Deanship of Graduate Studies

Al-Quds University

Prevalence of Low Back Pain After Epidural Analgesia in Postpartum Palestinian Women and the Impact of Home Exercise Programs on Alleviating it

Sawsan Mohammad Aliyan

M.Sc. Thesis

Jerusalem - Palestine

1447-2025

Prevalence of Low Back Pain After Epidural Analgesia in Postpartum Palestinian Women and the Impact of Home Exercise Programs on Alleviating it

Prepared by:

Sawsan Mohammad Aliyan

B.Sc. Physiotherapy / Bethlehem University

Supervisor:

Dr. Esra' Hamdan

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Physiotherapy-Deanship of Graduate Studies- Al-Quds University

1447-2025

Deanship of Graduate Studies

Al-Quds University

Physiotherapy / Faculty of Health Professions

Thesis Approval

Prevalence of Low Back Pain After Epidural Analgesia in Postpartum Palestinian Women and the Impact of Home Exercise Programs on Alleviating it

Prepared By: Sawsan Mohammad Aliyan

Student No.: 22312255

Supervisor: Dr. Esra' Hamdan

Master thesis submitted and accepted, Date:

The names and signatures of examining committee members are as follows:

Head of Committee: Dr. Esra Hamdan Signature:

Internal Examiner: Dr. Hadeel Halaweh Signature:

External Examiner: Dr. Zenat Misk Signature:

Jerusalem – Palestine

1447-2025

Dedication

With profound gratitude and deep affection, I dedicate this thesis to my beloved family, whose steadfast support and unconditional love have been the foundation of my strength.

To my father, whose quiet wisdom, steady guidance, and unwavering belief in me have shaped my path and grounded me in moments of doubt.

To my mother, whose endless sacrifices, heartfelt prayers, and boundless love have been a constant source of light and courage.

To my entire family, whose encouragement and patience surrounded me with strength and reassurance at every stage of this journey.

And to my supervisor, Dr. Esra' Hamdan, whose mentorship, dedication, and insightful guidance were invaluable throughout the course of this research, thank you for believing in me and helping bring this work to life.

Declaration

I, Sawsan Mohammad Aliyan Aliyan, hereby declare that this Master's thesis, titled "Prevalence of Low Back Pain After Epidural Analgesia in Postpartum Palestinian Women and the Impact of Home Exercise Programs on Alleviating it ", submitted in partial fulfillment of the requirements for the Master of Physiotherapy degree at Al-Quds University, is entirely my own original work.

I further declare that:

This work has not been submitted previously, in whole or in part, for any degree, or other academic qualification at Al-Quds University or any other institution.

All sources of information, ideas, data, and literature used in this thesis have been properly acknowledged and fully referenced in accordance with the academic guidelines of Al-Quds University.

I have read and complied with the University's research ethics policies. I accept full responsibility for ensuring that all research procedures were conducted ethically, and that the rights, well-being, and confidentiality of all participants were respected.

I have identified potential risks associated with this research, obtained all necessary ethical approvals (where applicable), and ensured that all copyrighted material included in this thesis is used with appropriate permission.

Date: 17 December 2025

Student Signature: Sawsan Mohammad Aliyan

Acknowledgment

All praise and gratitude are due to Allah, the Most Gracious and Most Merciful, for granting me the strength, patience, and perseverance to complete this academic journey.

I would like to express my heartfelt thanks and deepest appreciation to my supervisor, Dr. Esra' Hamdan, whose unwavering guidance, expertise, and encouragement were instrumental throughout this research. Her dedication, insightful feedback, and sincere support made every step of this thesis a meaningful and enriching experience.

My sincere gratitude also extends to the faculty and staff of the Department of Physiotherapy at Al-Quds University for providing a supportive academic environment and valuable resources that contributed to the success of this work.

To the amazing mothers who participated in this study — thank you for your time, trust, and willingness to share your experiences. Your strength and resilience inspired the very heart of this research.

I am also thankful to my fellow colleagues and friends who stood by me with motivation, collaboration, and encouragement throughout the research process.

Lastly, I extend my appreciation to my family — your patience, love, and belief in me were the foundation that carried me through this journey.

Prevalence of Low Back Pain After Epidural Analgesia in Postpartum Palestinian Women and the Impact of Home Exercise Programs on Alleviating it

By: Sawsan Mohammad Aliyan

Supervisor: Dr Esra' Hamdan

Abstract

Background: Postpartum low back pain (PPLBP) is a common musculoskeletal condition that can significantly impair functional recovery and quality of life after childbirth. Despite the widespread use of epidural analgesia during labor, its role in persistent postpartum pain remains controversial, and evidence from low- and middle-income settings is limited.

Objective: This study aimed to assess the prevalence of postpartum low back pain (PPLBP) among Palestinian women, examine the association between epidural analgesia and persistent pain, and evaluate the effectiveness of a home-based exercise program (HEP) in reducing pain and disability.

Methods: A two-phase design was used. Phase One was a cross-sectional survey of 414 postpartum women from the West Bank assessing PPLBP prevalence, risk factors, and pain management practices. Phase Two involved a pre–post intervention with 30 participants experiencing PPLBP. Participants completed a four-week physiotherapist-guided HEP delivered remotely. Outcome measures included the Numeric Pain Rating Scale (NPRS), Brief Pain Inventory (BPI), and Oswestry Disability Index (ODI).

Results: The prevalence of PPLBP was 82.4%, substantially higher than reported in other settings. No significant long-term association was found between epidural use and persistent pain. Younger age, elevated BMI, vaginal birth and lower parity were associated with higher pain intensity. Following the HEP, participants showed clinically significant improvements ($p=0.05$): NPRS scores decreased from 6.2 to 2.8, ODI from 38.7% to 18.4%, and BPI from 5.4 to 2.5. Adherence and satisfaction with the virtual program were high.

Conclusion: PPLBP is highly prevalent among Palestinian women and influenced more by demographic and physical factors than by epidural use. The HEP proved effective, feasible, and culturally appropriate, supporting its integration into postpartum care, especially in resource-limited settings.

