Pol. J. Appl. Sci., **2023**, 9, 26-29

PREVENTION AND PAIN REDUCTION STRATEGIES IN PREGNANT WOMEN USING NON-INVASIVE PHYSIOTHERAPEUTIC METHODS. A LITERATURE REVIEW

Kacper Zając[1], Agata Kupczak[1], Iwona Chorążyczewska[1], Krzysztof Olczyk[2], Natalia Białoń[3], Patrycja Szczęsny[2], Marcin Wystel[4]

[1]*Department of Sports Medicine and Exercise Physiology, Medical University of Silesia in Katowice, Poland*
[2]*Faculty of Medical Sciences in Zabrze, Medical University of Silesia in Katowice, Poland*
[3]*Medical University of Silesia in Katowice, Poland*
[4]*Academy of Physical Education in Katowice, Poland*

E-mail: kacperzajac1996@gmail.com

Abstract

Pain is a common discomfort that significantly affects daily functioning. Pharmacotherapy, while effective in alleviating pain, often fails to address the underlying cause of the problem. This is not always the recommended approach. Pregnancy presents challenges in terms of treatment, as the well-being of the mother directly impacts the well-being of the child. However, ensuring comfort and safety for both parties is not always feasible. Pregnant women experience various discomforts associated with their transitional state. Nevertheless, due to foetal health considerations, not all conventional therapeutic measures can be applied. The use of pharmacotherapy and invasive methods poses the risk of adverse effects on the foetus. This paper provides a review of effective and non-invasive methods for pain and discomfort reduction in pregnant women, as employed in physiotherapy.

Key words: pain, pain prevention, pregnancy, childbirth, physiotherapy for pregnant women, yoga, prenatal massage

DOI: 10.34668/PJAS.2023.9.4.04

Introduction

Pelvic girdle pain and its surrounding areas during pregnancy are common discomforts reported by patients to family doctors, gynaecologists, or midwives. It is estimated that 20% of expectant mothers will report pain in the reproductive organs, muscles, and supporting tissues. This physiological state, in which a woman's body undergoes challenges in terms of energy, increased demand for minerals and vitamins, and psychological stress due to hormonal fluctuations affecting mood and overall body balance, disrupts the equilibrium of the entire musculoskeletal system. Counteracting these forces becomes a challenge not only from external factors but also from the internal environment of the body. This disturbance can result in numerous complications and discomforts [1].

Often, pregnant women contemplate dealing with the problem using pharmacological means. While not incorrect, using analgesics that are tested and safe during pregnancy is intended to assist women during this challenging period. A increasing issue in developed countries is the misuse of opioids, which, categorized as Class C, do not cause teratogenic effects on the foetus but may contribute to respiratory depression in both the mother and, in the long run, lead to dependence in both mother and child, resulting in withdrawal syndrome after discontinuation [2, 3]. Addressing these conditions primarily involves patient education and the utilization of modern physiotherapy techniques, which non-pharmacologically allow achieving not only similar but often better outcomes than pharmacological treatment. The authors of this publication seek to demonstrate this by presenting available methods for treating soft tissue pain in pregnant women.

Manual Therapy

TProperly applied manual therapy during pregnancy constitutes a non-invasive and safe method for alleviating discomfort associated with strain. Techniques are most commonly applied to the pelvic and lumbar spine regions, aiming to relax muscles and stimulate regenerative processes in these areas [4,5].

Massage is one of the best-known and widely utilized techniques in patient therapy. Appropriate techniques have a calming effect on the nervous system, stimulate blood circulation, and accelerate the metabolism, aiding in the absorption of metabolites. Lower limb massage can effectively reduce swelling, a common cause of discomfort in pregnant women. Pelvic and lumbar spine treatments reduce pain and discomfort, while facial treatments

soothe the nervous system and provide relaxation, reducing stress. Acupressure utilizes prolonged local pressure to reduce tension in the pain point and surrounding tissues. Manual techniques are also effective in reducing pain during childbirth, contributing to muscle relaxation and potentially shortening the duration of labour [4, 5, 6, 7, 8, 9, 10].

