

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

5,800

Open access books available

142,000

International authors and editors

180M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



The Use of Evidence-Based Acupuncture: Current Evidence

Dedi Ardinata

Abstract

Evidence-based medicine (EBM), which emphasizes that medical decisions must be based on the most recent best evidence, is gaining popularity. Individual clinical expertise is combined with the best available external clinical evidence derived from systematic research in the practice of EBM. The key and core of EBM is the hierarchical system for categorizing evidence. The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) system divides evidence quality into four categories: high, moderate, low, and very low. GRADE is based on the lowest quality of evidence for any of the outcomes that are critical to making a decision, reducing the risk of mislabeling the overall evidence quality, when evidence for a critical outcome is lacking. This principle is also used in acupuncture as a complementary and integrative treatment modality, but incorporating scientific evidence is more difficult due to a number of factors. The goal of this chapter is to discuss how to establish a clinical evidence system for acupuncture, with a focus on the current quality of evidence for a variety of conditions or diseases.

Keywords: acupuncture, evidence-based medicine, GRADE, quality of evidence, meta-analysis

1. Introduction

Gordon Guyatt coined the term “evidence-based medicine (EBM)” in 1990 in an unpublished program description, and it was first published in 1992 [1]. This was the first time that an evidence-based practice has been formally established (EBP). Evidence-based practice requires making health care decisions based on the most up-to-date, valid, and relevant evidence. These decisions should be made by those receiving care, with the explicit and tacit knowledge of those providing care, and within the constraints of the available resources [2]. Clinical decision making is the culmination of a process that began with clinical reasoning, problem solving, and an awareness of the patient and health care environment [3]. Pursuing evidence-based acupuncture paves the way for the acupuncture field to fully integrate with modern health care, but there are obstacles. Acupuncture is actually classified as a complementary and alternative medicine modality but is only very rarely included in standard care guidelines, despite overwhelming evidence that it is more effective than the current guideline-based interventions for a variety of conditions [4].

2. The quality of evidence

While it is critical for acupuncture practitioners to understand the effects of acupuncture, they frequently have concerns about which conditions (diseases) acupuncture therapy has had the most evidence of benefit and the least risk to their patients. Guidelines were already being published at a higher rate than before. Acupuncturists should understand how guidelines are developed to make effective choices concerning health care. The GRADE approach has been adopted by national and international organizations that develop guidelines for acupuncture practitioners. GRADE is a system for assessing the quality of available evidence that supports acupuncture therapy for patients with a variety of conditions. The evidence was categorized as being of high, moderate, low, or very low quality [5]. The study design is critical in determining the quality of the evidence. Randomized controlled trials (RCTs) are initially given a higher grade due to their generally lower susceptibility to bias [6] than observational studies [7]. RCTs will be degraded since they have a bias that can be identified [8]. When multiple high-quality studies show consistent results, observational studies can be upgraded [9]. Factors that can lead to downgrading the quality of evidence: risk of bias: a lack of randomization, allocation concealment, and blinding biases; inconsistency: the results of different trials show significant and unexplained variation; indirectness of evidence: a comparison of a population, outcome, or intervention that is not direct; imprecision: wide confidence intervals reduce the data's quality; publication bias: studies with "negative" results are not published. Factors that can lead to an upgrade: large effect: the effect is so large that common biases in observational studies cannot possibly explain the result; dose-response relationship: the outcome is proportional to the amount of exposure. All plausible biases only reduce an apparent treatment effect: all possible confounders would only serve to dilute the effect that was observed [10]. GRADE levels do not always imply a recommendation, and the GRADE process is differentiated from the recommendation process. Although a high level of evidence is more likely to result

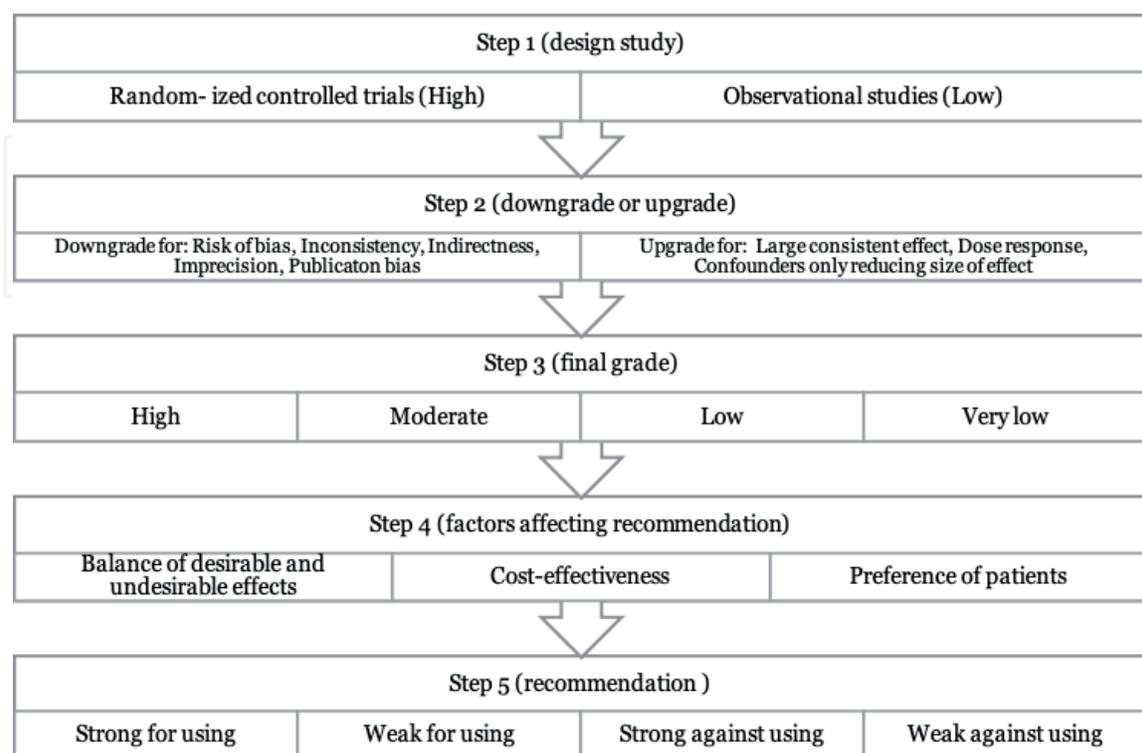


Figure 1.
Recommendation steps using the GRADE method.

in a recommendation, in some cases, a low or very low level of evidence can lead to a strong recommendation [11]. Other factors, such as cost, clinical judgment, and patient preference, must be considered in the development of recommendations, in addition to the quality of evidence [12]. Acupuncture practitioners will be able to make better clinical decisions if they understand the GRADE method [5]. There are five steps to the GRADE process, which we explain with examples in **Figure 1**.

