



Effectiveness of Dance Exercise on Low Back Pain in Pregnant Women : A Scoping Review

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ABSTRACT

Background: Low back pain is one of the most common complaints among pregnant women, with a prevalence of 60% to 70%. In some cases, the condition can be severe enough to result in disability, which can have a significant impact on the individual's ability to function. It is believed that exercise during pregnancy has the potential to reduce the intensity of back pain and prevent disability. **Objective:** To conduct a comprehensive review of the existing literature and evaluate the evidence pertaining to the efficacy of dance exercise in alleviating low back pain in pregnant women. **Methods:** The methodology used was a scoping review conducted according to five-step framework. This involved the initial identification of the review question, which was facilitated by the PICO framework (population, intervention, comparison, and outcomes). The subsequent literature search was conducted using six databases, namely PubMed, Science Direct, Wiley, Crossref, Cochrane and grey literature. Articles were selected based on the application of predetermined inclusion and exclusion criteria. Data charting, critical appraisal, and collection, summarization, and reporting of results were also performed according to the aforementioned framework. **Results:** 15 articles met the eligibility criteria and were assessed. Four themes emerged, namely the purpose of dance exercise intervention characteristics, effectiveness of dance exercise, factors affecting dance exercise, safety and feasibility of dance exercise. **Conclusion:** Dance exercise has been demonstrated to be an efficacious intervention for the alleviation of low back pain during pregnancy, particularly in the third trimester.

Keywords: Dance therapy, Physical exercise, Low Backache, low back pain, pregnant woman

ABSTRAK

Latar belakang : Nyeri punggung bawah pada kehamilan adalah keluhan yang paling umum dialami oleh ibu hamil, dengan prevalensi berkisar antara 60% hingga 70%, bahkan 8% di antaranya mengalami kecacatan serius yang berdampak besar pada kualitas hidup mereka. Aktivitas olahraga selama masa kehamilan memiliki potensi untuk mengurangi intensitas nyeri punggung serta mencegah kecacatan. **Tujuan** untuk memetakan *literature* dan melakukan *review evidence* terkait dengan efektifitas dance exercise terhadap nyeri punggung bawah pada Ibu Hamil. **Metode :** metode *scoping review* digunakan berdasarkan lima langkah, yaitu mengidentifikasi pertanyaan *review* dengan bantuan *framework PICO (population, Intervention, Comparison and Outcoma)*, pencarian literatur dengan menggunakan 6 database yaitu *PubMed, Science Direct, Wiley, crossref, Cohrane* dan *grey literature*, seleksi artikel berdasarkan kriteria inklusi dan eksklusi yang telah ditetapkan, data charting, *critical appraisal* untuk menilai kualitas artikel dan mengumpulkan, meringkas serta melaporkan hasil. **Hasil :** 15 artikel yang memenuhi kriteria *eligibility* dan memiliki grade. Empat tema muncul adalah tujuan karakteristik intervensi *dance exercise*, efektifitas *dance exercise*, faktor-faktor yang mempengaruhi *dance exercise*, keamanan dan kelayakan *dance exercise*. **Kesimpulan :** *Dance Exercise* telah terbukti sebagai intervensi yang berkhasiat untuk meringankan nyeri punggung bawah selama kehamilan, terutama pada trimester ketiga.

Kata kunci: *Terapi tari, Latihan fisik, Nyeri punggung bawah, nyeri punggung bawah, wanita hamil.*

INTRODUCTION

Low back pain is a prevalent concern among pregnancy, frequently attributable to the physiological and hormonal alterations that occur within the body during gestation (Baran et al., 2022). These changes include increased weight, shifting center of gravity, and hormonal relaxation of ligaments, all of which can place additional stress on the lumbar spine and surrounding muscles. Traditional treatment approaches for LBP in pregnancy often include physical therapy, medication, and rest. However, alternative forms of exercise, such as dance, have gained attention for their potential benefits in managing LBP during pregnancy. (Aparicio et al., 2023).

During pregnancy, a woman's body undergoes significant anatomical and physiological changes. The growing fetus increases the anterior load on the spine, shifting the center of gravity forward and often leading to hyperlordosis, a condition characterized by an exaggerated inward curve of the lower back (Amayri et al., 2023). This shift increases mechanical stress on the lumbar region and may result in muscle fatigue, stiffness, and pain (Daneau et al., 2022). Additionally, the hormone relaxin is released in higher quantities during pregnancy, leading to the relaxation of ligaments and joints to prepare the body for childbirth. While necessary, this process can also reduce spinal stability and exacerbate LBP. (Sencan et al., 2018).

Traditional methods for managing LBP in pregnancy include physical therapy, which typically focuses on strengthening and stabilizing the core muscles, improving posture, and enhancing flexibility (Lukmanulhakim & Awaludin, 2019). Medications such as acetaminophen are often recommended for pain relief, although their use is limited due to potential side effects and risks to the fetus (Purnamasari et al., 2019). Rest and ergonomic adjustments, such as using supportive pillows and maintaining proper body mechanics, are also commonly advised. However, these methods may not always provide adequate relief and can sometimes lead to physical inactivity, which might worsen muscle weakness and pain in the long term. (De Sousa et al., 2019).

