 ± 5.9 and 66.8 ± 27.9 mm VAS, respectively, $p = 0.001$). |
| Moradi et al., Iran, 2014. | RCT. | Primiparous women, N=150. | STAI. | 1) GB21, 2) SP 6 on both sides. | Finger pressure. | 20 mins, at 3- to 4-cm cervical dilation. | Acupoints were touched without pressure. | Not indicated. | The anxiety level was significantly lower in the intervention groups compared to the control group ($P < 0.001$). Nevertheless, no significant difference was observed between the two intervention groups ($p > 0.05$). |
| Nordio & Romanelli, Italy, 2008. | RCT. | Patients with insomnia, N=40. | STAI. | HT7, bilateral. | H7-insomnia control device. | 20 nights. | Placebo. | No adverse events. | Reduction of anxiety level was highly significant in H7-treated patients (before: 49.27 ± 8.00; after 40.11 ± 7.06; $p = 0.004$). |
| Olshan-Perlmutter et al., USA, 2019. | Correlated-sample design (repeated measures). | Nurses, N=98. | Generalised Anxiety Disorder (GAD-7). | Shenmen auricular point. | Magnetic pellet with tape. | The magnetic pellets were replaced weekly every Monday for six weeks for participants receiving auricular acupressure. | | Skin irritation. | Results indicate anxiety measured using the GAD-7 improved statistically significantly ($p < 0.05$) following auricular acupressure. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Oviedo et al, USA, 2021. | RCT. | Women undergoing first-trimester aspiration abortion, N=177. | VAS-A. | Acupoint not mentioned. (1) Auricular acupressure plus usual care. (2) Auricular acupuncture plus usual care. | 1) Single-use gold-plated 1.2-mm diameter acupressure beads. 2)Acupuncture press needles on a 12-mm adhesive base. | Immediate before and during treatment. | Placebo plus usual care. | No adverse events. | Auriculotherapy using acupressure or acupuncture did not result in lower pain or anxiety scores during first-trimester uterine aspiration compared to inert placebo patches. |
| Ozkan & Balci, Tuba, 2020. | RCT. | Children having venipuncture, N=90. | STAI Children (STAIC), VAS, HR and oxygen saturation values. | LI4, LI11, HT7. | Finger pressure. | 10 min before the venipuncture procedure. | No intervention. | Not indicated. | It was observed that the children in the acupressure group (VAS: 19.51 +/- 4.98; FPS-R: 2.08 +/- 0.41) experienced less pain than the children in the control group (VAS: 47.37 +/- 9.89; FPS-R: 4.84 +/- 1.08), No statistically significant differences were observed in terms of the heart rate and oxygen saturation values of the children in the acupressure and control groups both before and after the venipuncture procedures ($p$ > 0.05). |
| Pouy et al., Iran, 2019. | RCT. | Mothers with child undergoing tonsillectomy, N=61. | STAI. | Yintang. | Finger deep massage and clockwise rotation. | 20 mins intervention. | Light superficial massage. | Not indicated. | After intervention in both groups, a significant difference was observed in their anxiety scores (38 ± 2 and 40 ± 6, respectively). In the intervention group, acupressure reduced the anxiety score, but there was not much change in the anxiety score in the sham group. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Qu et al., China, 2014. | RCT. | Infertile patients with tubal blockage who were referred for IVF, N=305. | STAI , Amsterdam Pre-operative Anxiety and Information Scale. | 1)AA: Shenmen, endocrine, internal genitals, 2) Sham: triple energiser, stomach, large intestine. | Vaccaria seed with tape. | Subjects were asked to press the acupoints four times a day (08:00, 12:00, 16:00 and 20:00 h, respectively) for 15 min each time by themselves. For a duration of 6 days. | Standard care. | No side-effect. | AA at the three auricular acupoints notably decreased the levels of state anxiety, pre-operative anxiety (including anaesthesia and surgery-related anxiety) and the need for information about the patients undergoing IVF treatment. |
| Rani et al., India, 2020. | Non-blinded comparative study. | Patient with osteoarthritis, N=212. | Depression Anxiety Stress Scale-21, VAS. | ST34, ST35, ST36, SP9, SP10, and GB34). | Finger pressure. | 15 minutes, consisting of 3 minutes of initial message around acupoints and 12 minutes of pressure applied on acupoints (2 minutes for each acupoint). Frequency of acupressure application was two times a day for five days in a week. | Standard care. | | A 30.5% reduction in the DASS-21 score (40.85 ± 22.32 at baseline, 28.36 ± 18.76 after completion of treatment) was reported among intervention group patients, which is higher than that among control group patients ($p = 0.08$). Mean depression, anxiety, and stress scores scored better for intervention group patients ($p < 0.05$). |