It is worth noting that manual therapy techniques involve touch, which can positively contribute to improving feelings by reducing stress or anxiety associated with pregnancy and childbirth [7, 9]. Various manual therapy techniques are individually tailored to the needs of pregnant patients. Commonly used techniques include those employed in classical, relaxation, lymphatic, and acupressure massages, as well as myofascial release techniques. It is challenging to distinctly separate these techniques, so they are often collectively referred to as massage or manual therapy. The ability to effectively combine techniques and the versatility in their application enhance the effectiveness of rehabilitation procedures.

Physiotherapy

Of the available physiotherapy methods, few have been thoroughly tested for use in pregnant women. The most well-known and proven method is transcutaneous electrical nerve stimulation (TENS). TENS treatments have proven efficacy in alleviating pain during pregnancy and the early stages of physiological childbirth. TENS operates on the gate control theory of pain according to Melzack and Wall. It is a safe method under the supervision of trained personnel, although there may be other contraindications to its use. Currently, the most well-researched application of TENS is as a pain relief measure during childbirth [5, 11, 12, 17].

Another physiotherapy method is thermotherapy, a safe and effective method. Through the application of heat, muscles relax, reducing tension, a common cause of strain-related pain. Stimulation of blood flow to dysfunctional areas supports the body's healing processes. Heat is most commonly applied in the form of compresses in the lumbar-sacral spine region [8]. Hydrotherapy, an element of physical medicine, effectively and safely acts to relax and tone tense muscles. Underwater massage reduces swelling, relaxes tense muscles, and reduces pain and discomfort.

However, the use of physical medicine is a temporary solution and is more effective when combined with other techniques rather than as an independent pain therapy method [5].

Exercise

TExercise is a universal method to strengthen tissues, muscles, and fascia not only during pregnancy but also after. Subconsciously, people are aware of the intention that should be present during physical activity, i.e., strengthening the entire system. However, during the perinatal period, these exercises should be modified to avoid significant strain on the woman's body while effectively helping in coping with pain, reducing post-pregnancy complications, and improving well-being [16].

One common physical activity during the pre-pregnancy and pregnancy periods is yoga. A considerable percentage of women in the pre-pregnancy period exhibit very low physical activity [13]. Therefore, imposing heavily engaging exercises on these individuals, significantly involving the musculoskeletal system, would be a mistake during pregnancy. This is because the pregnancy period itself can worsen a woman's condition, and additionally, overly intense exercises will not help harmonize the body due to the increased need for regeneration. Strengthening and highly aerobic exercises for these women can even be harmful and ultimately pose a risk to the foetus. Therefore, the abilities of the patient should be scaled in relation to potentially performed exercises in most cases. Yoga combines elements of aerobic and strengthening exercises at a level possible for the practitioner. Thus, simple manipulation of intensity is possible, and the positions adopted allow achieving intensity without sudden and significant exceeding the woman's abilities. This makes yoga a very safe and necessary method of physical activity. Starting yoga before planned pregnancy allows strengthening the body in a way that the undesirable effects from the woman's internal environment are significantly reduced. Women practicing yoga for at least 3 months reported low pelvic girdle pain, suggesting that strengthening the muscles in this region effectively counteracts common musculoskeletal problems in this group [13, 15].

In addition to pain-related factors, prenatal yoga allows for improved well-being, awareness of one's body, and weight reduction, effectively burdening the musculoskeletal and vascular systems. This manifests as muscle stiffness, pain, leg swelling, and water retention [13, 14, 18].

Another way to cope with the lack of physical activity during pregnancy that effectively relaxes and improves muscle and organ blood circulation, thereby reducing pain, is swimming. While there is not much data available on the extent of pain reduction in pregnant women, it is certain that calm movements of the torso and legs in an environment with still low resistance will have similar results to practicing yoga. Therefore, further research in this area is needed. However, it is not a secret that such physical activity improves the well-being of women during the prenatal period and positively affects the entire muscular system. Water exercises relieve the musculoskeletal system, allowing for a free range of motion and reducing the load during movement. Additionally, buoyancy in the water, enabling free movement, can be an indispensable facilitation for women whose body weight has significantly increased during pregnancy. Considering the beneficial effects of water exercises in patients with rheumatic and geriatric conditions, water exercises can be considered a safe alternative to traditional exercises during pregnancy [19,22,23,24,25].

