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REVIEW ARTICLE

Benefits of aquatic exercise during pregnancy: A systematic review

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ABSTRACT

Aquatic exercise has emerged as an accessible form of prenatal physical activity due to its reduced musculoskeletal load and improved thermoregulation. Growing evidence suggests potential benefits for maternal well-being as well as pregnancy- and birth-related outcomes. Objectives: To synthesize current evidence on the effects of aquatic exercise during pregnancy on maternal health and labour outcomes. Methods: A systematic review was conducted using PubMed and Google Scholar to identify studies published between 2020 and 2025 investigating aquatic exercise or hydrotherapy interventions in pregnant women. Eligible studies included randomized controlled trials, clinical trials, and systematic reviews/meta-analyses published in English. Data extracted included study design, participant characteristics, intervention protocols, and maternal and labour-related outcomes. Results: Five studies met the inclusion criteria. Findings from randomized controlled trials and meta-analyses suggest that aquatic exercise during pregnancy may improve maternal mental health, reduce perceived labour pain, enhance quality of life, and support gestational weight management. No adverse neonatal outcomes were reported in the included studies. However, findings related to mode of delivery and obstetric outcomes were limited and inconsistent. Conclusions: Aquatic exercise may be a useful component of prenatal care and may provide benefits for maternal well-being. However, conclusions should be interpreted with caution due to the limited number of studies and heterogeneity of the available evidence. Further high-quality, large-scale studies are needed to strengthen the evidence base.

Keywords: Pregnancy, Aquatic exercise, Prenatal physical activity, Maternal well-being.

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INTRODUCTION

Pregnancy is associated with significant physiological, biomechanical, and hormonal changes that may affect a woman's comfort, mobility, and overall health. Maintaining physical activity during pregnancy is considered an important component of prenatal care, although some forms of exercise may become less comfortable due to increased body weight, joint stress, and postural changes.

Aquatic exercise has gained attention as a feasible and accessible form of physical activity during pregnancy. The properties of water, including buoyancy, hydrostatic pressure, and reduced mechanical loading, may help reduce musculoskeletal strain and improve exercise tolerance, making it a potential alternative to land-based exercise for pregnant women (Rodríguez-Blanque et al., 2020; Del Carmen Carrascosa et al., 2021).

Regular physical activity during pregnancy has been associated with improved maternal well-being and quality of life (Navas et al., 2021; Cancela-Carral et al., 2022). Current clinical guidelines recommend moderate-intensity physical activity for pregnant women without medical contraindications.

Evidence from randomized controlled trials and meta-analyses suggests that aquatic exercise during pregnancy may improve maternal mental health, reduce perceived labour pain, and support healthy gestational weight management, without reported adverse neonatal outcomes in the included studies (Mellado García et al., 2024; Xu et al., 2024).

Despite these promising findings, differences in intervention protocols, sample sizes, and outcome measures make it difficult to draw firm conclusions. In addition, evidence on aquatic exercise during pregnancy remains limited. Therefore, this systematic review aimed to synthesize recent evidence regarding the effects of aquatic exercise during pregnancy on maternal and neonatal outcomes.

Objectives

The objective of this systematic review was to evaluate the effects of structured aquatic exercise programs during pregnancy on maternal and neonatal outcomes. Specifically, the review aimed to assess maternal mental health outcomes, including anxiety, depression, and quality of life, as well as secondary outcomes such as labour-related outcomes, gestational weight gain, and neonatal health indicators.

METHODS

PICO Framework

This systematic review followed a PICO framework. The population included pregnant women without contraindications to exercise. The intervention was aquatic exercise performed at least twice per week. The comparison group included standard prenatal care or land-based exercise. The main outcomes were maternal mental health (anxiety, depression, and quality of life). Secondary outcomes included labour outcomes, gestational weight gain, and neonatal outcomes.

Search strategy

A systematic search was conducted in PubMed and Google Scholar for studies published between January 2020 and June 2025. The search used keywords related to pregnancy and aquatic exercise, combined with Boolean operators.

The search terms were: ("*pregnancy*" OR "*prenatal*") AND ("*aquatic exercise*" OR "*water-based exercise*" OR "*hydrotherapy*") AND ("*maternal health*" OR "*labor outcomes*" OR "*delivery*").

Reference lists of included studies were also checked for additional articles.

The search was limited to English-language studies.

Eligibility criteria

Studies were included if they:

1. Were published between 2020 and 2025.
2. Were written in English.
3. Included pregnant women.
4. Examined aquatic or water-based exercise.
5. Reported maternal or neonatal outcomes.
6. Were randomized trials, clinical trials, or reviews.

Both primary studies and systematic reviews/meta-analyses were included to provide a broader overview of the available evidence on aquatic exercise during pregnancy. Findings were interpreted with caution to minimize potential overlap between studies.

Exclusion criteria

Studies were excluded if they:

1. Did not involve aquatic exercise.
2. Included non-pregnant populations.
3. Were editorials, abstracts, or opinion papers.
4. Had insufficient data.