3. Methods

The published systematic reviews/meta-analyses (SRs/MAs) were retrieved using Google Scholar with the following search terms: “systematic review” AND “meta-analysis” AND “(selected conditions)” AND “GRADE” AND “acupuncture”. The literature search was carried out from January 2018 to July 2021.

3.1 Inclusion and exclusion criteria for literature selection

3.1.1 Inclusion criteria

1. Systematic reviews and meta-analyses
2. The main treatments for migraine prophylaxis, headache (chronic tension type and chronic episodic), low back pain, knee osteoarthritis pain, allergic rhinitis (seasonal and perennial/persistent), chemotherapy-induced nausea, and vomiting (CINV), postoperative nausea and vomiting (PONV), and postoperative pain
3. Using Recommendations Assessment, Development, and Evaluation (GRADE) to assess the quality of evidence
4. Language is restricted to English.

3.1.2 Exclusion criteria

1. A protocol for systematic review and meta-analysis
2. Animal studies
3. Incomplete literature

We determined eight conditions, such as migraine prophylaxis, headache (chronic tension type and chronic episodic), low back pain, knee osteoarthritis pain, allergic rhinitis (seasonal and perennial/persistent), chemotherapy-induced nausea, and vomiting (CINV), postoperative nausea and vomiting (PONV), and postoperative pain, based on results and strong evidence from *The Acupuncture Evidence Project: A Comparative Literature Review (Revised edition)*, 2017th [11].

4. Results of the search

A total of 1286 articles related to eight conditions were searched (**Table 1**). After reviewing the abstract and full text of the article, 17 systematic reviews and meta-analyses of the six conditions that met the inclusion criteria were finally

Conditions	Total articles	Article selected	Year of publication
Migraine prophylaxis	286	5	2018; 2019; 2020
Headache (chronic tension type and chronic episodic)	33	2	2020; 2021
Low back pain	436	3	2018; 2020
Knee osteoarthritis	201	2	2019; 2020
Allergic rhinitis	35	0	—
Chemotherapy-induced nausea and vomiting (CINV)	34	0	—
Postoperative nausea and vomiting (PONV)	79	2	2020; 2021
Postoperative pain	182	3	2020; 2021
Total	1286	17	

Table 1.
Total articles and articles selected.

included [13–29], and articles related to allergic rhinitis and chemotherapy-induced nausea and vomiting (CINV) did not meet the criteria for inclusion (**Table 1**).

5. The quality of evidence for each condition

5.1 Migraine prophylaxis

Migraine is characterized by recurrent, pulsating headaches, and increased intracranial blood flow, which are caused by vasomotor and cerebrocortical dysfunction, vasospasm, and excessive stress. Stimuli such as light, sound, or physical activity can set it off [30]. Pharmacological treatment, which includes propranolol, sodium valproate, topiramate, flunarizine, and metoprolol, has been proven to be effective for migraine prophylaxis. However, all of these treatments have significant and often intolerable adverse effects [31, 32]. Because of these adverse effects, people are becoming more interested in and using complementary health approaches to treat migraines, and because of its measurable effects on the duration and frequency of migraine attacks, acupuncture has received increasing attention as a worthy adjunct to migraine therapeutic interventions [33].

5.1.1 Previous quality of evidence

Migraine frequency can be reduced with acupuncture. Acupuncture is superior to sham and may be as effective as prophylactic drugs, according to evidence of moderate quality [34]. Acupuncture appears to be at least as effective as conventional migraine preventative medication, and it's also safer, lasts longer, and expenses less – (A narrative review of high-quality RCTs with a large sample size) [35]. Acupuncture is superior to sham in terms of effectiveness and risk of recurrence, according to moderate to high-quality evidence [36].

5.1.2 Current quality of evidence

Even though there are some inconsistencies in the results of current RCTs comparing the efficacy of acupuncture vs. sham or no treatment or western

medicine, the most recent evidence shows that acupuncture improves migraine patients significantly. Xu et al. conducted 14 RCTs for migraine without aura that met all inclusion criteria and data standards of quality from 1467 studies based on an electronic database and found that when acupuncture therapy was compared to medical therapy, the evidence supporting the difference in migraine frequency was very low, whereas the evidence supporting the difference in migraine days, effective rate, and VAS scores was low. Because of the risk of bias, inconsistency, and inaccuracy, the quality of evidence supporting the primary outcome is low (to very low) [13]. At three months of follow-up, moderate evidence suggests that acupuncture is “at least non-inferior” to the now-proven, conventional treatment for reducing headache frequency, when compared to placebo [15]. Giovanardi et al. concluded that acupuncture was more effective and safer than medication or sham acupuncture in the treatment of migraines based on high-quality evidence [16]. Furthermore, acupuncture has benefits in terms of pain management and safety for acute migraine treatment and prevention, but the quality of evidence for SR/MA acupuncture for migraine even now needs to be improved [14].

5.1.3 Conclusion

Despite some limitations to acupuncture therapy, the quality of recent evidence from the SRs/MAs suggests that acupuncture is more effective and safer than medication or sham acupuncture for migraine prophylaxis in reducing headache frequency.

5.2 Headache (chronic tension type and chronic episodic)

The most common type of primary headache in the general population is the tension-type headache (TTH) [37]. Chronic tension-type headache (CTTH) is a disorder that arises from episodic tension-type headaches, with daily or highly frequent headache bouts lasting hours or days [38]. Simple analgesics and nonsteroidal anti-inflammatory drugs are the drugs of choice for episodic treatment, with combination analgesics containing caffeine showing their effect in seconds; however, nonpharmacological care should always be attempted despite a lack of scientific evidence [39]. Psychotherapy, behavior therapy, physical therapy, and acupuncture therapy are common nonpharmacological treatments that are frequently used in conjunction with other pharmacological treatments, and their efficacy has been proven [40]. In previous investigations, acupuncture support for tension-type headaches was shown to be insufficient. However, the Cochrane review has identified it as a beneficial, non-pharmacologic therapy for episodic-type and chronic stress-type headaches, based on newly added data [41].

5.2.1 Previous quality of evidence

Linde et al. have looked at 12 trials with a total of 2349 individuals and found that the GRADE quality of evidence is moderate to low, owing to the lack of blinding and varying effect sizes, but suggested that acupuncture is effective in treating episodic-type or chronic tension-type headaches [42]. Acupuncture can improve the intensity, frequency, and disability associated with headaches in the workplace. However, the evidence seems to be of low quality [43].