| Rodriguez-Mansilla et al., Spain, 2014. | RCT. | Elders with dementia, N=120. | Doloplus2, Cornell and Campbell scales. | AA: Myorelaxant1, Shenmen, xin Heart Massage therapy group: relaxing massage 20mins daily. | Vaccaria seed with tape. | New seed replaced every 15 days. | No intervention. | Not indicated. | The results of the present study indicate that ear acupressure and massage therapy have better results than the control group improving pain, anxiety and depression in elderly persons with dementia. Ear acupressure achieved better results. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Samadi et al., Iran, 2018. | RCT. | Pregnant women, N=131. | Face Anxiety Scale (FAS). | SP6, bilateral. | Finger pressure. | 1 min of pressure followed by 1 min of rest was applied intermittently until the pressure time equalled an overall 30 min. | Routine care. | Not indicated. | Anxiety in the pressure group was significantly decreased compared with the touch and routine care group. |
| Sharifi et al., Iran, 2017. | RCT. | Cancer patients who were undergoing bone marrow biopsy and aspiration, N=90. | STAI, VAS, physiological indexes. | LI4 and HT7, bilateral. | Finger pressure. | 2 min symmetrically immediately after the start and the end of the biopsy. | No intervention. | No adverse event. | The lowest average anxiety score (1.5 ± 0.5; $p$ = 0.01) and the lowest average pain score (4.9 ± 0.8) after the intervention were related to the acupressure method ($p$ = 0.001). The acupressure successfully resulted in less anxiety in the intervention group(F = 4.189, df = 2, P0 = 0.01) |
| Shruthi et al., India, 2021. | Clinical trial. | Students, N=50. | HR, Oxygen saturation. | HT7. | Wristband. | 12 hours. | Fitbit. | Not indicated. | Anxiety-controlling wristband, which uses the traditional method, proved beneficial in assuaging health and emotional illness through experiments conducted on people suffering from anxiety. |
| Soylu & Kartin, Turkey, 2021. | RCT. | Adult patients underwent a laparoscopic cholecystectomy operation, N=53. | STAI. | ST25, CV12, TH6, and HT7. | Finger pressure. | 12 min, as 3 min at each point, at 0, 4 and 8 h after laparoscopic cholecystectomy operation. | Placebo. | Not indicated. | There was seen to be a similar reduction in SAI points in both groups, from 53.02 ± 14.86 to 36.26 ± 6.37 in the intervention group, and from 50.48 ± 14.44 to 36.00 ± 7.09 in the placebo group ($p > 0.05$) with no significant difference determined between the groups ($p > 0.05$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Sun et al. , China, 2019. | RCT. | Nail biters (8–12 years old), N=41. | Screen for Child Anxiety Related Emotional Disorder. | Auricular: the sympathetic point (MA-AH7), Sanjiao point (MA-IC4), heart point (MA-IC), Shenmen point (MA-TF1), and adrenal gland point (MA-TG). | Magnetic bead with tape. | The participants pressed the acupressure points with the seeds thrice a day for 20 seconds per time under parental supervision. For 2 months. | Placebo. | No adverse event. | There were significant differences in the efficacy of habit reversal treatment, the anxiety score, the nail status, and the SGI in favour of Method A ( $p < 0.001$). |
| Tsay et al., Taiwan, 2005. | RCT. | Patients with chronic obstructive pulmonary disease, N=52. | RR, HR, VAS-A. | Neiguan (PC6) and Hegu (LI4) in both hands, Shenmen (HT7) on both ears. | Acupressure massage. | 15 minutes, consisting of 3 minutes of massage on the shoulders and both arms to relax the person and 12 minutes of acupoints massage (4 minutes per acupoint). | Standard care. | Not indicated. | Dyspnoea (P =.009), anxiety (P= 0.011) and physiological indicators ($P < 0.0001$) in the acupressure group improved statistically significantly over time when compared to those in the comparison group. |
| Tseng et al., Taiwan, 2021. | RCT. | Older adults in long-term care. institutions, N=47. | Geriatric Depression Scale (GDS)-Short Form, Beck anxiety inventory. | Auricular: Shenmen. | Adhesive tape with a magnetic bead. | 14 days, 7 days on the right ear and 7 days on the left ear. | Blank patch | Dizziness (1) | The experimental group had greater improvements in depression and anxiety after 14 days. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Valiee et.al, Iran, 2012. | RCT. | Patient undergoing surgery, N=70. | VAS-A BP, RR, HR. | Yintang, Auricular Shenmen. | Fingers and little plastic beads. | A plastic bead was placed on the Shenmen point of the non-prevailing ear. Immediately and Yintang point was pressured for 10 minutes using the thumb in a rotating manner with a mean of 20 to 25 cycles per minute. | Sham. | Not indicated. | The findings demonstrated a reduction in the level of pre-operative anxiety for both groups ($P < 0.001$). Furthermore, they showed a statistically significant difference between the mean of vital signs before and after the intervention in the acupressure group ($P < 0.001$). |
| Wang et al., China, 2022. | random crossover study. | Children undergoing endoscopic procedures, N=52. | State-Trait Anxiety Inventory for Children (STAIC), BIS. | Auricular: Sympathetic point (MA-AH7), 2. Sanjiao point (MA-IC4), 3. Heart point (MA-IC), 4. Shenmen point (MA-TF1), and 5. Adrenal gland point (MA-TG). | Magnetic beads with tape. | 30 min. | Sham. | Not indicated. | The average heart rate and SCO of the children with trait anxiety were significantly lower in the acupressure group, whereas there was no significant difference between the methods in the children with non-trait anxiety. |
