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Use of Non-Pharmacological Methods for Pain Control in Intramuscular Injection Applications: A Systematic Review

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Abstract
Background*: This study aimed to systematically investigate studies in which non-pharmacological methods are used for pain relief in intramuscular (IM) injection applications.*
Materials and Methods*: The study was conducted between October 01, 2018 and November 30, 2019, by searching some of the international databases including Pubmed, Science Direct, Medline, Ebsco, and Scopus on search engines. During the search, keywords such as "intramuscular / IM injection" and "pain control" were used. A total of 26 publications that met the inclusion criteria were included in the study, and they were evaluated in terms of comparison, limitations, and results.*
Results*: In papers investigated in this study, non-pharmacological methods used in IM injection application, injection sites, the sample of the studies, and pain levels after the administration of injection were evaluated. In these studies, 15 different non-pharmacological methods were found to be employed. The average number of subjects included in the sample of the studied papers was calculated as 93.42. Also, in the studies investigated, the injection administration sites and their proportions were found as dorsogluteal site with 69.23%, ventrogluteal site with 15.38 %, deltoid site with 11.53%, and dorsogluteal and ventrogluteal sites together with 3.84%. While a single non-pharmacological method was used in 84.62% of the studies, multiple non-pharmacological methods were employed together in 15.38%. The non-pharmacological methods used in these studies were determined to include manual pressure application (23.33%), Helfer skin tap (20.00%), ShotBlocker application (13.33%), local ice application (6.66%), injection rate technique (6.66%), and techniques such as locally cooled steam, buzzy, music, Z-track technique, massage, internal rotation, needle tip replacement, cold spray, Fluori-Methane application, and muscle relaxation (3%). The analysis of the results of the studies indicated that 88.47% of the non-pharmacological methods employed were effective in relieving injection pain, but that 11.53% did not yield a difference.*
Conclusion*: In the studies examined, effective non-pharmacological methods in IM injection applications were found to significantly relieve the injection pain, and in this context, the use of non-pharmacological methods to relieve IM injection pain was recommended.*
Keywords*: Intramuscular İnjection;Pain;Pain Management;Nursing*

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I. Introduction

Pain is a complex and multidimensional phenomenon associated with real or potential tissue damage, which creates unpleasant sensory and emotional experiences. It is also an individual, unique, and subjective experience that can be difficult to explain and describe.[1-2]

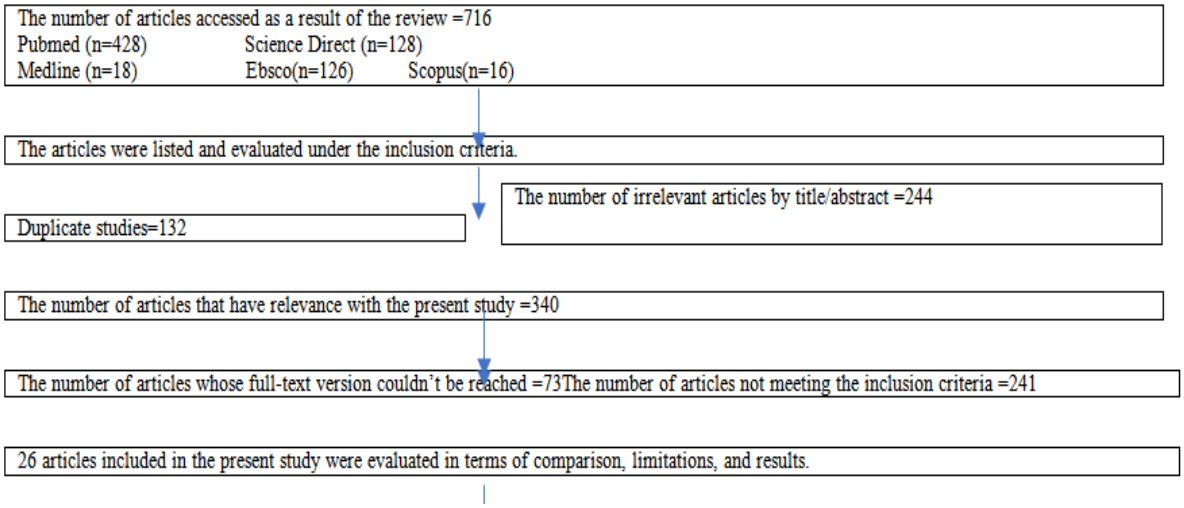
Preventing and relieving pain is considered the basic requirement of human rights. In this context, intramuscular (IM) injection, which is considered as an inseparable part of healthcare services and used widely, is one of the most important sources of pain; therefore, employing the best approach to pain management is the main responsibility of nurses.[3] The factors that can affect pain in IM injection include the medication injected and its volume, technique used, patient anxiety, patient position, medication delivery rate, injection site, and the needle length.[4] However, a good injection technique and the employment of approaches to relieving pain may ensure a less painful experience in individuals. [5-6]