5.2.2 Current quality of evidence

Acupuncture has been shown to be more effective than other treatments for some THH outcomes, according to Huang et al. and Kolokotsios et al., who

conducted investigations and assessed the quality of evidence in RCTs on the effectiveness of acupuncture over sham acupuncture, non-acupuncture therapy, Chinese patent medicine, nonsteroidal anti-inflammatory drugs, and drug therapy for some THH outcomes. In this study, Huang et al. assessed the methodological quality, reliability, and outcome measures of SRs/MAs on the use of acupuncture for TTH [18]. The GRADE results revealed that 69.4% of the results provided low- or very-low-quality evidence, 11.1% provided moderate-quality evidence, and 19.4% provided high-quality evidence, further recommending that acupuncture appears to be an effective treatment modality for TTH, but the credibility of the results is limited due to the methodological quality and generally low quality of evidence [18]. The results of four studies with 557 participants found that the acupuncture group had lower quality evidence in terms of headache frequency and visual analog scale (VAS) scores when compared to the control group after their last treatment, whereas Kolokotsios et al. found low-quality evidence in terms of headache frequency and VAS scores when compared to the control group after their last treatment. Both the severity and the frequency of headaches were reduced over the long term, with the results being statistically significant only in the case of the pain intensity reduction [19].

5.2.3 Conclusion

Acupuncture treatment is useful for patients suffering from tension-type headaches, with both the intensity and the frequency of their headaches decreasing over time. Consequently, additional research should be undertaken on this topic to determine its usefulness in reducing the frequency and intensity of headaches.

5.3 Low back pain

The term “low back pain (LBP)” refers to pain, muscle tension, or stiffness that occurs below the costal border and above the inferior gluteal folds, and maybe associated with or without sciatica (pain traveling down the leg from the lower back) [44]. Even though many patients with back pain recover within a year, some will develop a chronic illness characterized by fluctuating or persistent pain of low or medium severity that is punctuated by periods of no pain or painful exacerbation [45]. Non-specific low back pain (NSLBP) is the most common type of LBP. When the pathoanatomical source of the pain cannot be ascertained, this term is used [46]. The underlying pathophysiology of NSLBP is, by definition, unknown. Therefore, treatment is primarily focused on alleviating pain symptoms, and a variety of pharmacological and non-pharmacological intervention modalities are utilized in clinical practice to achieve this goal [47]. Various pharmacological treatments for low back pain are associated with low to moderate, primarily short-term effects on pain. According to new research, acetaminophen is ineffective for acute low back pain, while duloxetine has only the modest effects on chronic low back pain [48]. Acupuncture, stretching, heat application, massage, and manual spinal manipulation are among the non-pharmacological treatments recommended by the American College of Physicians for acute and chronic non-radicular low back pain (non-radicular LBP) in their clinical practice recommendations [45].

5.3.1 Previous quality of evidence

Liang et al. examined the research situation and trends pertaining to the global use of acupuncture for low back pain during the past 20 years (1997–2016) and concluded that according to clinical practice guidelines from the United States,

acupuncture for LBP was only weakly suggested in 2007. However, moderate-quality evidence was reported in 2017, which demonstrated that acupuncture has been widely utilized to treat LBP [49]. Acupuncture has high-quality evidence whereas acupressure, on the other hand, offers moderate-quality evidence for the treatment of low back pain, according to Wellington et al. [50]. In the short term, acupuncture alone or as an addition to standard care improved pain and function in people with LBP, evidence ranging from low to high quality, and it should be recommended in ordinary clinical practice [51]. According to the findings of another study, acupuncture had moderate-quality evidence for pain and function in chronic low back pain but low-quality evidence for pain and function in acute low back pain [52].

5.3.2 Current quality of evidence

A large number of acupuncture randomized controlled trials have indicated that the treatment is ineffective. These findings are based on acupuncture randomized controlled trials in which a real acupuncture group was compared to a sham acupuncture (SA) or placebo acupuncture (PA) group. The argument over placebo effects presents a conundrum for those working in the field of acupuncture. Xiang et al. reviewed seven meta-analyses of SA or PA for LBP and found statistically significant differences in post-intervention pain reduction between SA or PA and routine or waiting list care, with moderate and high quality of evidence, but low in disability [20]. Procedures that are comparable to real acupuncture may be used in clinical trials, which may cause the results to be biased [51]. After reviewing 14 trials (2110 participants) comparing the efficacy of acupuncture to that of sham therapy or placebo for NSLBP, Xiang et al. reported statistically significant differences in pain reduction between acupuncture and sham therapy or placebo. The GRADE findings indicate that post-intervention and follow-up pain intensity in both acute/subacute and chronic LBP are of moderate quality of evidence [21]. Mu et al. assessed the effectiveness of acupuncture with a sham intervention, no therapy, or usual care in the treatment of chronic nonspecific low back pain. Acupuncture may not be more effective than sham treatment in alleviating pain immediately after treatment, did not appear to be significantly more effective in alleviating pain immediately after treatment, did not appear to be more effective in improving function immediately after treatment, and did not appear to improve the quality of life in the short term when compared to usual care. Acupuncture was found to be more effective than no treatment in terms of pain alleviation and functional improvement right after treatment. There maybe no difference in adverse event rates between acupuncture and sham. The evidence's certainty ranged from low to moderate. Problems with masking acupuncturists or participants were found in many experiments. A small sample size resulted in inconsistent and imprecise results [22]. Although the Cochrane systematic review (CSR) is regarded as the highest level of evidence, it cannot be ruled out that the CSR in acupuncture may have methodological flaws [53].

5.3.3 Conclusion

Acupuncture had a significant effect on pain intensity but not on function in patients with (sub)acute and chronic nonspecific LBP when compared to sham acupuncture or placebo. Acupuncture, on the other hand, is more effective in the short run than no treatment at improving pain and function. Acupuncture as a treatment for chronic low back pain is a popular choice. The availability, cost, and patient preference may all influence the guidelines for evaluating SA or PA control procedures to establish the specific effect of acupuncture on placebo pain.