Knowledge about other types of exercises, including those involving strength and aerobic aspects, such as popular sports like Nordic Walking and others that may reduce pelvic girdle pain, is beyond the scope of this article. It is a well-known fact that they improve overall physical and mental fitness, but the exact percentage contribution to reducing pain aspects in pregnant women has not been studied. It is worth exploring this aspect in future publications.

Patient Education

The final aspect considered by the authors was patient education, which involves not only teaching individuals the right and necessary behaviours to maintain well-being but also individual preventive measures against the emergence of problems and coping when they occur. Often, women left with information about the risk factors and the possibility of regulating the probability of their contribution to a potential condition they would like to avoid is sufficient. Brochures, informational books, meetings, and group therapies allow women to understand their bodies better and comprehend what is best for them. Often, these women, understanding their condition and the changes occurring in their bodies, are more inclined to cope with it individually, without resorting to pharmacological means but rather using breathing techniques, relaxation, massage, and tension relief associated with pregnancy.

The invaluable support of the partner seems to be crucial, with significant contribution to pain relief and improving the well-being of the woman. Therefore, educating the future father of the child is essential in many presented cases. The mere possibility of soothing or reducing pelvic girdle pain in the comfort of one's home, which scales from zero to excessively bothersome for the woman, allows effective counteraction to the progression of pain development and a quick response to factors that may contribute to the worsening of the patient's condition.

Summary

The collection of methods presented above serves as a review of currently the most reliable and well-researched methods that prove effective in the physiotherapy of pregnant women. Other techniques that are not currently credible in terms of effects and safety of use have not been included in this work. Despite the separate listing of the mentioned methods, it is essential to remember that the most effective therapy is often a combined method of individually selected techniques based on the patient's needs and her individual conditions. Urogynaecological physiotherapy is still a relatively young field in physiotherapy, but the increasing social awareness of the needs of pregnant women and the growing demand favour its development. Patients increasingly conscious of their own needs choose to use the services of physiotherapists working with pregnant women.

The above methods are characterized by non-invasiveness and safety of use. Proper utilization and implementation in the standards of therapeutic rehabilitation procedures reduce the costs of hospital treatment, side effects, and the risk of adverse side effects occurring in both the mother and the foetus compared to standard hospital treatment using only pharmacotherapy. Strengthening the woman's body and reducing painful symptoms are important factors conducive to maintaining the health of both the mother and the unborn child. Despite seemingly few currently available reliable methods, they are safe and supported by studies that meet evidence-based medicine (EBM) criteria.

Literature

[1] Sward, Lindsey MD; Manning, Nirvana MD; Murchison, Amanda B. MD; Ghahremani, Taylor MD; McCaulley, Jill A. MD; Magann, Everett F. MD‖ Pelvic Girdle Pain in Pregnancy: A Review. Obstetrical & Gynecological Survey 78(6):p 349-357, June 2023. | DOI: 10.1097/OGX.0000000000001140

[2] Hendrée E., Jones PhD., Walter K., Kraft MD. Analgesia, Opioids, and Other Drug Use During Pregnancy and Neonatal Abstinence Syndrome. Clinics in Perinatology, 2019-06-01, Volume 46, Issue 2, Pages 349-366

[3] Farmakoterapia chorób układu ruchu u kobiet w ciąży Jolanta Patro-Małysza, Beata Marciniak, Żaneta Kimber-Trojnar, Elżbieta Poniedziałek-Czajkowska, Radzisław Mierzyński, Jacek Bartosiewicz, Bożena Leszczyńska-Gorzelak, Jan Oleszczuk Ginekologia i Perinatologia Praktyczna 2016;1(2):56-65.