The review of the literature has indicated that various non-pharmacological methods are used in pain relief [7-8] such as local cold application [9-10] ShotBlocker[11,12,13,14] , manual pressure application [15,16,17,18,19,20,21], and Helfer skin tap technique. [22,23,24,25,26]

II. Methods

The literature review was conducted between 1 October 2018 and 30 November 2019 using search engines on some international databases including Pubmed, Science Direct, Medline, Ebsco, and Scopus. The review was carried out retrospectively with keywords such as "intramuscular injection, pain, pain control, and non-pharmacologic approaches" covering the relevant studies conducted between 2002 and 2009. As a result of the literature review, the full text of 73 out of 340 papers conducted using methods for pain relief in IM injection could not be reached. Of the 267 articles whose full text was reached, 241 did not meet the inclusion criteria; therefore, a total of 26 articles were included in the systematic review.

Table 1. The specification process of the articles included in the systematic review



Research Questions

- What non-pharmacological methods do nurses use to relieve injection pain in IM injection applications?
- What injection sites do nurses prefer in IM injection applications?
- Do the non-pharmacological methods employed by nurses affect injection pain?

Inclusion Criteria for Articles

- Use of non-pharmacological methods in IM injection applications,
- English as the language of the publication,
- Inclusion of individuals older than 18 in the sample,
- Having been published in the last 17 years, and
- Full-text access.

Limitations of the Study

The limitation of this systematic review was that articles that were published in Turkish or English languages in the databases specified in the "methods" section and whose full-text version were accessed were included in the study.

III. Results

In this systematic review study, 15 international and 11 national articles that were published between 2002 and 2019 and met the inclusion criteria as a result of the review conducted were accessed. The type, sample characteristics, findings, and results of the articles were summarized in Table 1.

The average number of individuals in the samples of26 studies included in the study was calculated as 93.42. The examination of studies using non-pharmacological methods in IM injection applications indicated that the injection administration sites and their proportions were as dorsogluteal site with 69.23%, ventrogluteal site with 15.38 %, deltoid site with 11.53%, and dorsogluteal and ventrogluteal sites together with 3.84%.

A single non-pharmacological method was used in 84.62% of the studies examined within the scope of our study, whereas multiple non-pharmacological methods were employed together in 15.38%. The non-pharmacological methods employed in these studies were found to include manual pressure application (23.33%), Helfer skin tap (20.00%), ShotBlocker application (13.33%), local ice application (6.66%), injection rate technique (6.66%), and techniques such as locally cooled steam, buzzy, music, Z-track technique, massage, internal rotation, needle tip replacement, cold spray, Fluori-Methane application, and muscle relaxation (3%). The analysis of the results of the studies revealed that 88.47% of the non-pharmacological methods employed were effective in relieving injection pain, but that 11.53% did not yield any difference