5.4 Knee osteoarthritis

Knee osteoarthritis (OA) is a complex, degenerative joint disease marked by chronic pain and functional impairment [54]. The pathophysiology of osteoarthritis is complicated, involving mechanical, inflammatory, and metabolic processes that eventually contribute to structural destruction and synovial joint failure [55]. Knee OA pain is usually intermittent and primarily weight bearing (mechanical) in origin. Intermittent pain is frequently predictable, but when it gets more severe, more frequent, or unpredictable, patients are more certain to describe it as unacceptable [56]. The major goals of treatment have been to alleviate pain, restore function, and delay the disease's progression [57]. Recently, there has been no consensus on the optimal treatment for knee OA symptoms. In individuals with knee OA, standard pharmacological treatment always begins with analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs). However, it frequently results in noticeable deleterious consequences, such as gastrointestinal problems, hepatorenal toxicity, and adverse events associated with an increased risk of cardiovascular disease [58, 59]. Apart from the aforementioned therapies, acupuncture has emerged as a viable option for treating knee OA as a complementary therapy. Additionally, several randomized controlled trials have shown acupuncture's efficacy in treating knee OA. Acupuncture has been widely used as a complementary and alternative therapy for patients with knee OA due to its high safety and lack of side effects [60]. Although numerous trials have examined the usefulness of acupuncture for knee OA, its efficacy remains debatable. Emerging concerns about blinding, the validity of sham controls, sample size, effect size, and expectations have arisen [61]. Evidence from non-Cochrane reviews indicates that acupuncture may be beneficial in relieving symptomatic pain associated with knee OA.

5.4.1 Previous quality of evidence

Acupuncture, similar to balneotherapy, is superior to sham acupuncture, muscle-strengthening exercises, Tai Chi, weight loss, standard care, and aerobic exercise for knee OA (in order of rank). According to a sub-analysis of moderate- to high-quality studies, acupuncture is superior to routine care and muscle-strengthening exercises [62].

5.4.2 Current quality of evidence

The GRADE results suggest that acupuncture has a higher overall effective rate, short-term effective rate, and fewer adverse reactions than Western medicine as a treatment for knee OA. In 2019, an overview of non-Cochrane SRs, which included a meta-analysis, concluded that acupuncture was beneficial for alleviating pain associated with knee OA. Due to the following constraints, evidence was reduced to "medium" or "low" quality: Most results were produced by a limited sample size and were based on imprecision. Because of the insufficient literature search, some of the results had a significant potential for publication bias, which could not be ruled out [23]. Regarding patients with knee OA, Zhang et al. compared the therapeutic efficacy of acupuncture + hyaluronic acid injection to hyaluronic acid injection alone. These studies, which were all published between 2012 and 2018, found that the combined therapy was more effective than hyaluronic acid injections alone in reducing pain. According to the GRADE system, the evidence quality for the key outcomes ranged from very low to low [24].

5.4.3 Conclusion

Acupuncture may have some advantages in the management of knee OA, and it is more effective in pain alleviation when combined with a hyaluronic acid injection. However, due to the low quality of evidence, small sample size, and high risk of the studies, rigorously conducted randomized controlled trials with large sample numbers are required to confirm the findings. Thus, improved methodological quality is required.

5.5 Postoperative nausea and vomiting

One of the most prevalent adverse events following surgery is postoperative nausea and vomiting (PONV). It is unpleasant for patients, raises the possibility of additional adverse consequences, including readmission, and increases the costs, the health care facility revenue [63]. Nausea indicates a feeling of upcoming vomiting, while vomiting defines the reflux of gastrointestinal contents [64]. A number of factors, including the patient's demographics and the surgery type, influence the risk of PONV. Some surgeries, such as gynecologic, breast, and open-heart surgery, have been associated with an increased risk of PONV [65], whereas patient risk factors include female gender, nonsmoking, a history of PONV, and motion nausea [66]. Weibel et al. evaluated the quality of evidence for the effectiveness and safety of single-antiemetic drugs and combinations of antiemetic drugs used to prevent postoperative nausea and vomiting in adults following general anesthesia [67] and discovered high-certainty evidence of clinical efficacy compared to placebo for aprepitant, ramosetron, granisetron, dexamethasone, and ondansetron; moderate certainty evidence of. However, more studies are needed to investigate the drugs' possible side effects as well as patient populations with comorbidities (e.g., individuals with diabetes and heart disease) [67]. Hypnosis, relaxation imagery, music therapy, aromatherapy, acupressure, acupuncture, and electroacupuncture have all been included in recent studies and publications as complementary and alternative medicine interventions for PONV [68]. Numerous studies were placebo-controlled clinical trials, which effectively eliminated the placebo effect. Acupuncture appears to be more successful at controlling nausea than vomiting [69–71]. The PC6 acupoint is one of the most commonly utilized and studied acupoints for the prevention and treatment of PONV. Cheong et al. showed that using a single point of PC6 alone or in combination with other acupoints and alternative acupoints could help in the prevention and treatment of PONV [72]. The mechanism underlying acupuncture's effectiveness to reduce PONV is still under investigation. Serotonin transmission and beta-endorphin release may be affected [73–75].

5.5.1 Previous quality of evidence

Lee et al. found low-quality evidence supporting the use of PC6 acupoint stimulation over sham (compared to the last update in 2009) and moderate-quality evidence showing no difference between PC6 acupoint stimulation and antiemetic drugs to prevent PONV. There was inconclusive evidence supporting the use of a combined strategy of PC6 acupoint stimulation and antiemetic drugs over drug prophylaxis, and further high-quality trials are needed [76].

5.5.2 Current quality of evidence

A growing number of studies have demonstrated the effectiveness of acupuncture in preventing and treating postoperative nausea and vomiting [26]. Fu et al.

reviewed 50 RCTs published from 1997 to 2020 with 5980 patients. Both single therapy-electroacupuncture, acupressure, transcutaneous electrical nerve stimulation (TENS), acupoint plaster, acupoint injection, and 5-hydroxytryptamine (5HTA) receptor antagonists- and combination therapy (TENS + 5HTA, acupressure + 5HTA) had a better clinical effectiveness rate than placebo. However, the quality of evidence for acupuncture therapy in preventing PONV is moderate, low, and very low. None of the acupuncture therapy was regarded as high-quality evidence [25]. The results indicated that acupuncture was effective in reducing postoperative vomiting, both during the first 4 h (low quality) and within 24 h postoperatively (low quality); acupuncture was effective in reducing the first 4-h (moderate quality) and 0–24-h postoperative vomiting (moderate quality) when performed before and during anesthesia, respectively. Acupuncture was also effective in treating 0–24-h postoperative nausea (moderate quality) and in reducing the utilization of remedies during the first 4 h (moderate quality).

5.5.3 Conclusion

In adults, TENS + 5HTA may be the best treatment, while in children, acupuncture reduces the incidence of PONV as well as the use of antiemetics, particularly during the first few hours after surgery. Future work should determine the best technique or combination of techniques for acupuncture and also explore the use of acupuncture as a part of the complementary and integrative treatment of PONV.