Dance exercise represents a dynamic and engaging alternative to traditional LBP management techniques (Close et al., 2014.) It combines rhythmic movements, music, and often social interaction, which can enhance adherence to the exercise regimen and provide psychological

benefits. Dance forms such as Zumba, belly dancing, and prenatal-specific dance classes are designed to be safe and enjoyable for pregnant women, offering a holistic approach to fitness and pain management (Aparicio et al., 2023). Several mechanisms underlie the effectiveness of dance exercise in reducing LBP during pregnancy. Firstly, dance exercises improve overall body strength and flexibility, particularly in the core and lower back muscles. Strengthening these muscles enhances spinal stability and reduces the mechanical load on the lumbar spine (Shiri et al., 2018).

Secondly, dance has been demonstrated to promote better posture and body awareness, which can assist pregnant women in maintaining proper alignment and reducing the risk of developing hyperlordosis (Toberna et al., 2020). The rhythmic movements and stretching involved in dance can alleviate muscle tension and improve circulation, further reducing pain and discomfort (Horter et al., 2020). In addition to physical benefits, dance exercise can also have significant psychological advantages (Jones et al., 2014). Pregnancy can be a stressful time, and LBP can exacerbate feelings of discomfort and anxiety. (Rodríguez-Blanke et al., 2019).

Engaging in dance provides a positive and enjoyable outlet for stress relief, which has been demonstrated to promote the release of endorphins—natural painkillers and mood enhancers. Furthermore, the social aspect of group dance classes can provide emotional support and a sense of community, thereby reducing feelings of isolation and improving overall well-being (Baran et al., 2022). The impact of dance training on low back pain (LBP) in pregnancy has been the subject of several studies (Virgara et al., 2018). Research shows that when pregnant women engage in regular dance exercise, they experience significantly reduced pain intensity and improved functional mobility as compared to those who do not participate in such activities (Baran et al., 2022). Classes should emphasize gentle, controlled movements, proper warm-up and cool-down periods, and modifications for different stages of pregnancy. Informing pregnant women about the positive effects of dance and encouraging them to participate in safe and appropriate classes can improve their overall health and well-being. Providing resources such as information on local dance classes, instructional videos, and supportive online communities can help make dance exercise more accessible. In addition, ongoing research and evaluation of dance exercise programs can provide a better sense of their effectiveness and inform best practices for implementation.

METHOD

This article employs a methodological approach known as "scoping review," a common and popular method for analyzing research evidence. The aim of this scoping review is to provide an overview of the existing literature on a given topic and to map the volume and nature of the literature in that area. This study examines the efficacy of dance exercise in alleviating low back pain in pregnancy, employing evidence-based methods in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Page *et al.*, 2021). The research techniques employed included systematic database searching, manual searching of reference lists, and consultations with subject matter experts to identify pertinent studies not identified through the initial search process (Munn et al., 2018).

Formulating the Review Question

The definition of the population encompasses the delineation of the group of individuals or patients that the study aims to investigate or target. This may include characteristics such as age, gender, medical condition, or other pertinent demographics. The term "intervention"

pertains to the treatment, therapy, diagnostic test, or exposure that is being contemplated for assessment within the study. This component outlines what is being done to or with the population of interest. Thirdly, Comparison involves identifying the alternative to the intervention being considered. This could be a different treatment, placebo, no treatment, or another standard of care. Lastly, the Outcome specifies the effect or result that the intervention is expected to have on the population. This could include clinical outcomes, patient-reported outcomes, adverse effects, or other measurable impacts relevant to the study's objectives (Nishikawa-Pacher, 2022).

Table 1
PICO Framework

P (Population)	I (Intervention)	C (Comparison)	O (Outcome)
Pregnant woman	Dance Exercise (Aerobic, pilates, bally dance, muscular stretching)	Physical Activity	The incorporation of dance exercises into a pregnant individual's routine has been demonstrated to assist in the mitigation of low back discomfort, both in terms of its intensity and frequency.