Table 2. Studies using non-pharmacological methods for relieving the pain felt during intramuscular injection

Authors and the year of the publication	Methods and Sample	Results
Chung et al. (2002)[15]	Application of manual pressure on IM injection site N=75	The application of manual pressure on the site before injection was found to be effective in reducing pain in the intervention group compared to the control group.
Mawhorter et al. (2004)[9]	Application of Fluori-Methane containing locally cooled steam to the deltoid site N= 185	The level of injection pain in the group applied Fluori-Methane containing locally cooled steam was found lower compared to that of the other group.
Alavi (2007) [16]	Application of manual pressure on dorsogluteal site N=64	The perception of pain in the manual pressure applied group was found lower than that of the control group.
Özdemir et al. (2010) [27]	IM injection at two different rates (10 sec /ml and 30 sec/ml) into the dorsogluteal site N=25	Intramuscular administration of methylprednisolone at a rate of 10 sec/ml resulted in less post-injection pain than 30 sec/ml. .
Serena (2010)[22]	Application of Helfer Skin Tap technique for IM injection into the dorsoglutealsite N=60	Helfer Skin Tap technique was found to be effective in reducing IM injection-induced pain.
Farhadi et al.(2011) [10]	Local ice application before IM injection into the dorsoglutealsite N=60	Local ice application to patients before IM injection was found to be effective in reducing pain.
Kanika and Rani (2011)[28]	Massage application to the gluteal site before IM injection N=30	Massage application to injection site before IM injection was found to reduce IM injection-bound pain.
AğaçandGüneş (2011)[29]	Changing needle tip before IM injection into dorsogluteal site N=100	Changing the needle before delivering medication intramuscularly (diclofenac sodium) reduces injection-bound pain.
Mary et al.(2012)[23]	Application of Helfer Skin Tap technique for IM injection into the gluteal site N=60	Helfer Skin Tap Technique was found to be effective in reducing IM injection-induced pain.
Zoreand Dias (2012) [17]	Application of manual pressure and muscle relaxation technique for IM injection into the dorsogluteal site N=50	The combination of manual pressure application and muscle relaxation technique together in IM injection application is effective in reducing injection pain.
Therese and Devi (2012) [24]	Application of Helfer Skin Tap technique for IM injection into the dorsogluteal site N=50	Helfer Skin Tap Technique was found to be effective in reducing IM injection-induced pain.
Nasiry et al.(2013)[18]	Application of manual pressure in IM injection administration N=90	Application of manual pressure was found to be effective in reducing IM injection-induced pain.
Tuğrul (2014)[30]	IM injection at two different rates (5 sec /ml and 10 sec/ml) into the dorsogluteal and ventrogluteal site N=60	The rate was found to not affect the perception of pain in intramuscular penicillin injection at two different speeds (5-10 sec/ml) in adult individuals. Also, no difference was determined in pain perception between IM penicillin injections in two different regions of adult individuals (dorsogluteal and ventrogluteal sites).
ÇelikandKhorshid (2015)[11]	Use of ShotBlocker during IM injection into ventrogluteal site N=180	ShotBlocker was shown to be effective in reducing IM injection pain.
Kara and YapucuGüneş (2016) [31]	The use of internal rotation and z-track technique in IM injection into the dorsoglutealsite N=75	The mean pain scores of the injections administered with internal rotation and z-track technique were found to be statistically significantly lower than the mean injection pain scores performed with the standard application.
Hassneinand Soliman (2016)[2]	Application of Helfer Skin Tap technique for IM injection into the dorsogluteal site N=100	Helfer Skin Tap Technique was found to be effective in reducing IM injection-induced pain.
Kant and BalcıAkpınar (2017) [19]	Comparison of the standard method, music and manual pressure in IM injection into the ventrogluteal site N=78	The mean pain score was found to be significantly lower in the injection using music application compared to the other groups, and no difference was found between the mean pain scores of the standard and pressure applications.
Çelik(2017)[12]	Application of ShotBlocker for IM	No statistically significant difference was found