5.6 Postoperative pain

Postoperative pain is acute pain that occurs following tissue injury associated with surgery and should resolve during the healing process. This normally takes up to 3 months, after which the pain is considered to be chronic or persistent [77]. Armstrong et al. found a significant correlation between increased preoperative and postoperative pain scores and anxiety, current smoking, psychological conditions, and current opioid use. Additionally, Armstrong et al. recommended for a multimodal approach to postoperative pain management and developed a pain sequence to help providers [78]. Multimodal analgesia is an essential component of such care. Further, there has been a recent renewal of interest in non-opioid alternatives or adjuncts in controlling postoperative pain, often in the context of multimodal analgesia [79]. Intravenous acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), magnesium, ketamine, dexmedetomidine, liposomal bupivacaine, and newer neuraxial and peripheral regional techniques, as well as patient-controlled modalities, are gaining importance. Acupuncture and transcutaneous electrical nerve stimulation may be useful as adjuncts in multimodal analgesia packages [79]. Acupuncture is a well-known and widely used treatment for pain and other conditions. There have been increasing numbers of clinical trials evaluating the efficacy of acupuncture and related techniques for postoperative analgesia. Sun et al. [80] evaluated 15 studies on the efficacy of acupuncture and related techniques for acute postoperative pain management in surgery: abdominal, maxillofacial, knee, hemorrhoidectomy, back, thoracotomy, hip arthroplasty, and molar extraction. They suggested that perioperative administration of acupuncture might be useful as an adjunct to postoperative analgesia [80].

5.6.1 Previous quality of evidence

Barlow et al. [81] found that acupressure reduced pain and acupuncture did not reduce pain but resulted in reduced use of ibuprofen (low-quality evidence). Chen

et al. [82] found acupuncture superior to sham in post-operative fentanyl use, time to the first request for fentanyl, and pain intensity (low-quality evidence). Wu et al. [77] found that some forms of acupuncture (acupuncture, electroacupuncture (EA), and transcutaneous electrical acupoint stimulation (TEAS)) improved pain on day 1 after surgery and reduced opioid use; subgroup analysis showed that acupuncture and TEAS were superior to EA (moderate-quality evidence).

5.6.2 *Current quality of evidence*

Yin et al. [27] found that acupuncture in combination with conventional treatment showed no statistical difference in pain reduction in Postcholecystectomy syndrome. The quality of the evidence for the overall outcomes was acceptable. The results showed that there was 7.7% of outcomes with very low-quality evidence, 46.15% with low-quality evidence, 46.15% with moderate-quality evidence, and none with high-quality evidence. However, it is difficult for therapists and patients to use blinding for acupuncture [27]. Qin et al. (2020) assessed the effectiveness of acupuncture and related techniques for postoperative pain after hemorrhoidectomy. They found that auricular acupressure plus acupuncture, acupuncture, other acupuncture techniques, and auricular acupressure were significantly superior over usual care, and auricular acupressure plus acupuncture ranked the most effective when analyzed for pain intensity, but the findings were limited by the quality of the evidence. Park et al. [29] assessed the quality of evidence in RCTs comparing pain scores between the EA and the sham groups, finding low cumulative evidence certainty across all studies. A low rating was given because there was inconsistency and a high risk of bias across all studies. However, according to data synthesized from previous studies, EA demonstrated the possibility of reducing pain for patients after thoracotomy with lower amounts of opioid analgesics [29].

5.6.3 *Conclusion*

Acupuncture may improve the overall symptoms of Postcholelcytic Syndrome. Acupuncture plus auricular acupressure is effective at reducing pain after postoperative hemorrhoidectomy, and electroacupuncture has the possibility of reducing pain for patients after thoracotomy.

Conflict of interest

The authors declare no conflict of interest.

IntechOpen

IntechOpen

Author details

Dedi Ardinata
Faculty of Medicine, Department of Physiology, Universitas Sumatera Utara,
Sumatera Utara, Indonesia

*Address all correspondence to: dedi1@usu.ac.id

IntechOpen

© 2021 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Guyatt G, Cairns J, Churchill D, Cook D, Haynes B, Hirsh J, et al. Evidence-based medicine: A New approach to teaching the practice of medicine. *JAMA: The Journal of the American Medical Association*. 1992;**268**:2420-2425. DOI: 10.1001/jama.1992.03490170092032
- [2] Dawes M, Summerskill W, Glasziou P, Cartabellotta A, Martin J, Hopayian K, et al. Sicily statement on evidence-based practice. *BMC Medical Education*. 2005;**5**:1-7. DOI: 10.1186/1472-6920-5-1
- [3] Maudsley G, Strivens J. "Science", "critical thinking" and "competence" for Tomorrow's Doctors. A review of terms and concepts. *Medical Education*. 2000;**34**:53-60. DOI: 10.1046/j.1365-2923.2000.00428.x
- [4] Godwin J. Rising to the challenges of evidence-based medicine: A way forward for acupuncture. *Journal of Alternative and Complementary Medicine*. 2014;**20**:805-809. DOI: 10.1089/acm.2014.0213
- [5] Austin TM, Richter RR, Sebelski CA. Introduction to the GRADE approach for guideline development: Considerations for physical therapist practice. *Physical Therapy*. 2014;**94**:1652-1659
- [6] Odgaard-Jensen J, Vist GE, Timmer A, Kunz R, Akl EA, Schünemann H, et al. Randomisation to protect against selection bias in healthcare trials. *Cochrane Database of Systematic Reviews*. 2011;**2011**:1-49. DOI: 10.1002/14651858.MR000012.pub3
- [7] Lu CY. Observational studies: A review of study designs, challenges and strategies to reduce confounding. *International Journal of Clinical Practice*. 2009;**63**:691-697. DOI: 10.1111/j.1742-1241.2009.02056.x
- [8] Ioannidis JPA. Why Most Published Research Findings are False. *PLoS Medicine*. 2005;**2**:696-701. DOI: 10.1371/journal.pmed.0020124
- [9] Rogozinska E, Gargon E, Olmedo-Requena R, Asour A, Cooper NAM, Vale CL, et al. Methods used to assess outcome consistency in clinical studies: A literature-based evaluation. *PLoS One*. 2020;**15**:1-12. DOI: 10.1371/journal.pone.0235485
- [10] Goldet G, Howick J. Understanding GRADE: An introduction. *Journal of Evidence-Based Medicine*. 2013;**6**:50-54. DOI: 10.1111/jebm.12018
- [11] McDonald J, Janz S. *The Acupuncture Evidence Project: A Comparative Literature Review (Revised Edition)*. 2017th ed. Brisbane, Australian Acupuncture and Chinese Medicine Association Ltd; 2017, 2017. Available from: <http://www.acupuncture.org.au>
- [12] Balshem H, Helfand M, Schünemann HJ, Oxman AD, Kunz R, Brozek J, et al. GRADE guidelines: 3. Rating the quality of evidence. *Journal of Clinical Epidemiology*. 2011;**64**:401-406. DOI: 10.1016/j.jclinepi.2010.07.015
- [13] Xu J, Qing ZF, Pei J, Ji J. Acupuncture for migraine without aura: A systematic review and meta-analysis. *Journal of Integrative Medicine*. 2018;**16**:312-321. DOI: 10.1016/j.joim.2018.06.002
- [14] Zhang XT, Li XY, Zhao C, Hu YY, Lin YY, Chen HQ, et al. An overview of systematic reviews of randomized controlled trials on acupuncture treating migraine. *Pain Research and Management*. 2019;**2019**:1-12. DOI: 10.1155/2019/5930627
- [15] Li YX, Xiao XL, Zhong DL, Luo LJ, Yang H, Zhou J, et al. Effectiveness and