| Wang et al., USA, 2008. | RCT. | Parent with children who were scheduled for elective surgery, N=61. | STAI HR, BP, BIS. | Yintang. | Acupressure bead. | 20 min. | Sham. | Not indicated. | Thirty minutes after the application of acupressure, children in the Ex-1 group experienced a reduction of anxiety, whereas children in the sham group experienced an increase in anxiety expressed as mean (range) (−9% [−3 to −15] vs 2% [−6 to 7.4], $P = 0.012$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Wang et al., USA, 2005. | RCT. | Children with at least two deep-arrested deciduous molar caries, N=75. | Salivary cortisol, HR, the Childhood Anxiety Sensitivity Index (CASI), Frankl compliance scale (FCS), the modified child dental anxiety scale in Chinese (MCDAS), the Venham's clinical anxiety obedience level rating scale . | Yintang. | Acupressure bead. | Bead replace after 7 days, 2 weeks in total. The participants pressed the acupressure points with the seeds three times per day for 20 s under parental supervision as recommended in a previous study. | Sham. | Not indicated. | Acupressure at the Yintang point results in decreased parental anxiety. State anxiety (STAI-S) between the two study groups differed over time, as evidenced by a significant group x time interaction (F = 7.59, P=0.008). |
| Wu et al. , Taiwan, 2004. | RCT. | Patients who were diagnosed with COPD, N= 44. | STAI. | GV14, CV22, B13,B23, L10. | Finger pressure. | 4 weeks (20 sessions in total) and consisted of 16-minute sessions that were given five times a week. | Sham. | Not indicated. | This study confirmed that acupressure using true pressure points relieved anxiety and dyspnoea and enhanced tolerance for activity, while the effects from the sham acupressure points did not produce similar outcomes. |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Yang et al., China, 2021. | N/A | | N/A | Yintang (EX-HN3), Shenmen (HT7), Neiguan (P6), Hegu (LI4), Taichong (LV3), Jianjing (GB21), Zu San Li (ST36), Sanyinjiao (SP6), Neiting (ST44), Auricular Shenmen acupoint ,and Relaxation point are the most frequently used points to treat anxiety. | Finger pressure. | Intermittent pressure can be used on the selected acupoint for 3–10 minutes per point, 2–3 points per session, twice daily. | N/A | N/A | N/A |
| Yildirim & Akman, Turkey, 2021. | RCT. | Nursing students, N=100. | VAS-stress, STAI. | HT7, Yintang. | Finger pressure. | Every five minutes for a total of 30 minutes. | No intervention. | Not indicated. | The stress levels of the students in the experimental group before their clinical practice decreased significantly after acupressure, according to VAS ($p < 0.001$). Moreover, the State Anxiety Inventory scores of the participants in the experimental group decreased significantly after intervention ($p < 0.001$). |

| Author, Year, Country | Design | Setting, Sample size | Anxiety measure | Acupressure interventions | | | Control | Adverse events | Key findings |
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| | | | | Acupoints | Method | Duration/ frequency | | | |
| Yildirim & Yildiz, Turkey, 2021. | RCT | Adult patients undergoing venipuncture, N=200. | STAI, HR, RR and oxygen saturation. | LI 4, LI 11 and HT 7. | Finger pressure. | 10 min prior to venipuncture. | No intervention. | No adverse event. | It was determined that the acupressure intervention applied to the adult patients reduced their acute pain and anxiety during the venipuncture procedure while raising their satisfaction levels with the procedure. However, acupressure did not affect the vital signs in adult patients during the venipuncture procedure. |
| Zick et al., England, 2018. | Secondary data analysis. | Female with stage 0 to III breast cancer. , N=288. | Hospital Anxiety and Depression Scale (HADS) visual analog scale (VAS) . | 1) Relaxing acupressure consisted of: Yin tang, Anmian, Heart 7, Spleen 6, and Liver 3 (bilaterally). 2)Stimulating acupressure points comprised Du 20, Conception Vessel 6, Large Intestine 4, Stomach 36, Spleen 6, and Kidney 3. | Finger pressure. | Self-administer acupressure daily. | Standard care. | Not indicated. | Relaxing and stimulating acupressure were associated with statistically significantly greater reductions in anxiety than usual care at the end of treatment (relaxing acupressure: OR = 1.82, 95% CI = 3.60 to 0.04, p = 0.043 vs usual care; stimulating acupressure: OR = 1.94, 95% CI = 3.66 to 0.21, p = 0.022 vs usual care), but there were no differences between the two acupressure arms (P = 1.000). |

*Appendix B: Practical implications and suggestions for future research*

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Abadi et. al, Iran, 2018 | Acupressure can be used as pre-operative routine nursing care; patient can be trained to control pre-operative anxiety through self-administering acupressure. | |