Keywords: Postpartum low back pain, epidural analgesia, home exercise program, physiotherapy, maternal health, Palestine

Table of Contents

List of Tables

List of Figures

List of Appendices

Abbreviations

1. **(LBP):** Low Back Pain
2. **(PPLBP):** Postpartum Low Back Pain
3. **(NPRS):** Numeric Pain Rating Scale
4. **(BPI):** Brief Pain Inventory.
5. **(ODI):** Oswestry Disability Index
6. **(HEP):** Home Exercise Program
7. **(BMI):** Body Mass Index

Chapter One: Introduction

1.1 Background

Low back pain (LBP) refers to discomfort between the lower ribs and the buttocks, classified as acute, sub-acute, or chronic. It restricts movement, impacts quality of life and mental well-being, and can limit work and social interactions. LBP can be specific, stemming from identifiable spinal issues or referred pain from other body areas, or non-specific, with no clear cause (World Health Organization, 2023). Postpartum low back pain (PPLBP) is defined as pain occurring in the lumbar or posterior pelvic areas that begins during pregnancy or shortly after delivery and persists into the postpartum period, typically lasting beyond the initial six weeks and potentially up to 18 months or more. This pain is often aggravated by physical activity or caregiving tasks and is frequently associated with risk factors such as pre-pregnancy LBP, physically heavy work, and multiparity. it is very common with studies showing that many women report LBP within the first year after delivery (Madzivhandila et al., 2023) (Ostgaard, 2016). For instance, recent study in 2023 in South Africa indicates that approximately 44%, 43.2% of women experience persistent LBP in the months following delivery (Madzivhandila et al., 2023a). While a study was done in 2016 in Sweden highlighted that over 67% of women experienced LBP immediately after giving birth, with 37% still reporting persistent pain after 18 months of birth (Ostgaard, 2016).

The use of epidural analgesia during labor, while effective for managing acute pain, has been associated with an increased risk of persistent PPLBP (Madzivhandila et al., 2023a). This connection raises concerns about the long-term effects of epidural analgesia on musculoskeletal health. Research indicates that epidural analgesia may alter pelvic and lumbar biomechanics, contributing to chronic pain (Halliday et al., 2022). Additionally, the postpartum period involves significant hormonal and musculoskeletal changes that can exacerbate the risk of LBP (S Chungade et al., 2020). Building upon this understanding of physiological and psychosocial contributors to postpartum recovery, recent research has turned attention to the prevalence and functional impact of PPLBP, particularly in low-resource settings where maternal health outcomes are more vulnerable. A study by Nawshin and Sanam (2023) found that 71% of postpartum women reported functional impairment due to LBP, with a mean ODI score of 26.1, indicating moderate disability. Notably, sitting was reported as the most aggravating factor (84.9%), and cesarean delivery was significantly associated with higher disability levels (Nawshin & Sanam, n.d.). Similarly, Malik et al. (2025) reported a 100% prevalence of postpartum LBP among primigravida women in Pakistan, with 89.8% experiencing moderate disability (Afiah Malik et al., 2025).

While many studies investigate the physiotherapeutic interventions for LBP after delivery, home exercise programs (HEPs) have shown promise in alleviating PPLBP, with evidence suggesting that regular physical activity can improve recovery and reduce pain levels (Ferreira & Alburquerque-Sendín, 2013). Specifically, home exercises focused on core stability and pelvic floor strengthening have been effective in enhancing functional outcomes and decreasing pain (Sakamoto et al., 2018). Collectively, these findings underscore the importance of evidence-based physical therapy interventions in effectively managing PPLBP and improving the quality of life for postpartum women. Understanding these postpartum physiological and musculoskeletal changes is essential for healthcare providers to appropriately address postpartum recovery and associated conditions such as PPLBP(Chauhan & Tadi, 2022).

1.2 Problem Statement:

The rising prevalence of chronic LBP after epidural analgesia during childbirth is a significant yet overlooked issue for Palestinian women. While epidurals are being increasingly commonly used for pain relief during labor, they can lead to PPLBP, affecting recovery and daily life. This is especially concerning for Palestinian women who may have limited resources and varying levels of postpartum care, making pain management challenging.

Conflicting research exists regarding the association between epidurals and chronic LBP, highlighting the need for culturally sensitive programs that address this issue among Palestinian women. Conventional pain relief approaches can be helpful, but they aren't always effective or accessible for all mothers. There’s also ongoing discussion about effective non-pharmacological interventions within the local healthcare system, such as physiotherapeutic HEPs, which have shown promise in reducing LBP among postpartum women. Thus, this research aims to fill the gap first in exploring the prevalence of epidurals and chronic LBP among the Palestinian women and then to investigate if a structured physical therapy HEP can be as a potential solution. By focusing on physiotherapeutic HEPs, the study acknowledges the practical challenges that many new mothers face and offers a way for them to manage their recovery independently as much as possible.

1.3 Significance of the Study:

As literature accumulated, it became evident that the prevalence of PPLBP was multifactorial, incorporating elements such as the type of analgesia administered, duration of labor, and specific complications associated with anesthetic techniques. Further Collectively, these theoretical perspectives indicate that while epidural analgesia serves as an effective pain management technique during labor, the potential biomechanical adjustments and psychological factors may interact, ultimately contributing to the incidence of PPLBP (Leffert, 2019; Wisner et al., 2014).

Additionally, psychosocial factors play a significant role in the etiology of PPLBP. Emotional well-being during and following childbirth influences pain perception, where increased anxiety or stress can amplify perceived pain levels (Kuhn et al., 2016; J. Wu et al., 2020). Thus, understanding the multifaceted interplay between these biomechanical, procedural, and psychological components is crucial for addressing PPLBP associated with epidural analgesia effectively. This comprehensive approach highlights the need for integrated care strategies that recognize the complexity of pain management in postpartum women (Leffert, 2019; Wisner et al., 2014).