	injection into the deltoid site N=242	between the mean pain scores of the intervention group using the ShotBlocker application and those of the control group.
Khanra et al.(2018) [25]	The use of Helfer Skin Tap technique for IM injection into the dorsogluteal site N=60	The mean pain scores in injections performed using Helfer Skin Tap technique was found to be significantly lower than those of the control group.
Suhrabiand Taghinejad (2018)[20]	The use of manual pressure for IM injection into the dorsoglutealsite N=150	Manual pressure was found to be effective in reducing IM injection pain.
Şahinand Eşer (2018) [33]	Using Buzzy during IM injection into the ventrogluteal site N=65	Pain scores of the Buzzy administered group were significantly lower compared to those of the control group.
Bilge et al. (2019)[14]	Application of ShotBlocker and cold spray for IM injection into the dorsoglutealsite N=120	The mean pain scores of ShotBlocker and cold spray groups were found statistically significantly lower than those of the control group.
Aydınand Avşar (2019)[13]	Application of ShotBlocker for IM injection into the ventrogluteal site N=50	The mean pain scores of the injection implemented using ShotBlocker were found to statistically significantly decrease.
Najafi et al. (2019)[21]	Manual pressure application in IM injection application N=48	Manual pressure application was found to be effective in reducing injection pain.
Mahatoand Thakur (2019)[26]	The use of Helfer Skin Tap technique in IM injection application N=60	Helfer Skin Tap Technique was found to be effective in reducing injection pain.
Akcimenet al.(2019)[32]	Ice and vapocoolant sprayin IM injection application N=292	The application of ice to the injection was found effective in reducing pain in adult patients administered intramuscular tetanus vaccine.

IV. Discussion

To highlight the concept of quality in the provision of nursing care services, the use of evidence-based approaches is of significance.[34] IM injection is an important part of medication applications and is a common nursing function in clinical practice.[31] In recent studies, the ventrogluteal site is recommended instead of the dorsogluteal site for IM injection because the former is away from the sciatic nerve and large blood vessels.[35,4,36,37]However, our systematic study revealed that the dorsogluteal site was still preferred as the injection site with a 71.42% rate and that the rate of ventrogluteal site as the choice of injection site was only 14.28%. These rates indicated that traditional approaches were still prioritized against evidence-based applications in IM injection.

The review of the literature revealed that a good injection technique was important in relieving IM injection-induced pain and that it could provide a painless experience for patients. [5-6] Besides, the length of the needle used in IM injection, needle replacement, and the correct determination of the injection site were all reported to be effective in relieving injection pain. In this context, the use of various non-pharmacological methods is emphasized for reducing IM injection-induced pain and increasing patient comfort. [7-8]

In our systematic review, 15 different non-pharmacological methods including Helfer Skin Tap, manual pressure application, local ice application, injection rate technique, locally cooled steam, buzzy, music, massage, ShotBlocker, internal rotation, needle replacement were determined to be employed in studies investigating this field. The injection techniques used in this study were found to statistically significantly reduce injection pain. In this context, it is of vital importance that nurses should follow the current literature, implement methods and approaches whose effect has been established, and base their applications on scientific knowledge to relieve IM injection-induced pain and to provide comfort for patients in all health units.

V. Conclusion

The systematic review of the studies investigating the use of non-pharmacological methods for relieving pain caused by IM injection, which is one of the basic nursing practices, indicated that various methods (Helfer Skin Tap, manual pressure application, local ice application, injection rate technique, locally cooled steam, buzzy, music, massage, ShotBlocker, internal rotation) administered before or after injection relieved the injection-induced pain. Besides, the correct length of the needle used, the status of needle replacement, and the accurate selection of the injection site were effective in reducing pain caused by IM injection.