Study selection (PRISMA)

The search identified 412 records. After removing duplicates (n = 96), 316 records were screened by title and abstract. Of these, 274 were excluded as irrelevant. A total of 42 full-text articles were assessed. Finally, 5 studies met the inclusion criteria.

Data extraction

Data were extracted by two reviewers using a standard form. Information included study design, participants, intervention, and outcomes. Any differences were resolved by agreement.

Risk of bias

Study quality was assessed using standard tools. Randomized trials were evaluated with the Cochrane Risk of Bias tool. Other study types were assessed using appropriate quality checklists.

Data synthesis

A narrative synthesis was used because the studies were different in design and outcomes. Results were grouped into maternal and neonatal outcomes and summarized in tables.

Limitations

The review is limited by the small number of studies and differences between them. Only English-language studies were included, which may introduce bias.

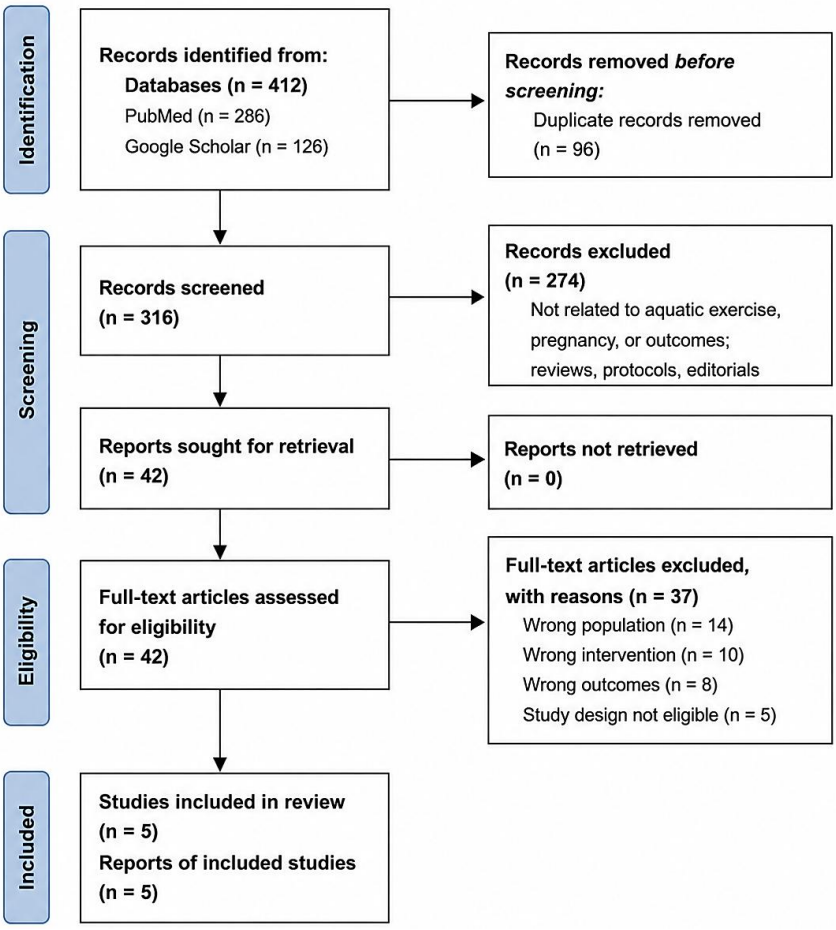

Figure 1. PRISMA flow diagram of the study selection process.

RESULTS

Study characteristics

A total of five studies were included in the final synthesis, including randomized controlled trials and systematic reviews/meta-analyses conducted in Spain and multi-country settings. Sample sizes in clinical trials ranged from 129 to 364 participants, while meta-analyses included up to 17 randomized controlled trials.

Interventions generally consisted of moderate-intensity aquatic exercise performed two to three times per week throughout pregnancy.

Maternal mental health and well-being

Most randomized controlled trials reported positive effects of aquatic exercise on maternal mental health. Improvements were observed in anxiety, depressive symptoms, sleep quality, and overall maternal well-being. One multicentre study reported reduced postpartum anxiety and depression (Navas et al., 2021).

Labor-related outcomes

Aquatic exercise was associated with reduced perceived labour pain in several studies. However, findings regarding epidural use and caesarean section rates were inconsistent across studies, with no clear overall difference observed (Del Carmen Carrascosa et al., 2021).

Mode of delivery and obstetric outcomes

Some randomized controlled trials reported higher rates of spontaneous vaginal delivery and better perineal outcomes among women who participated in aquatic exercise programs (Rodríguez-Blanque et al., 2020). However, results were not consistent across all studies.

Gestational weight gain and physical outcomes

Systematic reviews and meta-analyses suggest that aquatic exercise may help reduce excessive gestational weight gain. Additional benefits were reported for musculoskeletal discomfort and metabolic indicators, including glucose regulation (Cancela-Carral et al., 2022; Xu et al., 2024).

Neonatal Outcomes and SafetyNo adverse neonatal outcomes were reported in any of the included studies. Outcomes such as birth weight and Apgar scores were similar between intervention and control groups, suggesting that aquatic exercise appears to be safe during pregnancy.