Understanding these complexities, especially among Postpartum Palestinian women can guide clinical practices to mitigate such outcomes and highlight the importance of comprehensive pain education for parturient. Further research is needed to explore these interactions in greater detail to improve postpartum maternal health outcomes and quality of life. This brings the importance of exploring physiotherapy referral practices, culturally appropriate interventions, and effective physiotherapy strategies for managing PPLBP in particular home program exercises.

1.4 Study Questions:

1. What is the prevalence of PPLBP in Palestinian women who have undergone labor with epidural analgesia?
2. How effective is a structured HEP in reducing the intensity of LBP in Palestinian postpartum women who received epidural analgesia?
3. What impact does the HEP have on functional mobility and the ability to perform daily activities among Palestinian postpartum women?
4. Is exercise adherence to the HEP associated with greater improvement in PPLBP intensity, following the intervention?

1.5 Study Hypothesis

1. There is a significant difference in the prevalence of PPLBP between women who received epidural analgesia among Palestinian women and those who don’t.
2. Postpartum women who participate in a structured HEP will experience a statistically significant reduction in the intensity of LBP.
3. Participation in the physiotherapeutic HEP will lead to improved functional mobility and enhanced ability to perform daily activities among postpartum women.
4. Higher adherence to the prescribed HEP is associated with a greater reduction in PPLBP intensity scores after the intervention.

1.6 Study Objectives

1.6.1 Primary Objective:

1. To determine the overall prevalence of PPLBP among Palestinian women who delivered with and without epidural analgesia.
2. To compare the prevalence of PPLBP between women
3. To evaluate the effectiveness of a structured home exercise program (HEP) in reducing the intensity of PPLBP among women who received epidural analgesia.
4. To assess the impact of the HEP on functional mobility and the ability to perform daily activities in postpartum women.
5. To examine whether adherence to the HEP is associated with greater improvements in PPLBP intensity.

1.6.2 Secondary Objectives

1. To explore associations between PPLBP and maternal or obstetric factors such as age, parity, mode of delivery, body mass index (BMI), and history of low back pain.
2. To identify common pain management strategies used by postpartum women experiencing PPLBP.

1.7 Summary:

The study addresses the rising prevalence of LBP among Palestinian women after epidural analgesia during childbirth, a significant issue that impacts recovery and daily life in a resource-limited context. It highlights the need for culturally sensitive interventions due to conflicting existing research on epidurals and chronic LBP.

The study aims to examine the prevalence of PPLBP in women with and without epidurals and evaluate the effectiveness of a structured HEP in reducing pain intensity and improving functional mobility. It posits three hypotheses: a significant difference in pain prevalence between the two groups, a reduction in pain intensity for those participating in the exercise program, and improvements in mobility and daily functioning.

In summary, this research seeks to illuminate the challenges faced by postpartum women in Palestine and proposes practical solutions through HEPs, providing valuable insights for healthcare professionals in developing effective pain management strategies.

1.8 Definitons

1. **Low Back Pain (LBP):** Pain or discomfort localized below the costal margin and above the inferior gluteal folds, with or without leg pain. It is commonly classified as acute, subacute, or chronic based on duration. (European Guidelines for the Management of Acute Nonspecific LBP, 2004)
2. **Postpartum Low Back Pain (PPLBP):** A subtype of LBP that occurs during the postpartum period, typically within 12 months after childbirth, and is associated with physiological, biomechanical, and psychosocial changes related to pregnancy and delivery. (Wu et al., 2004; Sabino & Grauer, 2008)
3. **Epidural Analgesia:** A common method of pain relief during labor involving the administration of anesthetic agents into the epidural space of the spinal cord.
4. **Numeric Pain Rating Scale (NPRS):** A pain assessment tool where participants rate their pain intensity on a scale from 0 (no pain) to 10 (worst pain imaginable).
5. **Brief Pain Inventory (BPI):** A questionnaire that assesses the severity of pain and the impact of pain on daily functions.
6. **Oswestry Disability Index (ODI):** A standardized questionnaire used to measure a patient's permanent functional disability and assess the impact of back pain on daily life activities.
7. **Postpartum Period:** The time following childbirth during which the mother's body undergoes physiological recovery, typically categorized into acute, early, and late phases
8. **Home Exercise Program (HEP):** A structured set of physical exercises prescribed to be performed at home, often targeting specific muscle groups such as the core and pelvic floor, with the goal of reducing pain and improving function.
9. **Functional Mobility:** The ability to move independently and safely in various environments to carry out daily activities.
10. **Parity:** The number of times a woman has given birth to a viable offspring.
11. **Physically Demanding Job**: a job that involves significant physical exertion, requiring continuous use of strength, endurance, and body coordination for tasks like lifting, pushing, pulling, standing, or climbing, often with added weight or repetitive motion, impacting worker health and requiring high energy expenditure (Gebhardt & Baker, 2022).

Chapter Two: Reviewing the Literature

2.1 Theoretical Framework

2.1.1 Postpartum Low Back Pain

The postpartum period, often referred to as puerperium, begins after the placenta is delivered and lasts until the body fully recovers physiologically. This period is typically categorized into three distinct phases: the acute phase, which encompasses the first 24 hours post-delivery; the early phase, lasting up to 7 days; and the late phase, which extends from 6 weeks to 6 months. Each of these phases presents specific clinical considerations and challenges (Romano et al., 2010).

The postpartum period is marked by significant physiological and anatomical changes that can impact a woman's body and health. These changes include alterations in hormone levels, such as a decrease in estrogen and progesterone, which can affect mood and physical recovery (Chauhan & Tadi, 2022). Additionally, the body undergoes structural adjustments as it returns to its pre-pregnancy state, including changes in the musculoskeletal system that may contribute to the development of LBP (S Chungade et al., 2020). The abdominal muscles and pelvic floor may also experience weakness or dysfunction due to the stresses of pregnancy and childbirth, further contributing to discomfort or pain (J. C. Wu et al., 2023).