- safety of acupuncture for migraine: An overview of systematic reviews. *Pain Research and Management*. 2020;**2020**:1-14. DOI: 10.1155/2020/3825617
- [16] Giovanardi CM, Cinquini M, Aguggia M, Allais G, Campesato M, Cevoli S, et al. Acupuncture vs. pharmacological prophylaxis of migraine: A systematic review of randomized controlled trials. *Frontiers in Neurology*. 2020;**11**:1-15. DOI: 10.3389/fneur.2020.576272
- [17] Trinh KV, Diep D, Chen KJQ. Systematic review of episodic migraine prophylaxis: Efficacy of conventional treatments used in comparisons with acupuncture. *Medical Acupuncture*. 2019;**31**:85-97. DOI: 10.1089/acu.2019.1337
- [18] Huang J, Shen M, Qin X, Guo W, Li H. Acupuncture for the treatment of tension-type headache: An overview of systematic reviews. *Evidence-based Complementary and Alternative Medicine*. 2020;**2020**:1-10. DOI: 10.1155/2020/4262910
- [19] Kolokotsios S, Stamouli A, Koukoulithras I, Plexousakis M, Drousia G. The effectiveness of acupuncture on headache intensity and frequency in patients with tension-type headache: A systematic review and meta-analysis. *Cureus*. 2021;**13**:1-14. DOI: 10.7759/cureus.14237
- [20] Xiang Y, He J, Li R. Appropriateness of sham or placebo acupuncture for randomized controlled trials of acupuncture for nonspecific low back pain: A systematic review and meta-analysis. *Journal of Pain Research*. 2018;**11**:83-94. DOI: 10.2147/JPR.S152743
- [21] Xiang Y, He JY, Tian HH, Cao BY, Li R. Evidence of efficacy of acupuncture in the management of low back pain: A systematic review and meta-analysis of randomised placebo- or sham-controlled trials. *Acupuncture in Medicine*. 2020;**38**:15-24. DOI: 10.1136/acupmed-2017-011445
- [22] Mu J, Furlan AD, Lam WY, Hsu MY, Ning Z, Lao L. Acupuncture for chronic nonspecific low back pain. *Cochrane Database of Systematic Reviews*. 2020;**2020**:1-171. DOI: 10.1002/14651858.CD013814
- [23] Li J, Li YX, Luo LJ, Ye J, Zhong DL, Xiao QW, et al. The effectiveness and safety of acupuncture for knee osteoarthritis: An overview of systematic reviews. *Medicine (United States)*. 2019;**98**:1-9. DOI: 10.1097/MD.00000000000016301
- [24] Zheng Y, Duan X, Qi S, Hu H, Wang M, Ren C, et al. Acupuncture therapy plus hyaluronic acid injection for knee osteoarthritis: A meta-analysis of randomized controlled trials. *Evidence-based Complementary and Alternative Medicine*. 2020;**2020**:1-10. DOI: 10.1155/2020/4034105
- [25] Fu C-W, Shu Q, Jiao Y, Wu T, Song A-Q, Zhu Q-C, et al. Acupuncture in preventing postoperative nausea and vomiting: A systematic review and Bayesian network meta-analysis. *TMR Non-Drug Therapy*. 2021;**4**:1-9. DOI: 10.12032/TMRND20210525030
- [26] Zhang Y, Zhang C, Yan M, Wang N, Liu J, Wu A. The effectiveness of PC6 acupuncture in the prevention of postoperative nausea and vomiting in children: A systematic review and meta-analysis. *Paediatric Anaesthesia*. 2020;**30**:552-563. DOI: 10.1111/pan.13860
- [27] Yin Z, Xiao Q, Xu G, Cheng Y, Yang H, Zhou J, et al. Acupuncture for the postcholecystectomy syndrome: A systematic review and meta-analysis. *Evidence-based Complementary and Alternative Medicine*. 2020;**2020**:1-19. DOI: 10.1155/2020/7509481.