| Afrasiabi et.al, USA, 2021 | Traditional Chinese medicine modalities are safe and practical and can be implemented to reduce burnout and secondary traumatic stress in the frontline workers. | Further research on the use of acupressure and acupuncture to reduce burnout and compassion fatigue in healthcare professionals in a trauma center is supported by these results. |
| Agarwal et al., India, 2005 | Acupressure is effective in decreasing both pre-operative anxiety and bispectral index. | Further studies are needed to elucidate the duration for which acupressure is effective. |
| Akbarzadeh et.al, Iran, 2015 | The current study also showed that acupressure at the BL32 point for 20 minutes decreased the anxiety level during labour pain. Thus, acupressure could also be used as a simple, inexpensive, non-invasive method for reducing stress during labour. | |
| Ali et.al, Eygpt, 2022 | Should consider using acupressure as an effective technique for pain and anxiety management in addition to drug therapy. | Replication of the study on a large sample to be able to generalise the study result. |
| Amini et.al, Iran, 2021 | Acupressure can reduce soldiers' anxiety at the acupressure points, especially at the LI4 point. It is recommended that this simple and cost-effective intervention be used to relieve soldiers' anxiety in stressful situations. | |
| Avisa et.al, India, 2018 | The acupressure technique can be an adjunct to relieve the anxiety for dental scaling and operative procedures in 8-12-year-olds. | Further research is needed to assess the effect of acupressure on children younger than eight years old. As reduced anxiety can impact pain levels, acupressure's effect on pain needs to be further explored. |
| Aygin & Sen, Turkey, 2019 | Acupressure decreased the level of anxiety and improved the sleep quality in the surgical clinic after cardiac surgery. | There should be more studies in this clinical area with well-planned acupressure applications among wider study samples. The studies should be planned to determine the effect of acupressure on certain symptoms so that it can be understood which acupressure point affects which symptom. |
| Bang & Park, Korea, 2020 | AA was found to be an effective nursing intervention, as it improved sleep quality in cardiac patients. This therapy can be used for patients for which pharmacotherapy options are limited. | |
| Barker et. al, Austria, 2006 | Acupressure is an easy, non-invasive, and inexpensive technique for its effects in decreasing anxiety and pain during emergency transportation. | Future studies should also focus on the effect of this intervention on the overall outcome of the patients and the basic mechanism of ear acupressure in decreasing pain and anxiety. |
| Bastani, F, Iran, 2016 | Nurse-provided acupressure is an effective method to reduce anxiety in hospitalised women with GDM in the short term. Acupressure is a low-cost and easy-to-learn technique that can be incorporated into the care planning of women with GDM. | Future studies can be suggested to evaluate other outcomes, such as glycemic control and pregnancy outcomes in women with GDM who receive acupressure. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Bazarganipour et al., Iran, 2017 | | Randomised studies with larger sample sizes and longer follow-up periods would improve the existing knowledge of the benefits and mechanism of acupressure in PMS. |
| Beikmoradi et.al, Iran, 2015 | Acupressure is recommended as a complementary therapy to reduce anxiety in patients with cancer because of its low cost, safety, and simplicity. | It is recommended for future studies to carry out this research with 3 groups and for a longer duration. Future studies on acupressure should investigate one specific type of cancer. Moreover, the effect of acupressure should be compared with other anxiety-reducing medications and other complementary treatment methods. Finally, the effect of acupressure on other types of chronic diseases should also be investigated. |
| Boon et al., Malaysia, 2022 | Auricular acupressure over bilateral Shenmen helped to attenuate the haemodynamic changes during laryngoscopy and intubation. | Ideally, it would have been better to include the measurement of mediators related to stress levels in patients, i.e. plasma catecholamine and cortisol levels. |
| Borimnejad et.al , Iran, 2012 | | Further research is needed to evaluate acupressure as an effective non-pharmacological substitutive method for pre-operative anxiety reduction in children. |
| Borji et.al, Iran, 2019 | Acupressure can be an effective non-pharmacological technique for alleviating pre-operative anxiety in children, and nurses can employ this method without the need for specific facilities. | |
| Chen & Chen, Taiwan, 2010 | Acupoint pressure administered at Hegu and Sanyinjiao is easy to learn. It can be integrated into clinical practice and health education to enhance self-care skills for adolescents with primary dysmenorrhoea. | Further testing of physiological outcomes, such as heart rate, respiration rate, blood pressure and endorphin levels, with a larger sample size, is recommended. |
