

Non Pharmacological Pain Management: Systematic Literature Review

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Abstract

This review is aiming to discuss the Non pharmacological pain management, the presented review was conducted by searching in Medline, Embase, Web of Science, Science Direct, BMJ journal, and Google Scholar for, researches, review articles, and reports, published over the past years. Were searched up to November 2020 for published and unpublished studies and without language restrictions, if several studies had similar findings, we randomly selected one or two to avoid repetitive results. Based on the findings and results of this review, Using NPI to relief pain is become one of the complementary methods used to relief pain its cost effectiveness and safety make it more feasible to be used and additionally most of those intervention do not require high professional training and also can be self-administered.

Review show that there's many NPI that can be used to manage pain but it's depend on many factors like the severity of the pain in which there's no evidence support the use of NPI in case of acute pain and others factors like the patient mentality can affect the use of the psychological interventions, in general several massage techniques, mobilizations, Transcutaneous electrical nerve stimulation, Guided imagery, Meditation, Guided imagery prove to be effective as NPI for pain management further studies need to be conducted in the spirituality effect but it show promising outcomes in the reviewed studies.

Keywords: Pain; Control; Analgesia; Chronic; Psychological; Physical

Abbreviations

CDC: Centers For Disease Control And Prevention; IASP: International Association For The Study Of Pain; NPI: Non-Pharmacological Interventions; HSP: Hemiplegic Shoulder Pain; NMES: Neuromuscular Electrical Stimulation; NRS: Numerical Rating Scale; TENS: Transcutaneous Nerve Stimulation; MBSR: Mindfulness-Based Stress Reduction.

Introduction

Since 1999 statistics show that more than 750,000 person died from drug overdose, this include tow third of them died from opioids in 2018 [1,2]. opioids prescription is considered to be one of the main problems that face the health system world wild and its impact on the health of the people, the health expenses and the administration; in 2015 centers for Disease Control and Prevention (CDC) describe the over prescription of the opioids as one of the driving force in the health system and consider it as problem for that they call it opioid overdose epidemic [3].

On the other hand, using pain is one of the main complain that many patients come with in the emergency departments and critical care unites, managing and treating those patients is human right.⁴for that pain is Pain has been defined by International Association for the Study of Pain (IASP) as “the perceived and unpleasant response to actual or potential tissue damage” [5]. in the past year the use of non-pharmacological interventions (NPI) in pain management in increased and there’s huge highlight for its important which can help in many and different aspects as it can “Increase the individual ability to control feeling, Reduce the feeling of weakness, Enhance the functional capacity and activity level, Reduces anxiety and stress, Decrease the pain behavior and focused pain level, and Decrease the dosage of analgesic drugs, subsequently decreasing the well-known side effects of these drugs” [6].

NPI include verities of intervention that aim to reduce pain without using medications or chemical substance which include use of physical and psychological and others(like spiritual techniques) strategies to relief the pain [7]. CDC recommend the use of the NPI as first line in the treatment of the chronic pain and patients with cancer related pain or end-of-life care [8].

This review is aiming to show the different NPI techniques that used to relief pain and show its effectiveness, and efficiency.

Materials and Methods

The present review was conducted in November 2020 under the preferred reporting items for systematic reviews and meta-analyses (PRISMA) declaration standards for systematic reviews. We reviewed all the topics on the Non pharmacological pain management.

Our search was completed without language restrictions. Then we extracted data on study year, study design, and key outcome on Non pharmacological pain management.

The selected studies were summarized and unreproducible studies were excluded. Selected data are shown in table 1.

Studies have been rated as being high quality by an established evaluation process based on the Dyuna Med criteria and it’s based on the level of evidence as follows:

- **Level 1 (likely reliable) evidence:** Representing research results addressing clinical outcomes and meeting an extensive set of quality criteria that minimize bias. Example: Randomized controlled trial/meta-analysis.
- **Level 2 (mid-level) evidence:** Representing results addressing clinical outcomes, and using some methods of scientific investigation but not meeting the quality criteria to achieve level 1 evidence labeling. Example: well-designed non-randomized clinical trials.
- **Level 3 (lacking direct) evidence:** Representing reports that are not based on scientific analysis of clinical outcomes. Examples include case series, case reports, expert opinion, and conclusions extrapolated indirectly from scientific studies.