- [28] Zhang Y, Zhang C, Yan M, Wang N, Liu J, Wu A. Acupuncture and related techniques for postoperative pain after hemorrhoidectomy: A systematic review and meta-analysis. *Paediatric Anaesthesia*. 2020;**30**:552-563. DOI: 10.1111/pan.13860
- [29] Park S, Lyu YR, Park SJ, Oh MS, Jung IC, Lee E-J. Electroacupuncture for post-thoracotomy pain: A systematic review and meta-analysis. *PLoS One*. 2021;**16**:e0254093. DOI: 10.1371/journal.pone.0254093
- [30] Hayne DP, Martin PR. Relating photophobia, visual aura, and visual triggers of headache and migraine. *Headache*. 2019;**59**:430-442. DOI: 10.1111/head.13486
- [31] Carville S, Padhi S, Reason T, Underwood M. Diagnosis and management of headaches in young people and adults: Summary of NICE guidance. *BMJ (Online)*. 2012;**345**:1-5. DOI: 10.1136/bmj.e5765
- [32] Carsten P. Evidence-based guideline update: Pharmacologic treatment for episodic migraine prevention in adults: Report of the quality standards subcommittee of the American academy of neurology and the American headache society. *Neurology*. 2013;**80**:869-870. DOI: 10.1212/01.wnl.0000427909.23467.39
- [33] Urits I, Patel M, Putz ME, Monteferrante N, Nguyen D, An D, et al. Acupuncture and its role in the treatment of migraine headaches. *Neurology and Therapy*. n.d.;**9**:375-394. DOI: 10.6084/m9.figshare.12981695
- [34] Linde K, Allais G, Brinkhaus B, Fei Y, Mehring M, Vertosick EA, et al. Acupuncture for the prevention of episodic migraine. *Cochrane Database of Systematic Reviews*. 2016;**2016**:1-148. DOI: 10.1002/14651858.CD001218.pub3
- [35] da Silva AN. Acupuncture for migraine prevention. *Headache: The Journal of Head and Face Pain*. 2015;**55**:470-473. DOI: 10.1111/head.12525
- [36] Yang Y, Que Q, Ye X, Zheng GH. Verum versus sham manual acupuncture for migraine: A systematic review of randomised controlled trials. *Acupuncture in Medicine*. 2016;**34**:76-83. DOI: 10.1136/acupmed-2015-010903
- [37] Jensen RH. Tension-type headache—The normal and most prevalent headache. *Headache*. 2018;**58**:339-345. DOI: 10.1111/head.13067
- [38] Olesen J, Bes A, Kunkel R, Lance JW, Nappi G, Pfaffenrath V, et al. The international classification of headache disorders, 3rd edition (beta version). *Cephalalgia*. 2013;**33**:629-808. DOI: 10.1177/0333102413485658
- [39] Bendtsen L, Evers S, Linde M, Mitsikostas DD, Sandrini G, Schoenen J. EFNS guideline on the treatment of tension-type headache—Report of an EFNS task force. *European Journal of Neurology*. 2010;**17**:1318-1325. DOI: 10.1111/j.1468-1331.2010.03070.x
- [40] Smitherman TA, Penzien DB, Rains JC. Challenges of nonpharmacologic interventions in chronic tension-type headache. *Current Pain and Headache Reports*. 2007;**11**:471-477
- [41] Linde K, Allais G, Brinkhaus B, Manheimer E, Vickers A, White AR. Acupuncture for tension-type headache. *Cochrane Database of Systematic Reviews*. 2009:1-3. DOI: 10.1002/14651858.CD007587
- [42] Linde K, Allais G, Brinkhaus B, Fei Y, Mehring M, Shin BC, et al. Acupuncture for the prevention of tension-type headache. *Cochrane Database of Systematic Reviews*. 2016;**2016**:1-54. DOI: 10.1002/14651858.CD007587.pub2

- [43] Lardon A, Girard MP, Zaïm C, Lemeunier N, Descarreaux M, Marchand AA. Effectiveness of preventive and treatment interventions for primary headaches in the workplace: A systematic review of the literature. *Cephalalgia*. 2017;**37**:64-73. DOI: 10.1177/0333102416636096
- [44] Vlaeyen JWS, Maher CG, Wiech K, van Zundert J, Meloto CB, Diatchenko L, et al. Low back pain. *Nature Reviews Disease Primers*. 2018;**4**:1-18. DOI: 10.1038/s41572-018-0052-1
- [45] Qaseem A, Wilt TJ, McLean RM, Forcica MA. Noninvasive treatments for acute, subacute, and chronic low back pain: A clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine*. 2017;**166**:514-530. DOI: 10.7326/M16-2367
- [46] Kongsted A, Kent P, Axen I, Downie AS, Dunn KM. What have we learned from ten years of trajectory research in low back pain? *BMC Musculoskeletal Disorders*. 2016;**17**:1-11. DOI: 10.1186/s12891-016-1071-2
- [47] Maher C, Underwood M, Buchbinder R. Non-specific low back pain. *The Lancet*. 2017;**389**:736-747. DOI: 10.1016/S0140-6736(16)30970-9
- [48] Chou R, Deyo R, Friedly J, Skelly A, Weimer M, Fu R, et al. Systemic pharmacologic therapies for low back pain: A systematic review for an American College of physicians clinical practice guideline. *Annals of Internal Medicine*. 2017;**166**:480-492. DOI: 10.7326/M16-2458
- [49] Oliveira CB, Maher CG, Pinto RZ, Traeger AC, Lin CWC, Chenot JF, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: An updated overview. *European Spine Journal*. 2018;**27**:2791-2803. DOI: 10.1007/s00586-018-5673-2
- [50] Wellington J. Noninvasive and alternative management of chronic low back pain (efficacy and outcomes). *Neuromodulation*. 2014;**17**:24-30. DOI: 10.1111/ner.12078
- [51] Appleyard I, Lundeborg T, Robinson N. Should systematic reviews assess the risk of bias from sham-placebo acupuncture control procedures? *European Journal of Integrative Medicine*. 2014;**6**:234-243. DOI: 10.1016/j.eujim.2014.03.004
- [52] Roger C, Richard D, Janna F, Andrea S, Robin H, Melissa W, et al. Noninvasive Treatments for Low Back Pain. *Comparative Effectiveness Review No. 169*. Rockville: Agency for Healthcare Research and Quality; 2016
- [53] Li R, Jiang Y, Hu R, He X, Fang J. Effectiveness and safety of tenosynovitis of the long head of the biceps brachii with acupuncture: A protocol for a systematic review and meta-analysis. *Trials*. 2020;**21**:1-7. DOI: 10.1186/s13063-020-04800-6
- [54] Hunter DJ, Bierma-Zeinstra S. Osteoarthritis. *The Lancet*. 2019;**393**:1745-1759. DOI: 10.1016/S0140-6736(19)30417-9
- [55] Fu K, Robbins SR, McDougall JJ. Osteoarthritis: The genesis of pain. *Rheumatology (United Kingdom)*. 2018;**57**:iv43-iv50. DOI: 10.1093/rheumatology/kex419
- [56] Liu A, Kendzerska T, Stanaitis I, Hawker G. The relationship between knee pain characteristics and symptom state acceptability in people with knee osteoarthritis. *Osteoarthritis and Cartilage*. 2014;**22**:178-183. DOI: 10.1016/j.joca.2013.11.012
- [57] Zhang W, Moskowitz RW, Nuki G, Abramson S, Altman RD, Arden N, et al.

OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. *Osteoarthritis and Cartilage*. 2008;**16**:137-162. DOI: 10.1016/j.joca.2007.12.013

[58] Baigent C, Bhalal N, Emberson J, Merhi A, Abramson S, Arber N, et al. Vascular and upper gastrointestinal effects of non-steroidal anti-inflammatory drugs: Meta-analyses of individual participant data from randomised trials. *The Lancet*. 2013;**382**:769-779. DOI: 10.1016/S0140-6736(13)60900-9

[59] Bensman A. Non-steroidal anti-inflammatory drugs (NSAIDs) systemic use: The risk of renal failure. *Frontiers in Pediatrics*. 2020;**7**:1-2. DOI: 10.3389/fped.2019.00517

[60] Li R, Sun J, Hu H, Zhang Q, Sun R, Zhou S, et al. Research trends of acupuncture therapy on knee osteoarthritis from 2010 to 2019: A bibliometric analysis. *Journal of Pain Research*. 2020;**13**:1901-1913. DOI: 10.2147/JPR.S258739

[61] Kolasinski SL, Neogi T, Hochberg MC, Oatis C, Guyatt G, Block J, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the management of osteoarthritis of the hand, hip, and knee. *Arthritis and Rheumatology*. 2020;**72**:220-233. DOI: 10.1002/art.41142

[62] Corbett MS, Rice SJC, Madurasinghe V, Slack R, Fayter DA, Harden M, et al. Acupuncture and other physical treatments for the relief of pain due to osteoarthritis of the knee: Network meta-analysis. *Osteoarthritis and Cartilage*. 2013;**21**:1290-1298. DOI: 10.1016/j.joca.2013.05.007

[63] Gan TJ, Diemunsch P, Habib AS, Kovac A, Kranke P, Meyer TA, et al.

Consensus guidelines for the management of postoperative nausea and vomiting. *Anesthesia and Analgesia*. 2014;**118**:85-113. DOI: 10.1213/ANE.0000000000000002

[64] Becker DE. Nausea, vomiting, and hiccups: A review of mechanisms and treatment. *Anesthesia Progress*. 2010;**57**:150-156; quiz 157. DOI: 10.2344/0003-3006-57.4.150

[65] Tateosian V, Gan TJ. Another quest for the holy grail of abolishing postoperative nausea and vomiting. *Journal of Clinical Anesthesia*. 2017;**41**:58-59. DOI: 10.1016/j.jclinane.2017.06.007

[66] Jin Z, Gan TJ, Bergese SD. Prevention and treatment of postoperative nausea and vomiting (PONV): A review of current recommendations and emerging therapies. *Therapeutics and Clinical Risk Management*. 2020;**16**:1305-1317. DOI: 10.2147/TCRM.S256234

[67] Weibel S, Schaefer MS, Raj D, Rücker G, Pace NL, Schlesinger T, et al. Drugs for preventing postoperative nausea and vomiting in adults after general anaesthesia: An abridged Cochrane network meta-analysis. *Anaesthesia*. 2021;**76**:962-973. DOI: 10.1111/anae.15295

[68] Stoicea N, Gan TJ, Joseph N, Uribe A, Pandya J, Dalal R, et al. Alternative therapies for the prevention of postoperative nausea and vomiting. *Frontiers in Medicine*. 2015;**2**:1-5. DOI: 10.3389/fmed.2015.00087

[69] Gan TJ, Jiao KR, Zenn M, Georgiade G. A randomized controlled comparison of electro-acupoint stimulation or ondansetron versus placebo for the prevention of postoperative nausea and vomiting. *Anesthesia & Analgesia*. 2004;**99**:1070-1075

[70] Alizadeh R, Esmaeili S, Shoar S, Bagheri-Hariri S, Shoar N. Acupuncture

in preventing postoperative nausea and vomiting: Efficacy of two acupuncture points versus a single one. *JAMS Journal of Acupuncture and Meridian Studies*. 2014;**7**:71-75. DOI: 10.1016/j.jams.2013.04.005

[71] Smith C, Crowther C. The placebo response and effect of time in a trial of acupuncture to treat nausea and vomiting in early pregnancy. *Complementary Therapies in Medicine*. 2002;**10**:210-216. DOI: 10.1016/S0965-2299(02)00072-9

[72] Cheong KB, Zhang JP, Huang Y, Zhang ZJ. The effectiveness of acupuncture in prevention and treatment of postoperative nausea and vomiting—A systematic review and meta-analysis. *PLoS One*. 2013;**8**:1-17. DOI: 10.1371/journal.pone.0082474

[73] Lee EJ, Warden S. The effects of acupuncture on serotonin metabolism. *European Journal of Integrative Medicine*. 2016;**8**:355-367. DOI: 10.1016/j.eujim.2016.06.022

[74] Liu JL, Chen SP, Gao YH, Meng FY, Bin WS, Wang JY. Effects of repeated electroacupuncture on β -endorphin and adrenocorticotrophic hormone levels in the hypothalamus and pituitary in rats with chronic pain and ovariectomy. *Chinese Journal of Integrative Medicine*. 2010;**16**:315-323. DOI: 10.1007/s11655-010-0503-3

[75] Ma S-X. Neurobiology of acupuncture: Toward CAM. *Evidence-based Complementary and Alternative Medicine*. 2004;**1**:41-47

[76] Lee A, Chan SKKC, Fan LTYT. Stimulation of the wrist acupuncture point PC6 for preventing postoperative nausea and vomiting. *The Cochrane Database of Systematic Reviews*. 2015;**11**:1-164. DOI: 10.1002/14651858.CD003281.pub4

[77] Wu MS, Chen KH, Chen IF, Huang SK, Tzeng PC, Yeh ML, et al. The

efficacy of acupuncture in postoperative pain management: A systematic review and meta-analysis. *PLoS One*. 2016;**11**:1-12. DOI: 10.1371/journal.pone.0150367

[78] Schug SA, Lavand'Homme P, Barke A, Korwisi B, Rief W, Treede RD. The IASP classification of chronic pain for ICD-11: Chronic postsurgical or posttraumatic pain. *Pain*. 2019;**160**:45-52. DOI: 10.1097/j.pain.0000000000001413

[79] Mitra S, Carlyle D, Kodumudi G, Kodumudi V, Vadivelu N. New advances in acute postoperative pain management. *Current Pain and Headache Reports*. 2018;**22**:1-11. DOI: 10.1007/s11916-018-0690-8

[80] Sun Y, Gan TJ, Dubose JW, Habib AS. Acupuncture and related techniques for postoperative pain: A systematic review of randomized controlled trials. *British Journal of Anaesthesia*. 2008;**101**:151-160. DOI: 10.1093/bja/aen146

[81] Barlow T, Downham C, Barlow D. The effect of complementary therapies on post-operative pain control in ambulatory knee surgery: A systematic review. *Complementary Therapies in Medicine*. 2013;**21**:529-534. DOI: 10.1016/j.ctim.2013.06.008

[82] Chen CC, Yang CC, Hu CC, Shih HN, Chang YH, Hsieh PH. Acupuncture for pain relief after total knee arthroplasty: A randomized controlled trial. *Regional Anesthesia and Pain Medicine*. 2015;**40**:31-36. DOI: 10.1097/AAP.0000000000000138