[4] Morimoto, Kaori, Harrington, Alisha, Nelson, Claudia and Loveless, Brian. "Osteopathic approach to sacroiliac joint pain in pregnant patients" Journal of Osteopathic Medicine, vol. 122, no. 5, 2022, pp. 235-242. https://doi.org/10.1515/jom-2021-0231

[5] Hu, Y., Lu, H., Huang, J. and Zang, Y. (2021), Efficacy and safety of non-pharmacological interventions for labour pain management: A systematic review and Bayesian network meta-analysis. J Clin Nurs, 30: 3398-3414. https://doi.org/10.1111/jocn.15865

[6] CY Lai, Margaret KW Wong, WH Tong, SY Chu, KY Lau, Agnes ML Tam, LL Hui, Terence TH Lao, TY Leung. Effectiveness of a childbirth massage programme for labour pain relief in nulliparous pregnant women at term: a randomised controlled trial. Hong Kong Med J 2021 Dec;27(6):405–12 | Epub 17 Dec 2021 https://doi.org/10.12809/hkmj208629

[7] Karaduman S, Akköz Çevik S. The effect of sacral massage on labor pain and anxiety: A randomized controlled trial. Jpn J Nurs Sci. 2020; 17:e12272. https://doi.org/10.1111/jjns.12272

[8] Hülya Türkmen , Nazan Tuna Oran. Massage and heat application on labor pain and comfort: A quasi-randomized controlled experimental study. Explore (NY) 2021 Sep-Oct;17(5):438-445. doi: 10.1016/j.explore.2020.08.002. Epub 2020 Aug 11.

[9] Türkmen H, Oran NT. Massage and heat application on labor pain and comfort: A quasi-randomized controlled experimental study. Explore (NY). 2021 Sep-Oct;17(5):438-445. doi: 10.1016/j.explore.2020.08.002. Epub 2020 Aug 11. PMID: 32828687.

[10] LGÖNENÇ, Ilknur Munevver1*; TERZIOĞLU, Füsun. Effects of Massage and Acupressure on Relieving Labor Pain, Reducing Labor Time, and Increasing Delivery

Satisfaction. Journal of Nursing Research 28(1):p e68, February 2020. | DOI: 10.1097/jnr.0000000000000344

[11] Njogu A, Qin S, Chen Y, Hu L, Luo Y. The effects of transcutaneous electrical nerve stimulation during the first stage of labor: a randomized controlled trial. BMC Pregnancy Childbirth. 2021 Feb 24;21(1):164. doi: 10.1186/s12884-021-03625-8. PMID: 33627077; PMCID: PMC7905652.

[12] Daniel L., Benson J., Hoover S. Transcutaneous Electrical Nerve Stimulation for Pain Management for Women in Labor. MCN, The American Journal of Maternal/Child Nursing 46(2):p 76-81, March/April 2021. | DOI: 10.1097/NMC.0000000000000702

[13] Wójcik M, Jarząbek-Bielecka G, Merks P, Luwański D, Plagens-Rotman K, Pisarska-Krawczyk M, Mizgier M, Kędzia W. Visceral Therapy and Physical Activity for Selected Dysfunctions, with Particular Emphasis on Locomotive Organ Pain in Pregnant Women-Importance of Reducing Oxidative Stress. Antioxidants (Basel). 2022 Jun 5;11(6):1118. doi: 10.3390/antiox11061118. PMID: 35740015; PMCID: PMC9219914.

[14] Corrigan L, Moran P, McGrath N, Eustace-Cook J, Daly D. The characteristics and effectiveness of pregnancy yoga interventions: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2022 Mar 25;22(1):250. doi: 10.1186/s12884-022-04474-9. PMID: 35337282; PMCID: PMC8957136.

[15] Höbek Akarsu R, Kocak DY, Akarsu GD. Experiences of Pregnant Women Participating in Antenatal Yoga: A Qualitative Study. Altern Ther Health Med. 2022 May;28(4):18-23. PMID: 34653024.