Interventions	Types
Physical (sensory) techniques	Massage
	Positioning
	Hot and cold
	Acupuncture
	Transcutaneous electrical nerve stimulation
	Progressive muscle relaxation.
Psychological techniques	Cognitive behavioral therapy
	Mindfulness-based stress reduction
	Acceptance and commitment therapy
	Biofeedback
	Guided imagery
Others techniques	Spirituality and religion
	Music therapy

Table 1: Classification of techniques for Non pharmacological pain management.

Inclusion criteria

Inclusion criteria were; Current techniques of Non pharmacological pain management.

Exclusion criteria

Irrelevant articles [not related to the aim of this review and articles that did not meet the inclusion criteria in this review.

Data extraction and analysis

Information relating to each of the systematic review question elements was extracted from the studies and collated in qualitative tables. Direct analysis of the studies about the Non pharmacological pain management.

Results and Discussion

Non pharmacological pain management can be divided into three major classifications which is the Physical (sensory) interventions, Psychological interventions, and others interventions. Physical (sensory) interventions is used “nociceptive input and pain perception” to reduce the pain intensity or relief it and making the patients more comfortable, Psychological interventions pain is associated with or it can be considered one of the leading risk factors for opioid misuse [9]. so in the process to prevent those maladaptive behaviors and help the patient to cope with the chronic pain and the anxiety associated with it; in fact there’s strong two-ways relationship between the pain and the occurrence of depression. other NPI include the use of the spirituality and the religious and music therapy to relief the pain [6].

There’s many interventions for Non pharmacological pain management, For the purpose of the report we have classified the interventions as Physical (sensory) interventions, Psychological interventions, and others interventions grouped in a thematic analysis methodology in table 2.

Physical (sensory) interventions

In which there’s use of many techniques to inhibit the “nociceptive input and pain perception” which include using of Massage, Positioning, Hot and cold, Acupuncture, Transcutaneous electrical nerve stimulation, and Progressive muscle relaxation.

Author and Year	Sample	Interventions	Outcomes Measured	Findings	Levels of Evidence
López-Sendín N.2012 [10].	Four (24) patients	several massage techniques, mobilizations, and local and global exercises	Brief Pain Inventory (BPI, 0-10 scale), Memorial Pain Assessment Card (0-10 scale), and Memorial Symptom Assessment Scale (MSAS Physical, Psychological, 0-4 scale).	The combination of massage and exercises can reduce pain and improve mood in patients with terminal cancer.	Level 2
Zhou M.2018 [12].	Total of 184 HSP patients, aged 18-80 years,	NMES (15Hz, pulse width 200µs) was applied to supraspinatus and deltoids (medial and posterior parts), whereas TENS (100Hz, pulse width 100µs) was used on the same areas	Improvement from baseline in numerical rating scale for hemiplegic shoulder pain at 4 weeks.	TENS and NMES can effectively improve HSP, the efficacy of NMES being distinctly superior to that of TENS in maintaining long-term analgesia. However, NMES was not more efficacious than the TENS or control group in improving the shoulder joint mobility, upper limb function, spasticity, the ability of daily life activity, and stroke-specific quality of life in HSP patients	Level 2
Wells RE.2014 [13].	19 episodic migraines	mindfulness-based stress reduction (MBSR)	-change in migraine frequency. -change in headache severity, duration, self-efficacy, perceived stress, migraine-related disability/impact, anxiety, depression		Level 2
Posadzki P.2012 [15].	Fifteen randomized clinical trials	Guided imagery.	pain relieving	The evidence that guided imagery alleviates non-musculoskeletal pain is encouraging but remains inconclusive.	Level 1
Sollgruber A.2018 [16].	147 volunteers	religious and spirituality	Cold Pressor Testing	The meditation group showed an increase in their pain tolerance on the CPT test and a decrease in their pain intensity for heat after the experimental condition, in contrast to the relaxation group. Furthermore, the meditation group showed a higher level of religious spiritual well-being (MI-RSB48 Total score) as well as in the sub-dimensions General Religiosity, Forgiveness, and Connectedness after the experimental condition, compared to the relaxation group.	Level 2

Table 2: Results from Sequencing Studies.

*NMES: neuromuscular electrical stimulation, HSP: hemiplegic shoulder pain, HSP: hemiplegic shoulder pain, NRS: numerical rating scale, TENS: transcutaneous nerve stimulation.

Massage

Using manual techniques of massage is not only reducing pain but it also helps patients to relax reduce anxiety and improve the patient quality of life.