| Chen et.al, Taiwan, 2005 | The utilisation of acupressure treatment to promote the comfort of women during caesarean delivery is strongly recommended. | Future research considers including subjects who received general anaesthesia, that factors such as surgery duration and the type/number of procedures conducted to be considered as well, and that researchers examine the effects of acupressure upon other physiologic indices. These indices could include blood flow, blood oxygen saturation level, and various blood test values. |
| Cho et al., Korea, 2021 | The present study is significant because Meridian acupressure could be appropriately used as a nursing intervention method to reduce shift work nurses' stress, fatigue, and anxiety. | In the future, replication studies using Meridian acupressure as an intervention need to be conducted with more samples by selecting a greater number of hospitals, targeting various work environments and subjects, and including various study parameters. |
| Chueh et al., Taiwan, 2018 | School nurses and other health professionals should encourage students with sleep disturbance to undertake this 4-week AA because of the potential benefit of this intervention on sleep quality, anxiety, and depression. | Future studies using probability sampling approaches should be designed to ensure external validity. A control group design should be used in future evidence-based studies on this topic. The author also recommended conducting a longitudinal study to determine whether the improvement is short-term or sustained over the long term. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Dehghanmehr et al., Iran, 2019 | This study established the beneficial effect of reflexology and acupressure on depression and anxiety in hemodialysis patients. Given their low cost and easy implementation, it is recommended that nurses utilise them for patients undergoing hemodialysis. | |
| Dharwal et al., India, 2020 | Acupressure intervention was effective in reducing anxiety among patients undergoing hemodialysis. | |
| Fassoulaki et al., Greece, 2007 | Acupressure on the extra 1 point had no effect on melatonin and beta-endorphin levels. However, as it successfully produced stress relief, the technique can be used for premedication in ambulatory patients. | The state-trait anxiety inventory (STAI) scoring pre-operative anxiety may be a preferred tool. |
| Genc & Tan, Turkey, 2015 | Due to the effectiveness and inexpensiveness of acupressure and its ease of use, we suggest that it be employed in conjunction with pharmacological methods for chemotherapy-induced nausea and vomiting prophylaxis. | More comprehensive studies, including different cancer types, should be undertaken. |
| Gul & Kirca, Turkey, 2020 | Researchers may provide training to prospective mothers to inform them about these practices and teach them how to control their pre-operative anxiety. | Future studies should be conducted with larger samples and should consider the long-term secondary outcomes of anxiety. |
| Hassanzadeh-Bashtian et al. , Iran, 2018 | Acupressure can be used to reduce the unpleasant feelings and body perceptions of these women. | |
| Hmwe et al., Malaysia, 2015 | The positive finding from this study suggests that acupressure may have a role in promoting the psychological well-being of patients. | Further study should be conducted in a diverse population that includes equal proportions of ethnic groups to ensure the generalisability of the findings. A longitudinal study is recommended to investigate the long-term effects of acupressure on psychological variables. Acupressure intervention should be given on the non-dialysis day to avoid contamination of the intervention in the control group and minimise adverse effects. Further studies with large-scale, methodologically robust designs are recommended to produce strong evidence for applying cost-effective acupressure intervention to promote patients' psychological well-being. |
| Hoang et al., Hongkong, vietnam, 2021 | This study suggested the feasibility of a fully powered trial using self-acupressure in managing insomnia, depression, and anxiety in cancer patients. | |
| Honda et al., Japan, 2013 | This study provided initial but important evidence that individuals whose anxiety levels are not clearly high but mild can benefit significantly from a self-administered acupressure treatment course for reducing anxiety. | |

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Hsu et al., Taiwan, 2022 | Acupressure is an easy-to-practice, noninvasive complementary treatment that can reduce anxiety in patients undergoing thoracoscopic surgery. Acupressure should be used as an effective complementary intervention for improving the quality of postoperative care. | |
| Iunes et al., Brazil, 2015 | Auriculotherapy significantly reduced anxiety and provided pain relief. It also reduced the electrical activity of the trapezius and temporal muscles. | There is a need for different studies to find common auricular acupuncture points to create an international standard of clinical research that facilitates replication and dissemination of the results. Further multicenter, longitudinal studies with larger samples are needed in this area |
