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WATER METHOD PREGNANCY EXERCISES TO REDUCE PREGNANCY BACK PAIN AQUATIC GYMNASTICS

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Abstract

Ten percent of pregnant women have chronic pain, and up to fifty percent have back discomfort. As the six-month mark approaches, 80% of pregnant women will at some point feel back pain, which is mostly due to changes in the spinal muscles (70%). Compared to weight-bearing exercise without the water method, the water pregnant exercise method is more strenuous and has a lower failure rate. Because they are submerged in water, this exercise improves thermoregulation and gives them a sense of lightness and comfort when moving. In addition, hydrostatic pressure may be able to prevent and treat lower back pain and lessen edema.

Keywords: Back Pain, Pregnancy, Water Exercise

Abstrak

Sepuluh persen wanita hamil mengalami nyeri kronis, dan hingga lima puluh persen mengalami ketidaknyamanan punggung. Menjelang usia enam bulan, 80% wanita hamil suatu saat akan merasakan sakit punggung, yang sebagian besar disebabkan oleh perubahan pada otot tulang belakang (70%). Dibandingkan dengan olahraga angkat beban tanpa metode air, metode olahraga hamil air lebih berat dan memiliki tingkat kegagalan yang lebih rendah. Karena terendam air, latihan ini meningkatkan termoregulasi dan memberi mereka rasa ringan dan nyaman saat bergerak. Selain itu, tekanan hidrostatik mungkin dapat mencegah dan mengobati nyeri punggung bawah serta mengurangi edema.

Kata Kunci: Nyeri Punggung, Kehamilan, Olahraga Air

Introduction

Pregnancy-related back pain represents one of the most common and challenging musculoskeletal conditions affecting expectant mothers, with studies indicating that 50-80% of pregnant women experience significant back pain during their pregnancy. This high prevalence poses substantial challenges to maternal well-being and daily functioning, often leading to decreased quality of life and increased healthcare utilization. The physiological changes during pregnancy, including weight gain, altered center of gravity, and the release of hormones such as relaxin that increase joint laxity, contribute significantly to the development of back pain (Lee, 1996).

Traditional interventions for pregnancy-related back pain have often been limited due to safety concerns and the unique physiological state of pregnancy. Many conventional pain management strategies, including certain medications and physical therapy techniques, may be contraindicated or require significant modification for pregnant women. This situation has created a pressing need for safe, effective, and accessible interventions that can address back pain while accommodating the specific needs of pregnant women (Rodríguez-Blanque et al., 2020).

Aquatic exercise has emerged as a promising approach to managing pregnancy-related back pain. The unique properties of water, particularly its buoyancy effect, provide an ideal environment for exercise during pregnancy. Water buoyancy reduces the gravitational load on the spine and joints, potentially allowing for more comfortable movement and exercise execution. Additionally, the hydrostatic pressure of water can help reduce edema and improve circulation, which are common concerns during pregnancy. Despite the theoretical benefits of aquatic exercise, systematic research into specific water-based exercise protocols for pregnancy-related back pain has been relatively limited. While various aquatic exercise programs exist, there has been a lack of standardization in approaches and insufficient evidence regarding the optimal frequency, intensity, and types of exercises that should be implemented. This gap in knowledge has hindered the widespread adoption of aquatic exercise programs in prenatal care, despite their potential benefits (Bove et al., 2002).

Furthermore, the accessibility of aquatic exercise programs specifically designed for pregnant women remains a significant challenge in many communities. The need for specialized facilities, trained instructors, and pregnancy-specific exercise protocols has limited the availability of these programs to many expectant mothers who might benefit from them. Understanding these barriers is crucial for developing and implementing effective aquatic exercise interventions for pregnancy-related back pain management (Collins et al., 2019). The intersection of these challenges - the high prevalence of pregnancy-related back pain, the limitations of traditional interventions, and the need for evidence-based aquatic exercise protocols - creates a compelling rationale for investigating water-based exercise methods as a therapeutic approach to managing pregnancy-related back pain. This investigation becomes particularly relevant given the growing emphasis on non-pharmacological interventions during pregnancy and the increasing recognition of exercise as a crucial component of prenatal care (Zhang et al., 2020).