Identifying Relevant Articles

To identify relevant articles in this scoping review, Understanding the structure and content of a paragraph in an article is very important to identify it correctly. A paragraph usually consists of a main sentence that expresses the main idea, followed by explanatory sentences that support or develop that idea. Focusing on sentence structure and the logical relationships between them can help you clearly understand the message conveyed in the paragraph. The following criteria were employed in the selection of studies for this scoping review:

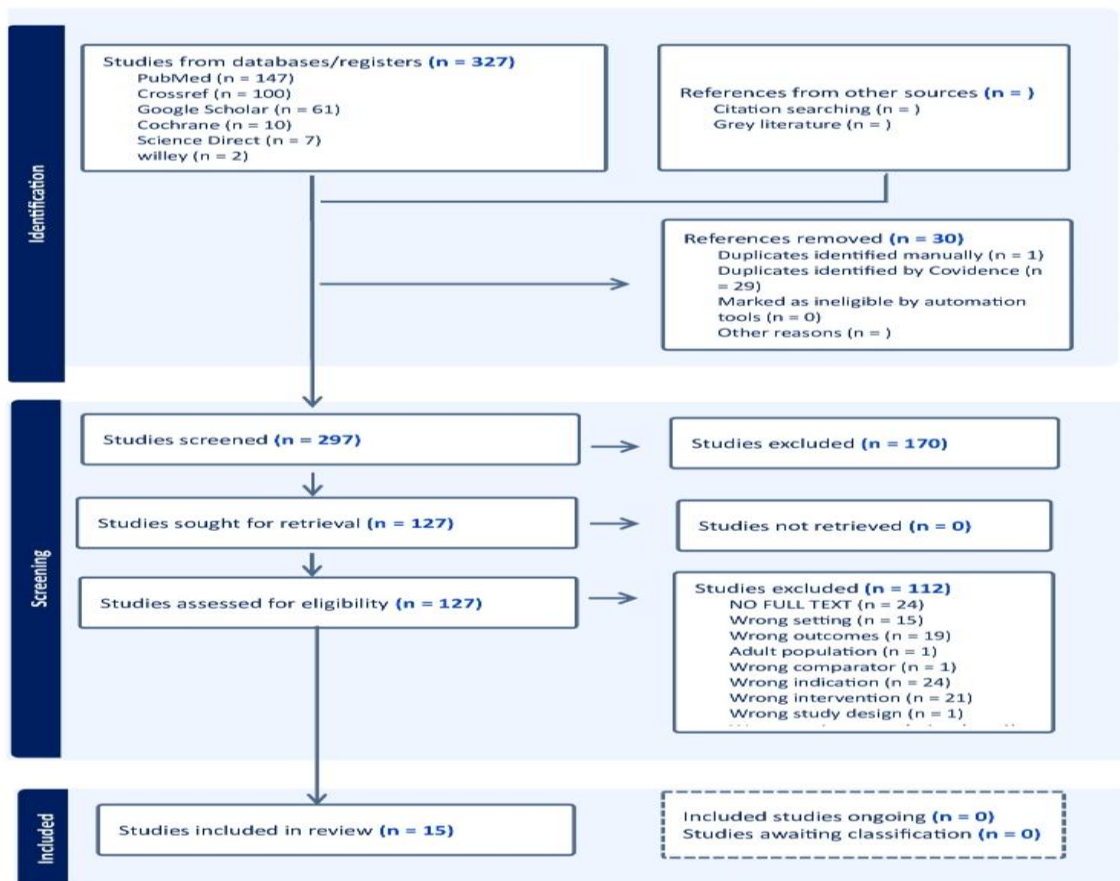


Figure 2. PRISMA Flowchart

Data Charting

Data mapping involves the process of organizing and structuring information within a paragraph to understand its underlying relationships and patterns. It typically entails identifying key concepts, their interconnections, and the overall flow of ideas presented in the text.

Table 2.
Data Charting

No	Title/ Author/ Year	Coun try	Objective	Meth od	Data collection	Participants/ Number of Samples	Results	Gra des
A1	Effect Of Physical Activity On Low Back Pain In Pregnant Women(Baran et al., 2022)	Polan d	Evaluatin g physical activity and its impact on the prevalenc e of low back pain	Cross - sectio nal	The interview is based on an anonymou s questionna ire with 30 questions and a visual analog scale (VAS).	118 women aged 23 - 42 years	Physical activity as a method of pain management compared to prevention of back pain (p=0.010).	A
A2	The Effect of Pilates on Pain in Pregnant Women(Reisi, 2021)	Iran	Measurin g the effect of Pilates to reduce pain in pregnant women.	Doubl e- blind rando mized clinic al trial	visual analog scale (VAS) according to Bourbanis, and checklist (ÿ) or circle (O) the number on the pain scale according to particular interview.	135 women met the inclusion criteria, 75 people left the study because they were concerned about safety issues and were not sure about the efficiency of the study. Total sample was 60 people	Results after intervention, back pain lower (0.001) and pelvic pain (P<0.001) were significantly lower in the intervention and control.	A
A3	The correlation between pregnancy-related low back pain and physical fitness was evaluated by an index system of maternal physical fitness test(Zhou et al., 2023)	Brazi l	Evaluate physical fitness during pregnanc y and analyze the relationsh ip between pregnanc y-related low back pain (LBP) and the physical fitness of pregnant women.	Quasi Exper iment	Physical fitness test system with Oswestry Disability Index (ODI)	180 participants were recruited and classified into middle gestational age group (14-28 weeks) and late gestational age group (28-37 weeks	LBP is negatively related to the heel lifting movement during standing for 20 seconds (p<0.01) and buttock movement while standing for 30 seconds (p<0.01 left, p<0.05 right.	A
A4	Effect of Pregnancy Exercise on Lower	Indon esia	The effective	Quasi experi	Pre and post test	30 third trimester	Paired sample t-test	A