Randomized controlled pilot study conducted in Twenty-four (24) patients with terminal cancer to assess the effectiveness of physiotherapy including massage and exercise show that "There were no significant between-group baseline differences ($p > 0.2$). A significant group \times time interaction with greater improvements in group A was found for BPI worst pain ($F = 3.5$, $p = 0.036$), BPI pain right now ($F = 3.94$, $p = 0.027$), and BPI index ($F = 13.2$, $p < 0.001$), for MSAS Psychological ($F=8.480$, $p=0.001$)" [10].

Transcutaneous electrical nerve stimulation (TENS)

"Is a non-invasive peripheral stimulation technique used to relieve pain During TENS pulsed electrical currents are delivered across the intact surface of the skin to activate underlying nerves". It's one of the safe and effective pain relieving methods that also can be self-administered and it's free from the complication like side effects and overdose [11].

Prospective randomized controlled trial conducted in 90 participants with hemiplegic shoulder pain (HSP) to assess and compare the effectiveness of the neuromuscular electrical stimulation (NMES) and transcutaneous nerve stimulation (TENS) result of the study show that NRS scores in NMES, TENS, and control groups had decreased by 2.03, 1.44, and 0.61 points, respectively after 4 weeks of treatment, with statistically significant differences among the 3 groups ($P < .001$). The efficacy of the NMES group was significantly better than that of the TENS group ($P = .043$). Moreover, the efficacy of NMES and TENS groups was superior to that of the control group ($P < .001$, $P = .044$, respectively). The differences in the therapeutic efficacy on shoulder AROM/PROM, FMA, MAS, BI, and SSQOLS scores were not significant among the 3 groups" [12].

Psychological interventions

Stress and anxiety are well known triggers for different types of physical discomfort and psychological one [13]. Many physical problems can be treated by psychological intervention to promote relaxation, positive adaptation, and distraction from the physical discomfort. psychological intervention includes many methods like Cognitive behavioral therapy, Mindfulness-based stress reduction, Biofeedback, Guided imagery, and others.

Meditation

Mindfulness-based stress reduction (MBSR) or meditation is proving its effectiveness in improving the patient's quality of life and enhance the patient's ability to deal with stress related to the pain and the anxiety that related to the diseases in general. Study conducted in patient with migraines to assess the effectiveness of the MBSR show the following results "MBSR was safe (no adverse events), with 0% dropout and excellent adherence (daily meditation average: 34 ± 11 minutes, range 16 - 50 minutes/day). Median class attendance from 9 classes (including retreat day) was 8 (range [3,9]); average class attendance was 6.7 ± 2.5 . MBSR participants had 1.4 fewer migraines/month (MBSR: 3.5 to 1.0 vs control: 1.2 to 0 migraines/month, 95% confidence interval CI [- 4.6, 1.8], $P = .38$), an effect that did not reach statistical significance in this pilot sample. Headaches were less severe, although not significantly so (- 1.3 points/headache on 0 - 10 scale, [- 2.3, 0.09], $P = .053$) and shorter (- 2.9 hours/headache, [- 4.6, - 0.02], $P = .043$) vs control. Migraine Disability Assessment and Headache Impact Test-6 dropped in MBSR vs control (-12.6, [- 22.0, -1.0], $P = .017$ and - 4.8, [- 11.0, - 1.0], $P = .043$, respectively). Self-efficacy and mindfulness improved in MBSR vs control (13.2 [1.0, 30.0], $P = .035$ and 13.1 [3.0, 26.0], $P = .035$ respectively)" [13].

Guided imagery

“Guided imagery is a mind-body intervention that uses the patient’s own imagination and mental processing to form a mental representation of an object, place, event, or situation perceived through the senses” [14].

Randomized, triple-blind clinical trial study conducted in 24 participants, the results of the study show “the experimental group presented a statistically significant reduction of the state anxiety scores ($p = 0.005$) as well as of cortisol levels ($p < 0.001$) after the intervention” [15].

Spirituality

“Spiritual beliefs often place a greater significance at the time of illness than any other time in a person’s life. Both religious and spiritual beliefs help some people accept their own illness and help explain illness for others” [16,17]. A randomized experiment conducted to assess the participants pain perception and whether spirituality and meditation can change this perception or not the results show “The meditation group showed an increase in their pain tolerance on the Cold Pressor Testing and a decrease in their pain intensity for heat after the experimental condition, in contrast to the relaxation group. Furthermore, the meditation group showed a higher level of religious spiritual well-being (MI-RSB48 Total score) as well as in the sub-dimensions General Religiosity, Forgiveness, and Connectedness after the experimental condition, compared to the relaxation group. Our data is consistent with the hypothesis that meditation increases pain tolerance and reduces pain intensity, however, further work is required to determine whether meditation contains similar implications for pain patients”.