If one calculates the time from fertilization to delivery, a normal pregnancy will occur within 40 weeks, 10 lunar months, or 9 months, as determined by the international calendar. Pregnancy is defined as the union of sperm and egg cells followed by implantation. According to WHO (2016), a pregnancy is split into three trimesters: the first lasts 12 weeks, the second lasts 15 weeks (weeks 13–27), and the third lasts 13 weeks (weeks 28–40). Pregnant women frequently experience low back discomfort, however there is little proof that it may be

effectively treated. It has been demonstrated that supervised exercise, whether done on land or in the water, helps manage low back pain, but there have been no trials testing the evidence that water exercise programs do not provide monitoring for low back pain (Pandey et al., 2021).

Between 50 and 80 percent of pregnant women report having back pain. Back pain is a common complaint among expectant mothers, which is concerning (Holingworth, 2017). Approximately 50% of pregnant women report having back pain, and 10% report having persistent back pain that starts during pregnancy. Pregnancy-related back discomfort typically first manifests around the start of the sixth month. Back discomfort is a common pregnancy symptom for over 80% of women. Pregnancy-related alterations in the spinal muscles might also result in back discomfort 70% of the time (Morino et al., 2017).

The majority of expectant mothers are looking for non-pharmacological ways to reduce labor pain. Thus, breathing and relaxation techniques, massage, perineal exercises, and water immersion are all crucial components of prenatal education. There is little proof that nonpharmacological approaches are effective, despite the fact that they don't seem to be harmful. Furthermore, elevated endorphin levels during pregnancy are linked to moderate exercise, which lessens labor pain and the need for painkillers (Davenport et al., 2018a).

Many clinical practice recommendations advocate exercise for low-risk pregnant women because of the well-established advantages of exercise during pregnancy. More precisely, there is proof that exercise interventions during pregnancy can lower weight growth, enhance glycemic management, and prevent gestational diabetes. Pregnancy-related exercise can also lower the risk of pre-eclampsia and high blood pressure. Compared to other types of exercise, water exercise during pregnancy carries a decreased risk of injury. Pregnant women who participate in this sport feel light and mobile (Green et al., 2019).

Method

This study uses a literature review method or literature review which is carried out systematically to analyze the effectiveness of aquatic exercise in reducing back pain in pregnant women. The research process is carried out through several structured stages to ensure the quality and validity of the research results. Article searches were conducted on several trusted electronic databases, including PubMed, Science Direct, Google Scholar, and Garuda Portal. The search was limited to articles published within the last 10 years (2014-2024) to ensure the information obtained was still relevant to the latest developments. Keywords used in the search included: “aquatic exercise pregnancy”, ‘water exercise pregnancy’, ‘aquatic exercise pregnancy’, ‘water exercise back pain pregnancy’, ‘hydrotherapy pregnancy’, and combinations of these key words in Indonesian and English (Davenport et al., 2018b).

Results and Discussion

Result

The results of the analysis show that exercise for pregnant women using the water method is effective in reducing the intensity of pain and discomfort during pregnancy and reduces injuries during exercise compared to exercise for pregnant women who do not use the water method. The research results are in the form of a literature review based on a collection of articles carried out by selecting journals or articles taken from five journals. The search process was carried out through Science Direct and Pubmed. The results of the analysis of journals that are considered to have high presentation value. The results of the journal analysis can be explained in the following table:

Table 1. Article Quality Assessment Table using The JBI (Joanna Briggs Institute) critical appraisal tools

Sitasi	Kriteria													Hasil
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Carrascosa et., (2021) Pengaruh latihan air aerobic selama kehamilan pada penggunaan epidural dan nyeri: Uji coba multisentral, acak, dan terkontrol	v	v	v	v	v	v	v		v	v	v	v	v	12/13 (92%)
Backhausen et al., (2017) Efek dari program latihan air tanpa pengawasan pada nyeri punggung bawah dan cuti sakit sakit di antara wanita hamil yang sehat – sebuah uji coba terkontrol secara acak.	v	v	v	v	v	v	v		v	v	v	v	v	12/13 (92%)
C, Nazari B, et al (2020) Efek dari empat minggu latihan fisik dalam air pada tingkat keparahan nyeri punggung bawah pada wanita hamil dengan riwayat kehamilan sebelumnya nyeri punggung bawah punggung bawah: Sebuah uji klinis terkontrol secara acak	v	v	v	v	v	v	V		v	v	v	v	v	11/13 (84%)
d. Araceli Navas et al (2018) Efektivitas dan keamanan latihan air aerobic intensitas sedang selama kehamilan untuk mengurangi penggunaan analgesia epidural selama persalinan: protocol untuk uji klinis acak	v	v	v	v	v	v	v		v	v	v	v	v	11/13 (92%)
e. K L Scott (2028)	v	v	v	v	v	v	v	v	v	v	v	v	v	13/13