					and post test			
A7	Effect of a regular exercise program on Pelvic Girdle and Low Back Pain in previously inactive pregnant women: A randomized controlled trial(Haakstad & Bø, 2015)	Norway	Find out what participation in the class is Group fitness for pregnant women can prevent and treat pain pelvic and lower back pain	Observer-blinded randomized controlled trial.	The interview questionnaire also contained 2 yes/no questions regarding disability or the severity of PGP/LBP	105 women were recruited to the trial with visits at 12–24 weeks (early), 36–38 weeks (after intervention), and 6–8 weeks postpartum.	There is no statistically significant difference between exercisers and controls reported 2 conditions after the intervention (pelvic girdle pain	A
A8	Pilates-based therapeutic exercise for pregnancy-related low back and pelvic pain: A prospective, randomized, controlled trial(Yıldırım <i>et al.</i> , 2023)	Turkey	Clarifying the impact of Pilates-based therapeutic exercise on disability, pain, mood, and sleep quality in patients with pregnancy-related lumbopelvic pain (LPP).	Single-blind randomized controlled study	Roland-Morris disability Questionnaire (RMDQ)], LPP [Visual Analog Scale (VAS)], mood [Hospital Anxiety and Depression Scale, Anxiety subscale (HADS-A) and Depression (HADS-D)], and <i>Pittsburgh Sleep Quality Index (PSQI)</i>]	34 pregnant women (mean age: 29.7±6.2 years; range, 18 to 40 years) in the second trimester (weeks 14–24) with LPP were randomly assigned to the control group and the Pilates group	There were statistically significant differences in disability, pain, and mood across groups Pilates (p<0.05). There was no significant difference between the two groups regarding PSQI (p>0.05).	A
A9	Effects of lumbar stabilization and muscular stretching on pain, disabilities, postural control and muscle activation in pregnant women with low back pain(Fontana	Canada	Comparing the effects of lumbar stabilization and stretching exercises for the treatment of	A pilot randomized clinical trial	Visual Analogue Scale (VAS) and McGill Pain Questionnaire and disability with the Roland	30 pregnant women between 19–29 weeks of gestation with low back pain were recruited, 24 of whom met the inclusion	Significant (P=0.03) reduction in pain (1.68 on the VAS and 4.81 on the McGill questionnaire) for both intervention s, but no	A

			given birth, and those who have never been pregnant or given birth.			birth, and 103 women who were not pregnant and had never given birth.		
A13	Impact of physical activity on postural stability in pregnant and postpartum women (Roshko & Skrzek, 2024)	Poland	Identifying the relationship between regular physical training in pregnant women during the second and third trimesters of pregnancy	experimental method	The postural stability test involved three 30-second tests of standing with eyes open, eyes closed, and visual control using a posturographic platform.	58 women completed the program, with 29 women in the exercise group and 29 women in the non-exercise group.	Regular physical exercise during pregnancy has a positive impact on postural stability and body coordination and can reduce back pain in pregnant women.	A
A14	The Effectiveness of Prenatal Yoga on Back Pain Intensity of Third-Trimester Pregnant Women in Surakarta (Oktavia et al., 2023)	Indonesia	To assess the effectiveness of prenatal yoga for back pain in third trimester pregnant women.	Quasi-experiment with group control pre-post test design	Oswestry Disability Index (ODI) questionnaire which has been translated into Indonesian.	A total of 30 respondents, divided into two groups: experimental group and control group.	Prenatal yoga reduces the level of back pain in third trimester pregnant women in Surakarta with a p-value of 0.001 (p>0.05).	A
A15	Birth Ball Therapy to Reduce the Intensity of Labor Pain (Paninsari et al., 2021)	Indonesia	The effect of birth ball therapy on pain intensity during labor.	Pre-experimental	Measuring pain intensity using the facial scale (FPRS).	50 respondents	There is a significant effect of birth ball therapy on the intensity of labor pain.	A
	A Cross-Sectional Study (Dudonien, 2023)		perceptions about the effects of exercise during pregnancy and comparing pregnant women, those who have		online questionnaire distributed through social networks related to pregnancy.	between 18-55 years. There were three groups divided almost evenly: 91 women who were pregnant, 97 women who were not pregnant but had given	aims to maintain body fitness (58%), reduce back and pelvic pain (55%), and facilitate childbirth (51%).	

Assessing Article Quality with Critical Appraisal

Critical research in the context of research methods involves a thorough examination and questioning of existing theories, practices, and assumptions within a particular field. This approach aims to uncover biases, power structures, and underlying ideologies that influence knowledge production. By critically analyzing these elements, researchers can challenge the

status quo, propose new frameworks, and contribute to the development of more inclusive and equitable practices (Al-Jundi & Sakka, 2017). In order to ascertain the category or criteria applicable to each question, the researchers have employed a critical appraisal process. This has involved establishing boundaries for the aforementioned categories and criteria.