2.1.2 Epidural analgesia in vaginal delivery

2.2.1.1 Overview and Mechanism of Epidural Analgesia

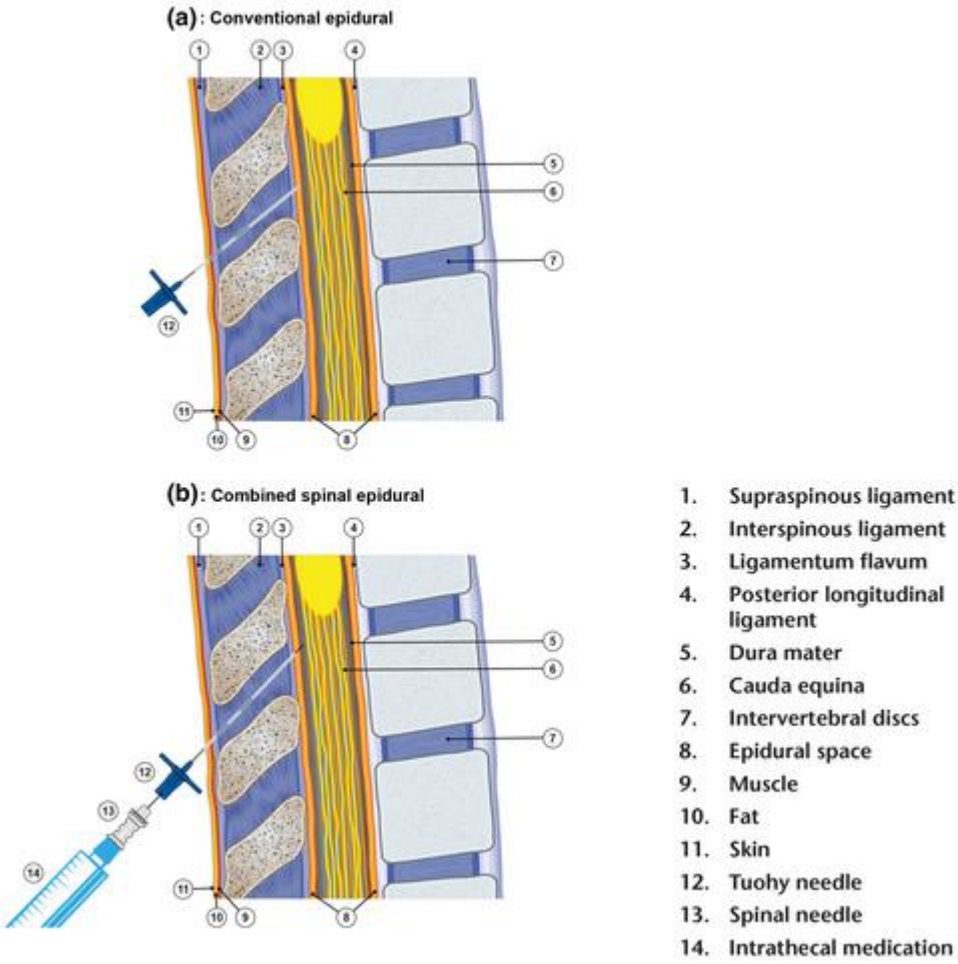
The lumbar epidural is widely regarded as the preferred method for pain relief during labor and is endorsed by the World Health Organization. Its usage varies significantly, with estimates ranging from 40% to 80% in high-income nations(World Health Organization, 2024).

During labor, uterine contractions and cervical dilation stimulate nociceptive afferent fibers that transmit pain signals through spinal nerves T10–L1, resulting in diffuse visceral pain. As labor progresses and the fetal head descends, stretching of the perineum and vagina activates pain fibers associated with the pudendal nerve and spinal roots S2–4. Epidural analgesia modulates these pain pathways through the administration of local anesthetics, opioids, and adjunct medications into the epidural space via an epidural catheter, thereby providing effective analgesia during labor (Rimaitis et al., 2015).

2.2.1.2 Types of Epidural Analgesia

There are two primary methods for administering labor epidural analgesia: the conventional lumbar epidural and the combined spinal epidural (CSE)(Halliday et al., 2022) shown in (Figure 1.1).

Figure *0*.1: (a) the conventional epidural catheter. (b) the combined spinal-epidural



(a) Conventional epidural catheter placement involves using a Tuohy needle to access the epidural space, after which the epidural catheter is threaded through the hollow needle to remain within that space. (b) In the combined spinal-epidural technique, the Tuohy needle is positioned in the epidural space while a spinal needle penetrates the dura mater, allowing for the administration of intrathecal medication into the subarachnoid space.

The conventional lumbar epidural involves using a Tuohy needle and a "loss of resistance" technique to locate the epidural space. Once identified, a catheter is threaded into the space to provide pain relief primarily for the first stage of labor, although effectiveness may vary

for the second stage. A test dose is given to check for correct placement, and complications such as unilateral block can occur in some cases(Halliday et al., 2022).

The combined spinal epidural (CSE) technique punctures the dura mater with a spinal needle after locating the epidural space. This method allows for the administration of intrathecal medication, offering faster pain relief and improved sacral analgesia. However, it is technically more challenging and carries a higher risk of neurological complications. A systematic review indicated an increased risk of non-reassuring fetal heart rate patterns with CSE compared to conventional epidurals. While CSE is favored in some settings, there isn't enough evidence to recommend it over conventional lumbar epidurals for labor analgesia (Halliday et al., 2022).

2.2.1.3 Maternal Outcomes and Complications of Epidural Analgesia

Epidural analgesia has been shown to significantly reduce pain intensity during labor and enhance maternal satisfaction (Henos Enyew Ashagrie et al., 2020; Mäkelä et al., 2023). Nevertheless, its use is associated with potential adverse effects, including hypotension, pruritus, and rare neurological complications.

The influence of epidural analgesia on labor duration and mode of delivery remains a subject of debate. Some studies have reported increased rates of instrumental delivery (Antonakou & Papoutsis, 2016) and cesarean section (James A et al., 1993), whereas other evidence suggests that, when appropriately managed, epidural analgesia does not significantly increase cesarean delivery (Antonakou & Papoutsis, 2016)(Henos Enyew Ashagrie et al., 2020). Additionally, epidural analgesia has been associated with prolonged second-stage labor and postpartum urinary incontinence (Leighton & Halpern, 2002).