Pengaruh latihan air dan darat pada wanita hamil yang berkaitan dengan masalah nyeri punggung	(100%)

Table 2. Data Extraction Results

Author (Tahun)	Sumber Artikel	Tujuan	Jenis Penelitian	Metode Penelitian	Pengumpulan Data	Populasi & Sampel	Hasil / Temuan
Carrascosa et al., (2021)	Mendeley	Menganalisa efektifitas dan keamanan latihan air aerobic dalam kaitannya dengan penggunaan epidural selanjutnya dalam persalinan pervaginaan serta Sectio Saeraria	Kualitatif dengan Casa Study	Uji Klinis Terkontrol (RCT)	Observasi	Populasi :Wanita Hamil usia : 18-40 th Kehamilan : 14-20 minggu Hamil tunggal, resiko kebidanan rendah Sampel : 320 wanita hamil	Latihan dalam air tidak mempengaruhi penggunaan analgesia epidural. Hasil menunjukkan wanita yang berada pada kelompok latihan lebih sedikit pada saat proses persallinan
Backhausen et al., (2017)	Mendeley	Menilai efek dari program latihan air tanpa pengawasan pada intensitas nyeri punggung bawah dan	Kualitatif dengan case study	RCT	Observasi dan kuesioner	Populasi : wanita hamil Sehat usia > 18, janin tunggal, uk, 16-17 minggu.	Pada kelompok latihan air, intensitas nyeri punggung bawah terlihat lebih rendah dengan penghitungan statistic dengan skor 2,01 (95%).

		hari cuti sakit diantara wanita hamil yang sehat				Sampel : 516 wanita hamil		
Nazari B et al (2020)	Mendeley	Untuk mengetahui pengaruh latihan fisik dalam air selama empat minggu terhadap tingkat keparahan nyeri punggung pada ibu hamil dengan riwayat kehamilan sebelumnya nyeri punggung bawah	Kualitatif dengan case study	RCT	Observasi dan kuesioner	Populasi :80 wanita hamil Dengan yeri punggung bawah kehamilan dan riwayat punggung bawah	Pada kelompok yang diberi intervening secara signifikan lebih rendah mengalami intensitas nyeri daripada kelompok control. Dan ini berkurang singnifikan	

Effectiveness of Aquatic Gymnastics on Back Pain Reduction

Based on research conducted by (Laksono et al., 2022) in the Indonesian Midwifery Journal, aquatic exercises performed regularly for 8 weeks with a frequency of twice a week showed a significant decrease in the intensity of back pain in pregnant women. Of the 30 respondents studied, 83% reported a decrease in pain from moderate (5-7) to mild (1-3) on the VAS (Visual Analog Scale) pain scale. These results are in line with international research by Rodriguez-Blanque et al.) in the journal International Journal of Environmental Research and Public Health which found that the SWEP (Study of Water Exercise during Pregnancy) program effectively reduced back pain intensity by 47% in the intervention group compared to the control group.

Physiological Mechanisms of Pain Reduction

The study published in Scopus by Kim and Lee (2020) explains that the therapeutic effect of water at 32-34°C provides relaxation to the muscles and reduces pressure on the pelvic and lumbar joints. The buoyancy of water reduces the burden of gravity by 80%, allowing pregnant women to move more freely and perform muscle strengthening exercises without overloading the joints (Soma-Pillay et al., 2016).

Optimal Duration and Frequency

A meta-analysis conducted by (Isnasia Rahayu, 2019) in the Indonesian Journal of Obstetrics showed that and aquatic exercise program with a duration of 30-45 minutes per session, conducted 2-3 times a week for at least 6 weeks provides optimal results. Participant compliance rates reached 89% when sessions were conducted in small groups with the guidance of certified instructors. This study analyzed 15 studies with a total of 876 participants and found a strong effect size (d=0.78) for back pain reduction.

Effective Exercise Components

Qualitative research by (Zuchdi & Afifah, 2019) in the Nursing Journal identified that a combination of movements that included in-water warm-up (10 minutes), core strengthening exercises (15 minutes), pelvic mobility exercises (10 minutes), and cool-down (10 minutes) provided the best results. This finding is supported by an international study by Cantarero-Villanueva et al. (2019) in the Physical Therapy Journal which emphasizes the importance of gradual progression in exercise intensity.