0 : In the event that an answer is absent, it is classified as "unanswered."

1 : If the answer is present but not implemented, it is classified as "narrated but not implemented."

2 : If the answer is present but unclear or incomplete, it is classified as "narrated but unclear/incomplete."

3 : If the answer is present and complete, it is classified as "narrated and complete and detailed."

In the subsequent step, the researchers categorize the total score boundaries based on the type of research, as follows:

Table 3
Critical Appraisal Terms and Conditions

Research Method	Scale	Total Score Boundaries	Grade	Categori
RCT	0 = No	27-39	A	Excelent
	1 = Not conducted	14-26	B	Good
	2 = unclear	0 -13	C	Not Good
	3 = Ya			
Quasi Eksperimental	0 = No	18-27	A	Excelent
	1 = Not conducted	10-18	B	Good
	2 = unclear	0-9	C	Not Good
	3 = Ya			
Cross sectional	0 = No	19-24	A	Excelent
	1 = Not conducted	9-18	B	Good
	2 = unclear	0-8	C	Not Good
	3 = Ya			

Table 4.
Critical Appraisal metode Randomize Control Trial Assessment

No	Question	Article Assessment						
		A2	A5	A7	A8	A9	A10	A11
1	Was the randomization process adequately described and carried out?	3	3	2	3	3	3	3
2	Was the randomization process adequately described and implemented?	3	2	3	3	3	3	3
3	Were the treatment groups similar at the start?	3	3	3	3	3	3	3
4	Were the participants blinded to the treatment assignments?	2	3	3	2	3	3	3
5	Were the treatment providers blinded to the intervention assignments?	3	3	2	3	3	3	3
6	Were the outcome assessors blinded to the intervention assignments?	3	3	3	3	3	3	3
7	Were the inclusion and exclusion criteria clearly defined?	3	3	3	3	2	3	3
8	Were participants, clinicians, and outcome assessors blinded to the intervention?	3	3	3	3	3	3	3
9	Were all participants who entered the trial properly accounted for at its conclusion?	3	3	3	3	3	3	3
10	Were the outcome measures valid, reliable, and appropriately defined?	3	3	3	3	3	3	3
11	Was the follow-up period adequate for observing the outcomes?	3	3	3	3	3	3	3
12	Were the statistical methods used appropriate for the study design?	3	3	3	3	3	3	3

13	Were potential conflicts of interest or funding sources reported and considered?	3	3	3	3	2	3	3
Total Score		38	38	37	38	37	39	39
Grade		A	A	A	A	A	A	A

Tabel 5
Critical Appraisal Design Quasi Eksperimental Assessment

No	Question	Article Assessment					
		A3	A4	A6	A13	A14	A15
1	Was it evident from the study what was meant by "cause" and what was meant by "effect," such that there was no ambiguity regarding the order of the variables?	3	3	3	3	3	3
2	Were the participants taken into account in the comparable comparison?	3	3	3	2	3	3
3	Did participants in the comparison receive similar care or treatment in addition to the exposure or intervention of interest?	3	2	3	3	3	3
4	Was a control group present?	2	1	1	3	3	2
5	Was the outcome measured more than once before and after the exposure or intervention?	3	3	3	1	3	2
6	Was follow-up done to the end, and if not, were the variations in follow-up between the groups sufficiently explained and examined?	2	3	3	3	3	3
7	Was the data collected from the participants included in the comparison obtained through the same methodology?	3	3	3	3	3	1
8	Were the results reliably measured?	3	2	2	2	3	3
9	Was an appropriate statistical analysis used?	3	2	2	3	3	3
Total		25	22	23	24	27	23
Grade		A	A	A	A	A	A

Tabel 6
Critical Appraisal Design Cross Sectional Assessment

No	Question	Article Assessment	
		A 1	A12
1	Were the objectives of the study clearly stated?	3	3
2	Was the study population clearly delineated and representative of the target population?	3	2
3	Was the sample size sufficient to achieve the study objectives?	3	3
4	Were the data collection methods adequately delineated and suitable for achieving the study's objectives?	3	3
5	Were potential sources of bias (such as selection bias or measurement bias) addressed?	2	3
6	Were the main findings clearly presented and supported by appropriate statistical analyses?	2	3
7	Were limitations of the study acknowledged and discussed?	3	3
8	How generalizable are the study findings to the broader population or specific groups?	3	2
Total		22	22
Grade		A	A

RESULTS

Characteristics of Articles by Country

The articles used in this scoping review were drawn from 5 articles from developed countries and 10 articles from developing countries.