Given these complex and sometimes conflicting maternal outcomes, growing attention has been directed toward the potential relationship between epidural analgesia and postpartum musculoskeletal complications, particularly postpartum low back pain.

2.1.3 Etiology and Pathophysiology of Postpartum Low Back Pain: The Role of Epidural Analgesia in Context

PPLBP is a multifactorial condition that arises from the complex interaction of physiological, biomechanical, and psychosocial changes occurring during pregnancy and the postpartum period. Rather than resulting from a single pathological process, PPLBP reflects the cumulative effects of structural adaptation, neuromuscular recovery, and contextual stressors associated with childbirth and early motherhood.

2.1.3.1 Evolving Perspectives on Epidural Analgesia and PPLBP

Early investigations into PPLBP primarily attributed symptoms to the epidural procedure itself, suggesting that nerve irritation or injury during catheter insertion or the local anesthetic instillation might contribute to pain development (Lim et al., 2020). These early interpretations emphasized direct mechanical or neurological injury as the primary explanation for post-epidural back pain.

By the mid-1990s, this perspective began to broaden. Researchers increasingly recognized that maternal posture during labor, prolonged immobilization, and pre-existing musculoskeletal conditions could play a significant role in postpartum pain outcomes (Emily Mcquaid Et Al., 2018). This shift marked an important transition from viewing epidural analgesia as an isolated cause to considering it within a constellation of interacting maternal and obstetric factors.

Subsequent research further supported this transition, demonstrating that the relationship between epidural analgesia and PPLBP is not singular but multifactorial, with no definitive pathophysiological mechanism directly linking epidural use to persistent postpartum pain (Abbasi et al., 2014). In

2.1.3.2 Biological and Mechanical Mechanisms Contributing to PPLBP

The postpartum period is characterized by pronounced hormonal and physiological changes that may influence pain sensitivity and neuromuscular recovery. Studies from the early 2000s emphasized that pregnancy-related hormonal fluctuations, particularly those affecting connective tissue laxity and neuromuscular control, may sensitize the nervous system to pain during the postpartum period (Herman Sehmbi et al., 2017; Kwak, 2017).

These findings suggest that postpartum pain may stem not only from anesthetic exposure but also from the physiological vulnerabilities induced by pregnancy and childbirth. Hormonal fluctuations can alter pain modulation pathways, while the delayed restoration of musculoskeletal integrity may heighten susceptibility to mechanical strain. In addition to these physiological factors, PPLBP may also be influenced by biomechanical changes during pregnancy and labor, as well as procedural elements of epidural analgesia.

Biomechanical adaptations during pregnancy and labor play a central role in understanding PPLBP. Epidural analgesia may indirectly influence postpartum pain through its effects on spinal mechanics and motor control. Reduced lower-body sensation and motor engagement during labor can limit a woman’s ability to actively stabilize the pelvis and lumbar spine, potentially increasing mechanical strain during prolonged labor (EMILY MCQUAID et al., 2018; Lim et al., 2020)

Pregnancy-induced alterations in pelvic alignment, including increased pelvic tilt and sacral slope, have been shown to modify lumbopelvic biomechanics and increase stress on the lumbar spine (Yoo et al., 2015). These biomechanical changes, combined with reduced postural control during epidural-assisted labor, may predispose some women to postpartum musculoskeletal dysfunction.

Additionally, the technical aspects of epidural catheter placement may influence outcomes. Variability in needle positioning or catheter placement has been associated with incomplete analgesia or altered spinal stabilization, potentially contributing to sustained nociceptive pathways and persistent pain (Benzon et al., 2016; Herman Sehmbi et al., 2017; Kwak, 2017). Complications such as post-dural puncture headache may further exacerbate pain-avoidance behaviors, indirectly aggravating musculoskeletal symptoms (Chia et al., 2016).

2.1.3.3 Multifactorial Contributors to PPLBP: A Biopsychosocial and Obstetric Perspective

Growing consensus in the literature affirms that PPLBP cannot be attributed to epidural analgesia alone. Instead, pain outcomes reflect a convergence of biomechanical loading, physiological recovery, psychological stress, and individual vulnerability. Excessive gestational weight gain, joint hypermobility, pre-existing spinal pathology, hormonal laxity, and psychosocial stressors have all been identified as contributors to persistent postpartum pain (Benzon et al., 2016; Matsuda et al., 2020).

Importantly, more recent high-quality studies have challenged earlier assumptions of a direct causal link between epidural analgesia and PPLBP, emphasizing the role of confounding factors and underlying musculoskeletal susceptibility (V Charlier, 2012). This paradigm shift highlights the need to focus on modifiable risk factors and holistic postpartum care rather than attributing pain outcomes to epidural exposure alone.

Several factors have been identified as influencing the occurrence of persistent postpartum low back pain. A narrative review conducted in 2020 highlighted key contributors, including a history of LBP prior to pregnancy and during the current or previous pregnancies, as well as earlier onset, longer duration, and greater severity of LBP during pregnancy (Komatsu et al., 2020).

Additional associated factors include sick leave due to low back pain, pain in other body areas during pregnancy, unmarried status, heavier body weight, greater weight gain during the postpartum period, and engagement in heavy physical work after delivery (Komatsu et al., 2020). However, no difference in the prevalence of LBP was observed among women who performed heavy work during the prepartum period (A. F. Turgut, 1998).

Obstetric-related factors have also been implicated, including the method of delivery, use of epidural analgesia, and induced labor, all of which have been linked to PPLBP (Komatsu et al., 2020). The interaction of these biomechanical, physiological, and psychosocial factors highlights the multifactorial nature of postpartum low back pain.