Psychological Impact and Quality of Life

The results of research by Hartati et al. (2023) in the Journal of Public Health showed that in addition to physical benefits, aquatic exercise also has a positive impact on psychological aspects. Of the 45 respondents, 91% reported improved sleep quality and 87% experienced a decrease in anxiety levels. This study is in line with the findings of Granath et al. (2021) in the Scandinavian Journal of Medicine and Science in Sports who noted a significant improvement in SF-36 quality of life scores after a 12-week aquatic exercise program.

Safety and Contraindications

A systematic review by Wahyuni and Putri (2022) in the Journal of Health Research analyzed the safety aspects of aquatic exercise in 24 studies with a total of 1,456 participants. No serious side effects were found, with a dropout rate of only 7%. However, the study recommended strict screening for conditions such as preeclampsia, vaginal bleeding, and a history of preterm labor (Dreyer et al., 2017).

Discussion

Four sets of exercises were developed for the study, each including muscle movement, breathing, and relaxation techniques. This exercise begins with stretching and warming up in the water (stretching the neck, chest, shoulders, back and thighs for 5 to 7 minutes). Water warm-up (consists of walking in water, taking large steps followed by small jumps, walking sideways and moving back and forth for 10 minutes), moderate water exercises (20 minutes), breathing and relaxation exercises (5 minutes).

Vaginal bleeding, placenta previa, premature membrane rupture, intrauterine growth restriction, severe anemia, frequent painful contractions, amniotic fluid leakage, shortness of breath prior to exercise, headache, dizziness, chest pain, muscle weakness that affects balance, calf pain, or swelling are all reasons why pregnant women are asked to stop the procedure. As a result, the use of epidural analgesia during labor is unaffected by aquatic exercise, and the amount of pain experienced following aquatic exercise will be less than that of traditional treatment, which is typically provided throughout labor. Both pregnant mothers and unborn children can safely use this technique. According to the Borg scales 11–13 and 14–15, the exercises were done at a moderate tempo [26]. It is predicted that each workout will take approximately forty-five minutes.

Research by Nazari B et al in 2020 showed that pregnant women who exercised in water had less discomfort during pregnancy, namely back pain. By statistical calculations it was concluded that the pain intensity in the aquatic exercise group (23.45 ± 03.56) was significantly lower than that in the standard ANC group (77.15 ± 13.03) (P = 0.001); In the group of pregnant women who experienced back pain when doing water exercise, the intensity of pain at the end of the study (23.45 ± 03.56) had decreased significantly compared to the beginning of the study (73.19 ± 11.42) (P = 0.001). Meanwhile, in the control group, after the intervention there was no significant change (77.15 ± 13.03) compared to before the intervention (74.36 ± 12.23) (P = 0.419). >Some aquatic exercises will be carried out on certain populations of pregnant women with a gestational age of 16 to 20 weeks. The population will be divided into 2 groups, namely pregnant women who are included in the sports group which will be supervised or supervised by a medical team (midwife) and pregnant women who are not included in the sports group, namely those pregnant women who only benefit from standard midwifery services without exercise. aquatic during pregnancy. Apart from these two groups, pregnant women with a history of pelvic pain will see whether the intensity of the pain they feel decreases after doing aquatic exercises to reduce pregnancy discomfort (Song et al., 2023).

Back pain during pregnancy is associated with receptor connectivity and pain reduction mechanisms in neurons, where opioid receptors were identified via autoradiography using high affinity and antibodies to unique peptide sequences in each receptor subtype. Three major opioid receptors are commonly found in the dorsal horn of the spinal cord. These receptors are found on pain-transmitting neurons in the spinal cord and on primary afferent nerves that send pain messages to the spinal cord. Apioid agonists inhibit the release of excitatory transmitters from the primary pain transmitter. In addition, apioid agonists directly inhibit pain transmitting neurons in the spinal cord. Therefore, it can be said that opioids act directly as strong analgesics on the spinal cord (Green et al., 2019).

Conclusion

Doing water exercises can relieve back pain, lower back pain and relieve pregnancy discomfort (musculoskeletal disorders) so that pregnancy runs smoothly, healthily and evenly.

And aquatic exercise or the so-called water method has been proven to reduce pain during childbirth.

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