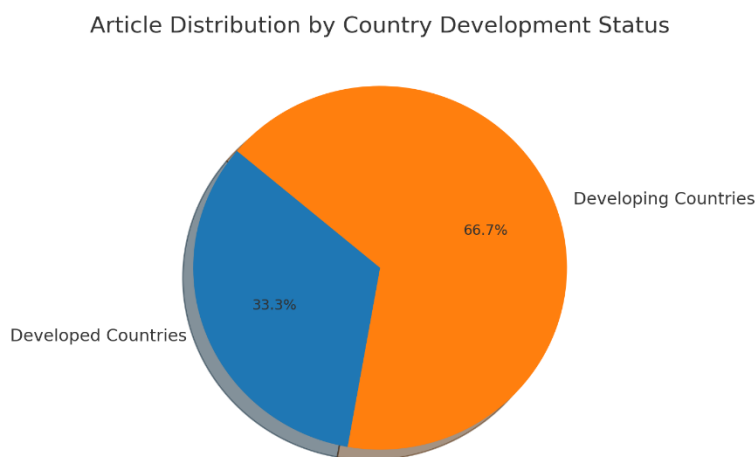


Figure 3. Diagram Characteristics of Articles by Country

Article Characteristics by Study Design

Based on the research design, all articles are categorized as quantitative research. Of the 15 articles selected, 7 articles used a randomized control trial design, 6 articles used a quasi-experiment design, and 2 articles used a cross-sectional design.

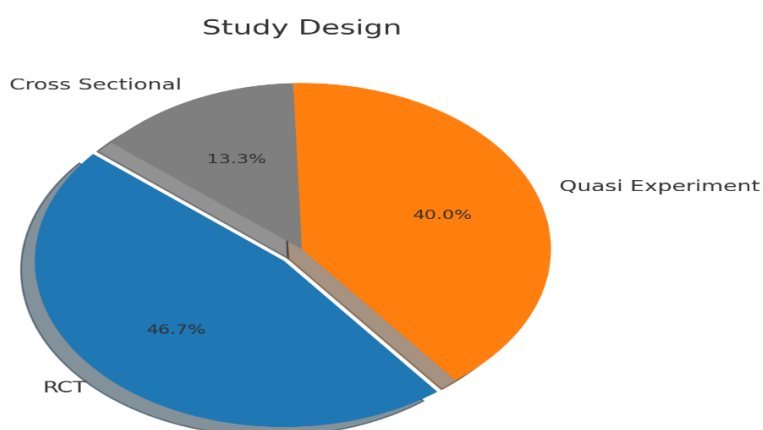


Figure 4. Study Design

Article Characteristics Based on Journal Quality

Based on the quality of articles that have been carried out through critical assessment using the Joana Briggs Institute (JBI), all articles (15) fall into the grade A category.

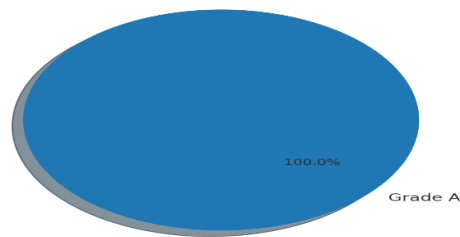


Figure 5. Grade Diagram

Mapping

The findings of the review of several topics pertinent to the overarching focus of the review are presented below :

Tabel 7
Thematic Analysis

No	Theme		Sub Theme	Article
1.	Characteristics of Dance Exercise Intervention	a	Types of Dance Exercise	A2, A4, A6, A14,A15
		b	Duration, Frequency, and Intensity of Dance Exercise	A2, A5,A7, A8, A14, A15
2.	Effectiveness of Dance Exercise on Lower Back Pain	a	Reduction in Lower Back Pain Score/Intensity	A1, A4, A6, A8, A10, A11, A12, A14, A15
		b	Perubahan aktifitas fungsional	A2, A6, A8, A9, A11, A14, A15
3.	Factors Influencing the Effectiveness of Dance Exercise	a	Gestational Age and Parity	A1, A13
		b	Body Mass Index (BMI)	A1,A2
		c	Occupation and Physical Activity	A1, A3, A12
		d	History of Musculoskeletal Pain	A1,A3, A15
4.	Safety and Feasibility of Dance Exercise	a	Side Effects of Dance Exercise	A1,A2,A4,A7, A8, A14, A15
		b	Barriers to Performing Dance Exercise	A7, A14
		c	Perception of Comfort and Satisfaction	A1, A6, A8, A10,A11, A14,A15

DISCUSSION

Dance Exercise Intervention Characteristics

Types of Dance Exercise

Based on the articles reviewed, all types of exercises such as pilates (A2), pregnant exercises (A4), core stability exercise (A6), prenatal yoga (A14), and birth ball (A15) aim to reduce physical pain experienced during pregnancy, especially back pain. Research by Muzayyana et al (2024), which demonstrated that prenatal exercise is an effective intervention for the management of backache in pregnancy. Research by Puri et al (2023) also revealed that core stability exercises play a role in increasing body stability and reducing pressure on the spine, thereby reducing the likelihood of back pain. Furthermore,

Pilates training has been demonstrated to be an efficacious non-pharmacological intervention for the reduction of back pain during pregnancy, particularly the case during the third trimester (Indriyani et al., 2023).