With the provision of qualified services, the role of evidence-based practices has become significant in terms of bringing the social perception towards the nursing profession to a more positive level. In this context,

nurses are recommended to use non-pharmacological methods with proven efficacy to reduce IM injection-induced pain, follow the developments in this field closely, and put them into practice.

References

[1]. Black MJ, Hawks, Keene AM. Medical surgical nursing clinical management for postoperative outcome. Philadelphia. W.B Saunders. 2007; 351-7.
[2]. Soliman HM, Hassnein AA. Efficacy of Helfer Skin Tapping technique on pain intensity as perceived by the patientsreceivingIntramuscularInjection. International journal of Nursing Didactics. 2016; 6(2), 12-22.
[3]. Blinderman CD, Billings JA. Comfort care for patients dying in the hospital. New England Journal of Medicine. 2015; 373(26), 2549-2561.
[4]. Cocoman A, Murray J. Intramuscular injections: a review of best practice for mental health nurses. Journal of Psychiatric and Mental Health Nursing. 2008; 15(5), 424-434.
[5]. Murphy JI. Reducingthepain of intramuscular (IM) injections. Advancing Clinical Care.1991; 6(4), 35.
[6]. Rodger MA, King L. Drawing up and administering intramuscular injections: a review of the literature. Journal of Advanced Nursing. 2000; 31(3): 574-82.
[7]. Hunter J .Intramuscular injection techniques. Nursing Standard. 2008; 22(24), 35-40.
[8]. Demir Y. Pain and management. In: Fundamentals of nursing, nursing science and art 1st ed. (Nobel Publishing, Ankara). 2011; 643-47.
[9]. Mawhorter S, Daugherty L, Ford A, Hughes R, Metzger D, Easley K. TopicalVapocoolantQuickly and EffectivelyReducesVaccineassociatedPain: Results a Randomized, Single-blinden, Placebocontrolled Study, J Travel Med .2004; 11(5): 267-272.
[10]. Farhadi A, Esmailzadeh M. Effect of local cold on intensity of pain due to penicillin benzathin intramuscular injection. International Journal of Medicine and Medical Sciences. 2011; 3(11): 343-5.
[11]. Celik N,KhorshidL. Theuse of ShotBlocker for reducing the pain and anxiety associated with intramuscular injection. Holisticnursingpractice. 2015; 29(5), 261-271.
[12]. CelikN.Effectsof shotblocker on relief of painduetohepatitis b vaccineınjectionintodeltoidmuscle. International Journal of Caring Sciences.2017; 10(3), 1669-1675.
[13]. Aydin E, Avşar G. Examiningtheeffect of Shotblocker in relievingpainassociatedwithintramuscularinjection. ComplementaryTherapies in Medicine. 2019;47, 102-192.
[14]. Bilge S, Aydin A, Gun C, Aldinc H, Acar YA, Yaylaci S, Balci V.Comparison of theefficacy of ShotBlocker and coldspray in reducingintramuscularinjection-relatedpain in adults. A prospective, randomized, controlledtrial. Saudimedicaljournal. 2019; 40(10), 996-1002.
[15]. Chung JW, WM Wong, TK. An experimental study on theuse of manual pressure to reduce pain in intramuscular injections. Journal of Clinical Nursing. 2002; 11(4):457–461.
[16]. Alavi NM. Effectiveness of acupressuretoreducepain in intramuscularinjections. International Journal of AcutePain Management.2007; 9(4): 201-205.
[17]. Zore G, Dias R.Effectiveness of nursingınterventions on painassociatedwithıntramuscularınjection. International Journal of Science and Research ISSN (Online): 2012; 2319-7064.
[18]. Nasiry H RahmaniA, Asayesh H, Hesam M, Shariati K, Bathai.SA. The effect of manual pressure on intramuscular injection pain severity 2013;13-21.