Parity and mode of delivery further influence the etiology and presentation of PPLBP. Primiparous women may experience pain related to acute biomechanical overload and first-time exposure to pregnancy-related physiological stress, as reflected in findings that reported a high prevalence of PPLBP among first-time mothers (Afiah Malik et al., 2025). In contrast, multiparous women may demonstrate cumulative structural adaptations, including increased pelvic incidence and sacral slope, which have been associated with long-term postural strain and mechanical stress (Yamada et al., 2021).

Mode of delivery also appears to modify postpartum pain outcomes. Evidence suggests that women undergoing cesarean delivery may report greater pain severity and functional disability, potentially due to altered biomechanics, delayed mobilization, and prolonged recovery (Nawshin & Sanam, .2024). Collectively, these findings reinforce the heterogeneity of PPLBP and the importance of individualized assessment based on obstetric history and biomechanical risk profile.

2.1.3.4 Associated Impairments and Musculoskeletal Interactions

PPLBP is frequently accompanied by other musculoskeletal impairments. Studies have reported associations between PPLBP and conditions such as diastasis rectus abdominis, reduced physical activity levels, and structural adaptations during the peripartum period (Romano et al., 2010). Neck pain has also been identified as a common coexisting complaint, with evidence suggesting that postpartum women experiencing LBP may be at increased risk of concurrent cervical pain due to shared postural and biomechanical stressors (Asif et al., 2023).

Pelvic misalignment has been repeatedly implicated in the development of PPLBP, with several studies demonstrating that altered pelvic alignment may contribute to abnormal load distribution across the lumbar spine (hiba saif, 2022; Kim & Shin, 2023; Mutaguchi et al., 2022) In contrast, evidence regarding the relationship between urinary incontinence and PPLBP remains inconsistent, with multiple studies finding no significant association between pain severity and urinary symptoms in postpartum women (Ghani et al., 2022; Sylvester Caesar & Petronilla, 2019; Tabassam et al., 2021).

2.1.3 Management of PPLBP

Given the multifactorial etiology of postpartum low back pain, effective management requires a combination of medical and rehabilitative approaches that address both symptom relief and underlying biomechanical and functional impairments. Current management strategies include pharmacological pain control alongside physiotherapy-based interventions aimed at restoring musculoskeletal function and improving postpartum recovery.

2.1.3.1 Medical Management of PPLBP

Medical management of PPLBP primarily focuses on symptom control. Pharmacological interventions commonly used by postpartum women include acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), and, in selected cases, oral narcotics for pain relief (East et al., 2012). However, limited comparative research exists regarding the effectiveness of different oral analgesics for postpartum pain, and much of the available evidence is dated (Jenifer O. Fahey, 2017).

Acetaminophen is another first-line medication recommended for its safety during breastfeeding, although its analgesic effects are less potent than NSAIDs (Chauhan & Tadi, 2022).on the other hand, studies suggest that nonopioid medications are effective in reducing postpartum pain, with NSAIDs showing greater efficacy than acetaminophen for this purpose (Chou D et al., 2013; Dowell et al., 2023; Wuytack et al., 2016).

Opioid analgesics may be prescribed for moderate to severe pain that does not respond to non-opioid medications; however, their use is limited by potential adverse effects, including constipation, sedation, and interference with maternal responsibilities such as infant care and breastfeeding (Jenifer O. Fahey, 2017). Consequently, opioids are typically reserved for short-term use in severe cases.

For persistent or severe pain, muscle relaxants, such as cyclobenzaprine, may be prescribed, though their safety in breastfeeding mothers requires careful consideration (Leffert, 2019)). In cases of neuropathic pain, Gabapentinoids (e.g., gabapentin) have been explored, though limited evidence exists regarding their postpartum efficacy and safety (Lim et al., 2020) Epidural steroid injections have been used in cases of radicular pain related to herniated discs or nerve impingement, offering temporary relief by reducing inflammation (Herman Sehmbi et al., 2017).

2.1.3.2 Physiotherapy Management for PPLBP:

2.1.3.2.1 Physiotherapy Referral Practices for PPLBP

Recent research has shown that physiotherapy referral practices for LBP in postnatal women may vary, with some women not being referred for physiotherapy at all(Boyle et al., 2024; Smith et al., 2024). However, when referred, physiotherapy interventions tailored to postnatal women's needs can effectively improve strength and function, aiding in the management of LBP(Boyle et al., 2024).

Culturally suitable physiotherapy interventions have the potential to enhance the postnatal experience and health outcomes for women experiencing LBP(Boyle et al., 2024; Foster et al., 2010; Koppenaal et al., 2022). Further exploration into the integration of culturally tailored physiotherapy practices for PPLBP could optimize care delivery and patient satisfaction(Boyle et al., 2024; Foster et al., 2010; Ogbeivor & Elsabbagh, 2021). However, a notable gap exists in the literature regarding culturally tailored physiotherapy practices for managing postpartum low back pain. Addressing cultural context and patient preferences in physiotherapy care has the potential to optimize outcomes and improve the overall quality of postpartum rehabilitation services (Ogbeivor & Elsabbagh, 2021).

Despite the recognized importance of physiotherapy referral in managing PPLBP, limited evidence exists on culturally appropriate physiotherapy and exercise-based interventions for postnatal women. Cultural beliefs, caregiving demands, and contextual barriers may influence engagement and adherence to rehabilitation programs. Integrating culturally responsive physiotherapy and exercise approaches may therefore improve participation and treatment outcomes, emphasizing the need to move beyond referral toward structured, accessible physiotherapy interventions tailored to this population (Boyle et al., 2024; Foster et al., 2010).

2.1.3.2.2 Physiotherapy Approaches for PPLBP Management

A wide range of physiotherapy interventions have been investigated for the management of postpartum low back pain. Emerging and adjunctive modalities such as kinesio-taping, extracorporeal shock wave therapy, osteopathic manipulative treatment, and acupuncture have demonstrated varying degrees of effectiveness in reducing pain and improving functional outcomes in postpartum women (Popovich et al., 2024; Rishi et al., 2022; Sh AHMED et al., 2018; Yazdanpanahi et al., 2017). In addition to modality-based interventions, physical activity and therapeutic exercise play a central role in postpartum rehabilitation.