Duration, Frequency and Intensity of Dance Exercise

The majority of studies demonstrate that this exercise is performed twice a week with a duration per session between 30 and 60 minutes and intensities that range from low to moderate (A2) (A5) (A7) (A8) (A15). However, there are also studies (A14) the results demonstrate that a single weekly exercise session of 45 minutes is sufficient to elicit the desired outcomes and the intensity can be flexibly adjusted to the condition of each pregnant woman. This flexibility in intensity regulation is important to ensure comfort and safety during exercise. This is consistent with the previously stated position with research by Claiborne et al (2023) which states that longer exercise durations, such as more than 35-40 minutes per session, can provide health benefits to mothers without adversely affecting pregnancy. Furthermore, extended exercise duration has been demonstrated to enhance glycemic response and mitigate the likelihood of excessive weight gain during pregnancy. It has been shown that regular, moderate to vigorous physical activity can mitigate the experience of physical discomfort, including conditions such as constipation, back pain, and sleep disturbances (Calbara & Budiono, 2023). A further study has demonstrated that a higher frequency of pregnancy exercises is related with a reduced occurrence of back pain in pregnancy. The findings indicate that exercises performed more than four times effectively reduce the risk of backache (Veronica et al., 2021).

Effectiveness of Dance Exercise on Low Back Pain

Decrease in Low Back Pain Score / Intensity

Physical activity is considered by pregnant women as an effective way to manage pregnancy pain (A1) (A6) (A11). Pregnant gymnastics, pilates, prenatal yoga and birth ball therapy have a significant and effective effect in reducing the intensity of low back pain in pregnant women (A4) (A8) (A10) (A12) (A14) (A15). Research by Putri et al (2024) which states that yoga exercises, specifically designed for pregnancy, can help flex muscles, reduce tension, and improve body balance, all of which contribute to reducing back pain. This is also reinforced by research by Calbara & Budiono (2023) which states that physical activity is considered by pregnant women as an effective way to overcome various discomforts that often arise during pregnancy, including low back pain that is often experienced in the third trimester. However, other studies have shown that using a combination of gym ball exercises and lavender aromatherapy is an effective method to reduce labor pain intensity and increase maternal comfort. Therefore, this complementary therapy may be a beneficial alternative during the delivery process (Agustina et al., 2023). Other studies have demonstrated that prenatal yoga has a notable impact on reducing back pain in pregnant women in the third trimester (Fauziah et al., 2020).

Functional Activity Changes

The implementation of physical exercises, including Pilates, aerobics, prenatal yoga, and the use of a birth ball, led to a notable reduction in low back and pelvic discomfort among the intervention group when comparing the results to those of the control group (A2) (A6) (A8)

(A9). A training program combining aerobic exercise and resistance training was demonstrated to markedly diminish low back discomfort and low back discomfort among pregnant women (A11). Prenatal yoga has been demonstrated to alleviate physical discomfort, enhance muscle flexibility, and provide pain relief in the back, pelvis, and neck region. Consequently, pregnant women may perform daily activities with greater comfort and efficacy (Oktavia et al., 2023). This study demonstrate that the use of birth balls is an effective method for the alleviation of pain and the enhancement of functional activity during labor. This approach has the potential to markedly improve the comfort and efficacy of a labouring woman's experience (A15). Research Raidanti et al (2021) which reveals that birth ball exercises can help relieve pain and fatigue in mothers by increasing pelvic flexibility, increasing mobility, and supporting fetal position. A subsequent study demonstrated that the use of birthing balls significantly reduced the level of discomfort experienced during the active phase of labor (Fara & Sagita, 2023).

Factors affecting the effectiveness of dance exercise

Age of Pregnancy

The findings of studies (A1) and (A13) indicate that the optimal timeframe for engaging in exercise during pregnancy is during the second and third trimesters. It has been demonstrated that the regular practice of physical activity during this period confers advantages in enhancing postural stability and mitigating the likelihood of falls in pregnant women. Dewi & Novita's research (2018) states that pregnancy exercises are recommended to be started at 28 weeks to 35 weeks of gestation. This is also reinforced by research by Nafiah et al (2024) pregnant gymnastics is most appropriate in the second to third trimester, especially 23-35 weeks of gestation, because it is effective in increasing postural stability, reducing the risk of falls, and physically preparing pregnant woman in the context of their experience of childbirth.