Summary of findings

Overall, aquatic exercise during pregnancy showed mostly positive effects on maternal outcomes, particularly mental health, pain perception, and physical well-being. However, findings were not fully consistent across all studies, and the small number of included studies limits the strength of conclusions.

Table 1. Characteristics and key findings of included studies.

Author (Year)	Country	Study design	Sample (n)	Intervention	Comparator	Outcomes measured	Key findings
Navas et al. (2021)	Spain	Multicentre RCT	320	Moderate-intensity aquatic aerobic exercise (150 min/week)	Usual prenatal care	Postpartum depression, anxiety, sleep quality, quality of life, neonatal outcomes	Reduced postpartum anxiety and depressive symptoms; no adverse maternal or neonatal outcomes
Del Carmen Carrascosa et al. (2021)	Spain	Randomized controlled trial	364	Water-based aerobic exercise (SWEP program)	Standard prenatal care	Labor pain, epidural use, delivery mode, labour duration	Lower perceived labour pain; no differences in epidural use or caesarean section
Rodríguez-Blanque et al. (2020)	Spain	Randomized controlled trial	129	Structured water-based exercise program	Routine care	Mode of delivery, perineal outcomes	Higher rate of spontaneous vaginal delivery and better perineal outcomes
Cancela-Carral et al. (2022)	Multiple	Systematic review & meta-analysis	17 RCTs	Aquatic exercise interventions	Standard care / land-based exercise	Gestational weight gain, musculoskeletal pain, glucose regulation	Reduced excessive gestational weight gain and pregnancy-related pain
Xu et al. (2024)	Multiple	Systematic review & meta-analysis	10 RCTs	Prenatal aquatic exercise	Standard care	Maternal quality of life, weight gain, neonatal outcomes	Improved maternal well-being and weight control; no adverse neonatal outcomes

DISCUSSION

This systematic review summarizes recent evidence on aquatic exercise during pregnancy and its effects on maternal and neonatal outcomes. Overall, the findings from randomized controlled trials and meta-analyses suggest potential benefits, particularly for maternal well-being, with no reported adverse effects on neonatal outcomes (Navas et al., 2021; Cancela-Carral et al., 2022).

Maternal mental health

The most consistent findings were related to improvements in maternal mental health, including reduced anxiety, depressive symptoms, and improved quality of life. These effects may be linked to the properties of water-based exercise, such as reduced joint load and improved comfort during movement, which may support relaxation and participation in physical activity.

Labor and obstetric outcomes

Findings related to labour outcomes were less consistent. Some studies reported reduced perceived labour pain, while others showed no clear differences in outcomes such as epidural use, caesarean section rates, or labour duration (Del Carmen Carrascosa et al., 2021). This variability may be explained by differences in study design, exercise protocols, intensity, and outcome measurements. Therefore, conclusions regarding obstetric outcomes should be interpreted cautiously.

Neonatal safety

No adverse neonatal outcomes were reported in the included studies (Xu et al., 2024). However, the evidence is still limited, and most studies were conducted in similar settings, which may affect the strength and generalizability of safety conclusions.

Geographical limitation

A clear limitation of the current evidence is the geographic concentration of studies, with most research conducted in Spain. This limits the ability to generalize findings to other populations and healthcare systems.

Implications and future research

Aquatic exercise may be considered a potentially useful complementary option in prenatal care, especially for improving maternal well-being and supporting women who have difficulty performing land-based exercise.

Future research should include larger multicentre randomized trials, standardized exercise protocols, and more diverse populations. Long-term maternal and neonatal outcomes should also be investigated to strengthen the evidence base.

CONCLUSIONS

Aquatic exercise during pregnancy appears to be safe and may provide beneficial effects on maternal outcomes, particularly in relation to mental health, quality of life, and perceived labour pain. The available evidence suggests potential positive effects; however, findings related to obstetric outcomes such as mode of delivery and birth weight remain limited and inconsistent.

The low-impact nature of water-based exercise may support healthy gestational weight management, reduce joint stress, and improve musculoskeletal comfort. No adverse maternal or foetal outcomes were reported in

the included studies; however, these conclusions are based on a small number of studies and should be interpreted with caution.

Overall, aquatic exercise may be considered a supportive option within prenatal care. However, stronger clinical recommendations require further high-quality, large-scale randomized controlled trials with standardized protocols and diverse populations.

AUTHORS CONTRIBUTIONS

All authors meet the criteria for authorship in accordance with established ethical guidelines. Contributions are specified according to the CRediT (Contributor Roles Taxonomy) as follows: Conceptualisation: Elga Zajmi, Bardhyl Misja. Methodology: Elga Zajmi, Bardhyl Misja. Formal analysis: Elga Zajmi. Investigation: Elga Zajmi. Data curation: Elga Zajmi. Writing – original draft: Elga Zajmi. Writing – review & editing: Elga Zajmi, Bardhyl Misja. Supervision: Bardhyl Misja.

All authors have critically reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

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