Discussion

Using NPI to relief pain is become one of the complementary methods used to relief pain its cost effectiveness and safety make it more feasible to be used and additionally most of those intervention do not require high professional training and also can be self-administered.

Using massage through history was one of the relaxation techniques that help in decreasing stress and anxiety. the neuromuscular electrical stimulation (NMES) and transcutaneous nerve stimulation (TENS) show good evidence in relieving pain but when compare the use of TENS and NMES, TENS is significantly more effective than NMES [12].

Psychological intervention shows significant evidence in reducing the chronic pain and help patients to have more adaptive behaviors to the diseases, but it’s depends on the patients willing mainly and how they think about life which depend on many factors like the support and the beliefs of the patients and so on.

On the other hand, studies show significant insight about the spirituality and the religious on the general wellbeing of the patients and their way to accept and deal with illness and it’s significantly help the patients to deal with the stressful times.

Conclusion

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Review show that there's many NPI that can be used to manage pain but it's depend on many factors like the severity of the pain in which there's no evidence support the use of NPI in case of acute pain and others factors like the patient mentality can affect the use of the psychological interventions, in general several massage techniques, mobilizations, Transcutaneous electrical nerve stimulation, Guided imagery, Meditation, Guided imagery prove to be effective as NPI for pain management further studies need to be conducted in the spirituality effect but it show promising outcomes in the reviewed studies.

Conflict of Interest

The authors of this article hasn't receive and support for this work and it was completely self-funded.

Bibliography

1. Wide-ranging online data for epidemiologic research (WONDER). Atlanta, GA: CDC, National Center for Health Statistics (2020).
2. Wilson N., *et al.* "Drug and Opioid-Involved Overdose Deaths-United States, 2017-2018". *Morbidity and Mortality Weekly Report* 69 (2020): 290-297.
3. Harris PA. "What physicians can do stop the opioid epidemic". *AMA Wire* (2015).
4. Sallum AMC., *et al.* "Acute and chronic pain: A narrative review of the literature". *Acta Paulista de Enfermagem* 25.1 (2012): 150-154.
5. International Association for the Study of Pain. IASP Taxonomy (2014).
6. Ahmed El Geziry., *et al.* "Non-Pharmacological Pain Management, Pain Management in Special Circumstances, Nabil A". Shallik, Intech Open (2018).
7. Lewis MJM., *et al.* "Pain control and nonpharmacologic interventions". *Nursing* 48.9 (2018): 65-68.
8. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report: CDC guideline for prescribing opioids for chronic pain-United States (2016).
9. Dowell D., *et al.* "CDC Guidelines for Prescribing Opioids for Chronic Pain". *United States* 1 (2016): 1-49.
10. López-Sendín N., *et al.* "Effects of physical therapy on pain and mood in patients with terminal cancer: a pilot randomized clinical trial". *Journal of Alternative and Complementary Medicine* 18.5 (2012): 480-486.
11. Johnson M. "Transcutaneous Electrical Nerve Stimulation: Mechanisms, Clinical Application and Evidence". *Reviews in Pain* 1.1 (2007): 7-11.
12. Zhou M., *et al.* "Efficiency of Neuromuscular Electrical Stimulation and Transcutaneous Nerve Stimulation on Hemiplegic Shoulder Pain: A Randomized Controlled Trial". *Archives of Physical Medicine and Rehabilitation* 99.9 (2018): 1730-1739.
13. Wells RE., *et al.* "Meditation for migraines: a pilot randomized controlled trial". *Headache* 54.9 (2014): 1484-1495.
14. Felix M., *et al.* "Guided imagery relaxation therapy on preoperative anxiety: a randomized clinical trial". *Revistalatio-Americana de Enfermagem* 26 (2018): e3101.
15. Posadzki P., *et al.* "Guided imagery for non-musculoskeletal pain: a systematic review of randomized clinical trials". *Journal of Pain and Symptom Management* 44.1 (2012): 95-104.

16. Dedeli O and Kaptan G. "Spirituality and Religion in Pain and Pain Management". *Health Psychology Research* 1.3 (2013): e29.
17. Sollgruber A., *et al.* "Spirituality in pain medicine: A randomized experiment of pain perception, heart rate and religious spiritual well-being by using a single session meditation methodology". *PLoS One* 13.9 (2018): e0203336.

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