Body Mass Indeks

The study (A1) stated that there was an increase in the mean BMI of the study respondents after pregnancy compared to before pregnancy. Almost half of the study participants (A2) had a BMI above normal, which can be an additional health risk factor during pregnancy. This conclusion is supported by the findings of Trial (2016), which indicate that pregnant women with a normal body mass index (BMI) (18.5–24.9) are advised to engage in regular prenatal yoga for a minimum of 45 minutes, at least twice a week, to reduce the incidence of back pain and facilitate the labor process. Furthermore, research has demonstrated that dietary and physical activity habits during pregnancy can effectively mitigate weight gain, including in populations with diverse BMI (Body Mass Index) ranges (Khan, 2017).

Work and physical activity

It is estimated that approximately 72% of women will endure low back discomfort during the course of their pregnancy (A1), which can be reduced by purposeful physical activity (A13), yet only 24.4% of 291 women were aware of the impact of exercise during pregnancy, while 44% were unaware of its impact, and 52.6% were unsure whether exercise could be prescribed (A12). Research of Syalfina et al (2021) low back pain is common during pregnancy, especially in the third trimester, caused by changes in hormones, weight, and posture, but can be reduced by light physical activity, pregnant gymnastics, relaxation

techniques, and massage. Another study demonstrated a significant correlation between work posture and the incidence of low back pain (Awaludin, 2019).

History of Musculoskeletal Pain

In research (A1) (A13) (A15) it was stated that the majority of pregnant women experience low back pain during the course of their pregnancy. A study conducted by Arummega et al (2022) indicates that approximately 70% of pregnant women experience back pain, which typically commences in the second trimester and reaches its zenith in the third trimester. This is also reinforced by the research of (Jannah et al., 2019), the incidence of acute low back pain was 55.6%, while chronic pain was present in 35.4% of cases. Furthermore, muscle cramps represent a prevalent musculoskeletal dysfunction, with the highest prevalence occurring during the third trimester of pregnancy.

Dance Exercise safety and feasibility

Side Effects of Dance Exercise

Most pregnant women experience increased low back pain during physical exercise, including dancing, persistent pain after activity (A1) (A4) (A7). Meanwhile, the study results state that pilates (A2) (A8) prenatal yoga (A14) and birth ball (A15) are considered safe and beneficial during pregnancy and research reports that there are no adverse side effects from the implementation of prenatal yoga, and this exercise actually helps reduce physical discomfort during pregnancy. This is consistent with the findings of Hidayati's (2019) research, which indicates that dance exercise, when performed correctly, does not result in any significant adverse effects and can enhance the production of endorphins and enkephalins, which have been demonstrated to alleviate pain and anxiety during labor.

Barriers to Dance Exercise

One of the main barriers identified was that the exercise program was perceived as demanding and time-consuming, leading to low adherence among previously sedentary participants (A7) (A14). Research by Jha et al (2023) that the main barriers encountered were making time for exercise and adherence to exercise programs, especially for those who were previously sedentary. This is also reinforced by research which revealed that the barriers identified in relation to doing dance exercise were high exercise intensity and time constraints, which were a challenge for previously inactive individuals, even though classes had been scheduled in the evening (Claiborne et al., 2023).

Perceived comfort and Mood

Pregnant women who participated in this physical activity felt an improvement in physical and mental well-being and felt more prepared to face labor (A1) (A8) (A11). Dance exercise, not only helps reduce pain intensity but also improves quality of life, sleep quality and comfort during pregnancy (A6) (A10) (A14) (A15). Research of Muzayyana et al (2024) that dance exercise provides psychological benefits by reducing stress levels and increasing a sense of calm during pregnancy. This conclusion is corroborated by research indicating that dance exercise programs are an efficacious intervention for the mitigation backache and the enhancement of comfort and satisfaction in pregnancy. Additionally, non-

pharmacological methods, such as prolonged breath relaxation and massage, have been shown to alleviate pain and promote a sense of calm (Syalfina et al., 2021).

LIMITATION OF THE STUDY

This study had limitations in finding specific articles on dance exercise, The variety of dance exercise protocols used in the studies was very diverse, making it difficult to compare effectiveness between studies.

CONCLUSIONS AND SUGGESTIONS

Dance exercise has been demonstrated to be an efficacious intervention for the alleviation of pain in the lower back during pregnancy, particularly in the third trimester. These exercises not only help decrease the intensity of pain, but also increase postural stability and flexibility, which are important for maintaining the comfort and health of pregnant women. Adjustments in exercise duration and intensity, such as 30-60 minute sessions twice a week, have been shown to provide positive benefits without risk to maternal and fetal health. Furthermore, dance exercise has been demonstrated to confer psychological benefits, including a reduction in stress levels and an enhancement of feelings of calm.

It is recommended that health practitioners, especially midwives, encourage pregnant women to actively engage in pregnancy exercise programs or other physical activities appropriate to their condition, especially during the second and third trimesters. Midwives need to adjust the intensity of the exercise based on individual conditions and provide support in the form of education about the benefits of the exercise. Midwives are also expected to overcome barriers faced by pregnant women in participating in exercise programs by providing flexible solutions and supporting their consistent involvement.

ETHICAL CONSIDERATIONS

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