Engagement in regular physical activity, including postural correction, walking, and structured exercise programs during pregnancy and the postpartum period, has been associated with improvements in fitness-related outcomes and reductions in PPLBP (Meena Sekar et al., 2020).

A wide range of physiotherapy interventions have been investigated for the management of postpartum low back pain. Within a biopsychosocial framework, physiotherapy modalities are theorized to alleviate symptoms by addressing biomechanical dysfunction, neuromuscular control deficits, and pain modulation mechanisms that arise during pregnancy and the postpartum period. Supportive and adjunctive physiotherapy techniques aim to enhance trunk stability, improve load distribution, and reduce musculoskeletal strain during postpartum recovery.

Emerging and adjunctive modalities such as kinesiology taping, extracorporeal shock wave therapy, osteopathic manipulative treatment, lumbar mobilization, acupuncture, and dry cupping have demonstrated varying degrees of effectiveness in reducing pain intensity and improving functional outcomes in postpartum women (Popovich et al., 2024; Rishi et al., 2022; Sh AHMED et al., 2018; Yazdanpanahi et al., 2017). Kinesiology taping is proposed to provide external support to the abdominal wall and lumbar region, potentially reducing mechanical stress associated with weakened musculature following pregnancy and childbirth ((Ahmed et al., 2023; Preethi et al., 2022). Shock wave therapy may contribute to pain reduction through neuromodulation, improved tissue perfusion, and stimulation of local healing responses (Sh AHMED et al., 2018; Yue et al., 2021).

Manual therapy approaches, including osteopathic manipulative treatment and postero-anterior lumbar mobilization, are grounded in theories of restoring joint mobility, reducing muscle hyperactivity, and normalizing neuromuscular function. These interventions are theorized to influence pain perception and functional recovery by addressing somatic dysfunctions and improving musculoskeletal alignment in postpartum women (Dalia M. kamel et al., 2016; Helge Franke, 2017; Schwerla et al., 2015). Complementary therapies such as acupuncture and dry cupping are supported by pain-modulation models, with proposed mechanisms including endorphin release, enhanced blood circulation, muscle relaxation, and inflammatory modulation (Maisaroh et al., 2025; Yazdanpanahi et al., 2017).

2.1.3.2.3 Exercise-Based and Home-Oriented Interventions

Among physiotherapy interventions, physical activity and exercise play a crucial role in managing PPLBP (Meena Sekar et al., 2020). In general, physical activity including; exercise, postural correction and regular walking during pregnancy and postpartum can improve fitness-related health problems such as PPLBP(Sarkar et al., 2021).

A systematic review in 2012 evaluated the effectiveness of various exercise types on PPLBP (LPP) among postnatal women. Four randomized controlled trials involving 251 participants were included, with three trials rated as having 'good' methodological quality (Chaudry et al., 2012). One trial demonstrated significant reductions in LPP intensity with specific stabilizing exercises, showing continued improvement at one- and two-year follow-ups, along with enhanced functional status and health-related quality of life. Another trial reported a significant difference in pain frequency at the three-month follow-up, although it did not show improvements in pain intensity or functional status. In contrast, a third trial found no significant differences in pain intensity or fatigue, but noted improvements in gluteal pain (Tseng et al., 2012). Overall, while there is some evidence supporting the effectiveness of exercise programs, particularly those focused on stabilization, findings were mixed, highlighting the need for further high-quality research to identify the most effective exercise elements for LPP relief.

Research in 2020 has shown that core stabilization exercises, along with postural care and education, can significantly reduce pain intensity and improve functional outcomes in early postnatal mothers(Meena Sekar et al., 2020). Additionally, a study combined core stabilization exercises with postural correction and found that it is an effective technique in the management of PPLBP(Chaudry et al., 2012). Moreover, Conventional treatment approaches and Pilates therapy have shown significant efficacy in addressing PPLBP (Suraj B. Kanase1 & Sanjay Kumar, 2022). (Suraj B. Kanase & Sanjay Kumar, 2021).

2.2 Similar Studies

2.2.1 Global studies

2.2.1.1 Prevalence of PPLBP

Building upon the broader understanding of postpartum musculoskeletal changes, several studies have examined the prevalence and functional impact of postpartum low back pain, particularly in low- and middle-income settings where maternal health burdens may be underreported. Nawshin & Sanam (2024) reported that 71% of postpartum women experienced functional impairment due to low back pain, with a mean ODI score of 26.1, indicating moderate disability. Functional limitations were most pronounced during sitting, which was identified as the most aggravating activity by 84.9% of participants, highlighting the substantial impact of postpartum LBP on daily activities. In addition, the study demonstrated a significant association between cesarean delivery and higher disability levels, suggesting that delivery-related factors may influence the severity of postpartum functional impairment (Nawshin & Sanam, 2024)

Similarly, high prevalence rates have been reported among primigravida women in Pakistan. Malik et al. (2025) conducted a cross-sectional study involving 176 primigravida women and

found that 100% of participants reported postpartum low back pain–related disability. The majority of women (89.8%) were classified as having moderate disability, while 10.2% experienced minimum disability, with no cases of severe or crippling disability reported. Disability severity did not differ significantly across age groups or occupational status, indicating that postpartum LBP constituted a consistent functional burden across demographic subgroups within this population (Afiah Malik et al., 2025).

2.2.1.2 Recent and High-Quality Evidence Suggesting No Association Between Epidural Analgesia and PPLBP

Several comparative studies have attempted to clarify whether the use of epidural analgesia increases the risk of PPLBP, but findings have varied across time points and study designs. The relationship between epidural analgesia and PPLBP has been the focus of multiple studies, yielding varied results. A study found similar rates of PPLBP on day one (40.9% for epidural vs. 40% for non-epidural) and one week (32.2% vs. 35.2%), with a decrease in prevalence in the epidural group at one and three months post-delivery (Abbasi et al., 2014). Importantly, no significant differences in pain scores were observed, leading the authors to conclude that epidural analgesia does not have a substantial association with PPLBP (Abbasi et al., 2014).