[19]. Kant E. Akpinar RB. The effect of music and the pressure applied on pain induced by intramuscular injection. International Journal of Caring Sciences. 2017; 10(3), 1313-1318.
[20]. Suhrabi Z. Taghinejad H. Effect of acupressure (UB32) on painintensity in intramuscularinjections. Iranianjournal of nursing and midwifery research. 2014;19(1), 24.
[21]. Najafi SS, Nazaribin S, MomennasabM,Yoosefinejad AK. theeffect of manualacupressure (point bl32) on painassociatedwithıntramuscularınjections of magnesiumsulfate. Journal of acupuncture and meridianstudies. 2019; 12(2), 67-72.
[22]. Serena. Rhythmic skin tapping: An effectivemeasuretoreduceproceduralpainduringintramuscularinjection. The Nursing J of India.2010; 1(8):22-6.
[23]. Rose Mary, Jose B,Sulochana Sheela S. Effectiveness of skin tap technique in reducingpainresponse. International Journal of NursingEducation. 2012;4(1)56-7.
[24]. Therese AM, Devi S. Effectiveness of Helfer skin tap technique and routinetechnique on painreductionamongpatientsreceivingintramuscularinjection at Government General Hospital, Puducherry. Int J SciRes. 2012; 3(10).
[25]. Khanra S, Lenka A. Helfer Skin Tap technique on pain associated with intramuscular injection among adult patients. International Journal of Nursing Education. 2018; 10(3).
[26]. Mahato E, Thakur I. Effectivenessof Helfer's Skin tap techniqueversusroutinetechnique on painreductionamongpatient'sreceivingıntramuscularınjections. International Journal of NursingEducation, 2019; 11(1).
[27]. Özdemir L, Pınarcı E, Akay BN, Akyol A. Effect of methyl prednisolone injection speed on the perception of intramuscular injection pain, Pain Management Nursing.2010; 1-8.
[28]. Kanika KH, Rani SP. Effect of massage on pain perception after administration of intramuscular injection among adult patients, Nursing and Midwifery Research Journal.2011; 7(3): 130-138.
[29]. Ağaç E, Güneş ÜY. Effect on pain of changingtheneedlepriortoadministeringmedicineintramuscularly: a randomizedcontrolledtrial. Journal of Advanced Nursing, 2011; 67: 563-568.
[30]. Tuğrul E, Khorshid L. Effect on painintensity of injectionsites and speed of injectionassociatedwithintramuscularpenicillin. International Journal of Nursing Practice.2014; 20(5), 468–474.
[31]. Kara D,YapucuGünes, ÜTheeffect on pain of threedifferentmethods of intramuscularinjection: A randomizedcontrolledtrial. International Journal of Nursing Practice. 2016; 22: 152–9.
[32]. Akcimen M, Bedel C, Selvi, F. Application of ice and vapocoolant spray to reduce tetanus vaccine pain: A prospective, randomized, controlled clinical study. Annals of Medical Research. 2019;26(6),995-8.
[33]. Şahin M, Eşer İ. Effect of the Buzzy application on pain and ınjection satisfaction in adult patients receivingıntramuscularınjections. pain Management Nursing 2018;19(6), 645-651.
[34]. Beyea SC, Slattery MJ. Evidence-basedpractice in nursing: A guidetosuccessfulimplementation. HCPro, Inc.2006.

[35]. CarterTempleton H, McCoy T. Are we on the same page? A comparison of ıntramuscular ınjection explanations in nursing. Fundamental Texts. MedsurgNurs. 2008; 17(4): 237–40.
[36]. Malkin B. Aretechniquesusedforintramuscularinjectionbased on research evidence? Nursing Times. 2008; 104, 48-51.
[37]. Walsh L, Brophy K. Staffnurses' sites of choiceforadministeringintramuscularinjectionstoadultpatients in theacutecaresetting. Journal of Advanced Nursing.2011; 67 (5), 1034-1040.

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