| Kafaei-Atrian et al., Iran, 2016 | Successful self-treatment by the participants indicates that this approach can help women to reduce their anxiety without seeking any help from someone else. | Further studies with a larger number of samples are recommended. |
| Kao et al. , Taiwan, 2012 | Participants improved whether receiving real or sham acupressure. | Research to develop safe and effective interventions using integrated complementary therapy and Western treatment should be encouraged. Further study with a larger sample size is necessary. |
| Khoram et al., Iran, 2020 | Applying acupressure during two stages on EX-HN3, HT7, and GB20 points reduced anxiety, systolic blood pressure, and heart rate in patients before open-heart surgery. | In future studies, the research samples should be the same for the surgeon. |
| Kim, Malaysia, 2020 | Tele-acupressure self-practice being used for the COVID-19 pandemic period facilitates the development of Malaysian public mental health intervention and could eventually improve the quality and effectiveness of mental health intervention methods. | It is suggested that future studies may be applied with a larger sample size and for a long-term follow-up treatment and observation period. |
| Kim, Malaysia, 2021 | Acupressure management may improve the psychological and general health of healthcare professionals. Acupressure as an add-on therapy is recommended to help manage psychological symptoms (depression, anxiety, and stress) and help bring relief. | |
| Kober et al., Austria, 2002 | Acupressure is an effective and easy-to-learn treatment for pain in first aid and emergency trauma care. We recommend this technique for emergency physicians and non-academic personnel, such as nurses, paramedics, firefighters, or emergency medical technicians. | |
| Kober et al., Austria, 2003 | Auricular acupressure is an effective treatment for anxiety and improves the patients' overall perception towards medical care. This technique is not only easy to learn but also has great potential to improve the quality of care for patients transported to the hospital. | STAI would be the gold standard, but it takes longer to complete, not suitable for this study setting. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
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| Kuo et al. , Taiwan, 2016 | Auricular acupressure is an effective non-pharmacological method for reducing cortisol levels, heart rate, anxiety, and fatigue in early postpartum after a caesarean section. It is recommended that caregivers consider applying this noninvasive method to deal with these two common and distressing symptoms, fatigue and anxiety, in the early postpartum period. | Future studies are suggested with greater sample heterogeneity. |
| Lang et al., Austria, 2007 | A 2-point system of acupressure is an appropriate and easy technique of first aid in prehospital emergency medicine. | Encourage further research to determine other areas in which acupuncture may be helpful, as well as research on point combinations for specific indications. |
| Lee & Park, Korea, 2021 | Auricular acupressure therapy effectively reduces test anxiety in students before taking an examination. | |
| Lee et al., Korea, 2021 | The results of this study showed that auricular acupressure affected reducing depression. However, auricular acupressure did not affect reducing stress and anxiety. | It is necessary to reverify the effect of auricular acupressure on anxiety reduction through repeated studies on multicentre selection and expanding the number of subjects. |
| Lewis, Australia, 1987 | Patients may prefer to avoid drugs and yet still reap the benefit of traditional anxiolytic premedication by receiving needle-free auriculotherapy or a dedicated meditation/relaxation tape pre-operatively. | |
| Luo et al., China, 2016 | The study showed that the AA intervention had the same anxiolytic effect as acupuncture before surgery, which showed a great advantage in relieving pre-operative anxiety without undesirable side effects and was easily applied in patients. AA might be a better complementary and alternative treatment for the relief of pre-operative anxiety. | |
| Luo et al., China, 2021 | Auricular point pressure could be a promising additional tool in the multimodal treatment for improving outcomes in patients with COVID-19. | Further clinical studies are necessary to evaluate the application of acupressure more comprehensively in these patients over longer periods. |
| Macznik et al., New Zealand, 2017 | The acupressure technique used in this study was effective for decreasing pain in athletes with acute musculoskeletal injuries but did not alleviate anxiety | participants were only followed up immediately after the treatment; therefore, the long-term effects of the intervention cannot be determined, and further research is needed to determine this. |