[16] Chukwuebuka P. Onyekere,Grace N. Emmanuel,Benjamin C. Ozumba, Chinonso N. Igwesi-Chidobe. Minimal-contact physical interventions for pregnant women with musculoskeletal disorders: a systematic review of randomised and non-randomised clinical trials. Journal of Obstetrics and Gynaecology Volume 42, 2022 - Issue 6 Pages 1679-1692 | Published online: 02 Jun 2022

[17] Annika Svahn Ekdahl, Monika Fagevik Olsén, Tove Jendman, Annelie Gutke. Maintenance of physical activity level, functioning and health after non-pharmacological treatment of pelvic girdle pain with either transcutaneous electrical nerve stimulation or acupuncture: a randomised controlled trial. BMJ Open. 2021 Oct 1;11(10):e046314. doi: 10.1136/bmjopen-2020-046314.

[18] Wadhwa, Y.; Alghadir, A.H.; Iqbal, Z.A. Effect of Antenatal Exercises, Including Yoga, on the Course of Labor, Delivery and Pregnancy: A Retrospective Study. Int. J. Environ. Res. Public Health 2020, 17, 5274. https://doi.org/10.3390/ijerph17155274

[19] Gundle L, Atkinson A. Pregnancy, cold water swimming and cortisol: The effect of cold water swimming on obstetric outcomes. Med Hypotheses. 2020 Nov;144:109977. doi: 10.1016/j.mehy.2020.109977. Epub 2020 Jun 11. PMID: 32570161.

[20] Esther van Benten, Anja de Kruif, Henri Kiers, Michel W Coppieters, Annelies L Pool-Goudzwaard. Exploring health and illness perceptions to identify the perceived cause of pregnancy-related pelvic girdle pain. A mixed-methods study among primiparous women in The Netherlands. Midwifery. 2023 Nov 24:129:103892. doi: 10.1016/j.midw.2023.103892.

[21] Steven D Manyozo, Tarimo Nesto , Phylos Bonongwe, Adamson S Muula. Low back pain during pregnancy: Prevalence, risk factors and association with daily activities among pregnant women in urban Blantyre, Malawi. Malawi Med J. 2019 Mar;31(1):71-76. doi: 10.4314/mmj.v31i1.12.

[22] Raquel Rodríguez-Blanque,María José Aguilar-Cordero, Ana Eugenia Marín-Jiménez, María José Menor-Rodríguez, Maria Montiel-Troya,Juan Carlos Sánchez-García. Water Exercise and Quality of Life in Pregnancy: A Randomised Clinical Trial. Int J Environ Res Public Health. 2020 Feb; 17(4): 1288. Published online 2020 Feb 17. doi: 10.3390/ijerph17041288

[23] Mikel Izquierdo, R. A. Merchant, J. E. Morley, S. D. Anker, I. Aprahamian, H. Arai, M. Aubertin-Leheudre, R. Bernabei, E. L. Cadore, M. Cesari, L.-K. Chen, P. de Souto Barreto, G. Duque, L. Ferrucci, R. A. Fielding, A. García-Hermoso, L. M. Gutiérrez-Robledo, S. D. R. Harridge, B. Kirk, S. Kritchevsky, F. Landi, N. Lazarus, F. C. Martin, E. Marzetti, M. Pahor, R. Ramírez-Vélez, L. Rodriguez-Mañas, Y. Rolland, J. G. Ruiz, O. Theou, D. T. Villareal, D. L. Waters, C. Won Won, J. Woo, B. Vellas, M. Fiatarone Singh. International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines. The journal of nutrition, health & aging; Volume 25, pages 824–853, (2021)

[24] Jee-Hye Yoo PhD. The psychological effects of water-based exercise in older adults: An integrative review. Geriatric Nursing; Volume 41, Issue 6, November–December 2020, Pages 717-723

[25] Luís B. Faíl, Daniel A. Marinho, Elisa A. Marques, Mário J. Costa, Catarina C. Santos, Mário C. Marques. Benefits of aquatic exercise in adults with and without chronic disease—A systematic review with meta-analysis. Scandinavian Journal of Medicine & Science in Sports. 16 December 2021 https://doi.org/10.1111/sms.14112

Received: 2023
Accepted: 2023