| Mansoorzadeh et al., Iran, 2014 | Acupressure had a positive effect on the reduction of anxiety and tachycardia. Therefore, acupressure can be utilised before conducting critical procedures. | |
| Masoudi et al., Iran, 2022 | Doula's supportive care and application of acupressure during labour decreased anxiety, tension, and a desirable experience; it can be done directly in clinical practice by nurses, midwives, and obstetricians during childbirth who are willing to perform noninvasive, low-risk methods to improve the condition of the mother and the mother's mental state. | It is recommended that large randomised controlled trials are conducted in future to clarify the mechanisms of action of acupressure and supportive care and its effects on labour and delivery progress. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Mirzaee et al., Iran, 2021 | This study confirmed the role of acupressure as an effective tool for the treatment of labour pain. | Studies with a crossover design and larger sample sizes are required to confirm the validity of these findings. |
| Mohammadifard et al., Iran, 2021 | The results indicated that the H7 acupressure effectively reduced state and trait anxiety in pregnant women during amniocentesis and when waiting for their amniocentesis results. It is recommended to pregnant mothers who are candidates for amniocentesis to decrease their anxiety. | Further studies with larger sample sizes, double-blinded, are recommended to be carried out to confirm the results of the present study. |
| Mora et al., Austria, 2007 | Auricular acupressure is an effective treatment for anxiety. | |
| Moradi et al., Iran, 2014 | The current study's findings demonstrated that acupressure, a simple and noninvasive method, effectively reduced pain and anxiety and could be easily used in labour rooms. | |
| Nordio & Romanelli, Italy, 2008 | Using the H7 insomnia control device increased subjective well-being, sleep quality, and reduced anxiety levels. | |
| Olshan-Perlmutter et al., USA, 2019 | The authors recommend acupressure as a therapeutic option to healthcare providers as a viable resource to address anxiety and burnout. | No longitudinal follow-up to determine whether there is a lasting benefit even in the absence of continued treatment. Additional research is needed to replicate and expand on these findings in other healthcare environments. |
| Oviedo et al., USA, 2021 | Premature to incorporate these auriculotherapy techniques into abortion practice. | |
| Ozkan & Balci, Tuba, 2020 | No significant difference in anxiety | Further studies that focus on different age groups and different painful interventions are recommended to support the effectiveness of acupressure with evidence-based studies. |
| Pouy et al., Iran, 2019 | The present study suggests that the use of acupressure by mothers can be an effective way to manage their anxiety. | Further studies are needed to study the effect of acupressure on mothers. |
| Qu et al., China, 2014 | AA could help to reduce anxiety levels associated with IVF and improves the outcomes of IVF partly through increasing the levels of NPY in the follicular fluids. | More large-size, randomised, multicentre, double-blinded and placebo-controlled trials are supposed to be conducted in the future, and further research should also be done on the mechanism involved. |
| Rani et al., India, 2020 | Acupressure as an add-on therapy is recommended with conventional treatments to control psychological symptoms (depression, anxiety, and stress) more efficiently. | |
| Rodriguez-Mansilla et al., Spain, 2014 | Ear acupressure and massage therapy improve pain, anxiety and depression in elders with dementia. Ear acupressure is slightly more effective than massage therapy. Massage therapy could be more effective, improving pain at the beginning of the treatment in elders with severe dementia. | The need for a bigger sample size to distinguish better between both treatments. A longer follow-up period would have probably given a better overview of the effects of the treatments. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
|---|---|---|
| Samadi et al., Iran, 2018 | Acupressure at SP6 could be considered an alternative method to decrease maternal anxiety and use sedatives and analgesics, especially pethidine, which could reduce analgesic and surgical complications in pain management. Lastly, acupressure can be considered by healthcare staff as a method for reducing anxiety and the use of sedatives and analgesics during labour. | |
| Sharifi et al., Iran, 2017 | Cost-effectiveness and simple short-term education make the acupressure method useful in clinical settings for different illnesses. | More studies with larger sample sizes are needed to verify the results of this study. Further studies, systematic reviews and meta-analyses are required to comment on the effects of acupressure on pain, anxiety, and the physiological indexes of patients with cancer undergoing bone marrow biopsy. |
| Shruthi et al., India, 2021 | Anxiety-controlling wristband, which uses the traditional method, is proven to be beneficial in assuaging health and emotional illness through experiments conducted on people suffering from anxiety. | |
| Soylu & Kartin, Turkey, 2021 | It can be recommended that noninvasive applications such as acupressure are applied by nurses trained in this subject. These interventions raise the quality of nursing care, and it can be recommended that they be used to improve patients' GIS functions. | |
| Sun et al., China, 2019 | Using auricular acupressure during HRT can better reduce anxiety and increase the efficacy of treatment. | Further studies are needed to determine how to best apply this treatment to provide the greatest improvements in the subjects' mental and physical health, and to determine whether the treatment results in long-term cessation of the harmful habit. |
| Tsay et al., Taiwan, 2005 | Nurses, patients and their families could be easily trained to administer this acupressure therapy. | .Future researchers should replicate and expand upon the study to address basic research questions and include a larger sample with a longitudinal design to state with confidence that massage treatment and acupressure therapy are responsible for lower perceptions of dyspnoea and anxiety in patients with COPD. |
| Tseng et al., Taiwan, 2021 | Auricular acupressure produces fewer side effects, and this method is inexpensive and noninvasive, so it is suitable for resident elderly. | It is recommended that future studies control for drugs used to reduce the possible impacts of drugs on mental health. |
| Valiee et.al, Iran, 2012 | Acupressure at true points (third eye and Shen men) can reduce higher pre-operative anxiety of patients before abdominal surgery, and it has had a more clinically beneficial effect than sham points. | There is a need to perform more studies with a larger sample and a longer period of intervention to ascertain a clearer relationship between acupressure and its effect on patients' vital signs before they undergo surgery. Also, a three-grouped study is necessary to confirm the effect of self-inculcation on the reduction of anxiety in patients in the placebo group. |
| Wang et al., China, 2022 | Suggest that APT may be able to alleviate CDA in some children by reducing physical tension caused by anxiety. | A larger sample is needed to generalise the findings. |

| Author, Year, Country | Implications for practice | Suggestions for future research |
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| Wang et al., USA, 2005 | Short follow-up period after the intervention.<br>Future investigations are needed to establish the duration of this anxiolytic effect and the impact of this parental intervention on the child's anxiety. | Future investigations are needed to establish the duration of this anxiolytic effect and the impact of this parental intervention on the child's anxiety. |
| Wang et al., USA, 2008 | More research is needed to determine whether the hypnotic effects of Extra-1 acupoint are related to the specific acupressure technique used. | More research is needed to determine whether the hypnotic effects of Extra-1 acupoint are related to the specific acupressure technique used. |
| Wu et al., Taiwan, 2004 | Acupressure is an alternative therapy that is relatively new to many nurses, content on acupressure needs to be included in nursing curricula, and in-service education programmes for nurses are needed in clinical practice | Additional studies are needed to validate the findings of our study. The effectiveness of acupressure using true acupoints, sham acupoints and sham non-acupoints needs to be explored, and long-term follow-up studies are necessary. |
| Yang et al., China, 2021 | | Clear need for more laboratory and clinical research to confirm the magnitude of the effect of acupressure on anxiety during the COVID-19 pandemic. |
| Yildirim & Akman, Turkey, 2021 | Acupressure is a safe, easy, noninvasive, and effective technique that requires no additional equipment when applied to the HT7 and Yintang (EX-HN3) points. Acupressure application was found to be effective in reducing the clinical stress levels of nursing students. | |
| Yildirim & Yildiz, Turkey, 2021 | For reducing acute pain and stress and enhancing satisfaction in adult patients during the venipuncture procedure, acupressure is a safe, easy, noninvasive and effective technique that needs no additional equipment when it is applied on the LI 4, LI 11 and HT7 points. | To advocate its effectiveness through evidence-based studies, acupressure should be applied in different painful procedures. |
| Zick et al., England, 2018 | Stimulating and relaxing acupressure were associated with greater improvements in anxiety than usual care; however, relaxing acupressure was associated with better reductions in depressive symptoms than stimulating acupressure (42% vs 25%), suggesting that these two types of acupressure might have different effects. | This study involved mainly white female BCS, limiting the generalizability of our findings to other groups. |