To better synthesize the conflicting findings from earlier observational studies, recent research has shifted toward high-quality designs, including meta-analyses and randomized controlled trials, offering more definitive conclusions. One of the most comprehensive investigations to date is a meta-analysis conducted by Timerga et al. (2025), which synthesized findings from 15 studies, including both randomized controlled trials (RCTs) and observational designs. The pooled analysis revealed no statistically significant association between neuraxial anesthesia and persistent postpartum LBP, reporting an overall odds ratio (OR) of 1.2 (95% CI: 0.77–1.86). This suggests that the slight difference observed between women who received neuraxial anesthesia and those who did not may be due to chance rather than a true causal relationship (Timerga et al., 2025). Importantly, the inclusion of high-quality RCTs in the analysis lends strong methodological weight to this conclusion. The authors also highlighted the need to distinguish between transient, mild LBP, which may result from needle insertion or patient positioning, and clinically significant, functionally limiting pain that persists beyond the immediate postpartum period.

Supporting this conclusion is the earlier randomized controlled trial by Loughnan et al. (2002), which directly compared the incidence of LBP at six months postpartum among women who received epidural analgesia (n=301) versus those given intramuscular meperidine (n=310) for labor pain. The results showed no meaningful difference in prevalence, with 48% of the epidural group and 50% of the meperidine group reporting LBP at follow-up. Even after excluding women with prior histories of LBP, the incidence

remained nearly identical (29% vs. 28%)(Loughnan et al., 2002). This trial, notable for its robust design and long-term follow-up, further reinforces the conclusion that epidural analgesia is not an independent risk factor for long-term LBP. This suggests that epidural analgesia is not a direct cause of PPLBP, challenging earlier claims of a causal relationship. As a well-controlled study, it provides robust evidence that shifts the focus from anesthesia-related factors to broader biomechanical and hormonal contributors. The methodological rigor of these trials, particularly their long-term follow-up and exclusion of participants with preexisting LBP, strengthens the validity of their findings and challenges assumptions of a direct causal link between epidural use and PPLBP.

Moreover, Charlotte Howell and colleagues found no significant differences in long-term LBP, disability, or movement restrictions between those receiving epidural pain relief and those using alternative pain management methods(Howell et al., 2002).

2.2.1.3 Earlier and Conflicting Evidence Suggesting Association

In contrast to recent high-quality studies, earlier research suggested a stronger association between epidural use and the onset of PPLBP, though many of these studies lacked methodological controls. Several earlier studies proposed a significant association between epidural analgesia and the development of PPLBP. Butler et al. reported that 18.9% of women who received epidural anesthesia developed chronic LBP, compared to 10.5% in the non-epidural group, with this difference persisting across most delivery types except elective cesarean sections (Butler & Fuller, 1998). Similarly, Russell et al. found that 17.8% of women who received epidurals reported new-onset LBP, compared to 11.7% among those without, reinforcing a potential correlation (Russell et al., 1993). Macarthur et al. also observed a higher incidence of LBP on the first postpartum day among women in the epidural group (53%) compared to those without epidurals (43%), although these differences were no longer apparent by six weeks postpartum (Macarthur et al., 1995). While somewhat more recent, Rafiqi Hehsan et al. (2022) found that 28% of women who received epidural analgesia reported LBP at 6 months postpartum, significantly higher than the 9% in non-epidural recipients. However, no significant difference was found in functional limitation levels. Additionally, Malevic et al. (2019) reported LBP prevalence at six months postpartum to be 31.65% in the epidural group, 28.74% in those who received intravenous anesthesia, and 23.91% in women without any anesthesia, but found no statistically significant correlation between anesthesia type and persistent LBP. Together, these studies represent the earlier body of evidence suggesting a potential link between epidural use and PPLBP, though more recent research has challenged these conclusions with improved methodological rigor and broader consideration of confounding factors. However, these earlier studies were often limited by small sample sizes, short follow-up periods, and failure to control for confounding factors such as BMI, delivery mode, or prior musculoskeletal conditions. These limitations

reduce their reliability and underscore the importance of interpreting such findings cautiously.

Although uncommon, isolated case reports provide insight into more severe clinical presentations of PPLBP following epidural analgesia and highlight the need for differential diagnosis. Ozgen et al. (2014) reported a case of a 23-year-old primiparous woman who presented with severe LBP 50 days after delivery involving epidural analgesia. MRI revealed vertebral compression fractures and osteoporotic changes, possibly linked to postpartum hormonal shifts and mechanical stress. The patient responded well to rehabilitation and physical therapy, highlighting the importance of postpartum musculoskeletal assessment and conservative management, particularly among high-risk populations.

While earlier studies suggested a possible link between epidural analgesia and PPLBP, more recent, high-quality evidence has found no consistent long-term association. These conflicting findings highlight the multifactorial nature of PPLBP and the influence of factors such as maternal weight, prior musculoskeletal issues, and psychosocial stress. This complexity underscores the need for evidence-based, non-pharmacological interventions—such as structured exercise programs—to support postpartum recovery.

2.2.1.4 Physiotherapeutic home exercise therapy for PPLBP management

Physical therapy plays a crucial role in managing PPLBP, with various interventions demonstrating effectiveness in alleviating symptoms and improving functional outcomes. specific techniques such as spinal mobilization have shown beneficial effects in decreasing pain intensity and enhancing muscle activity in postpartum women suffering from LBP (Kamel et al., 2016). Pelvic stabilization exercises, when combined with realignment devices, have also been effective, yielding immediate and short-term improvements in pain reduction (Sakamoto et al., 2018). Additionally, a review was published in 2013 indicated that physical therapy can significantly reduce pain intensity and disability levels associated with PPLBP, particularly when utilizing tailored exercise programs aimed at core stabilization and pelvic floor strengthening (Ferreira & Alburquerque-Sendín, 2013).

Comparative studies suggest that individualized and supervised physical therapy approaches yield superior outcomes compared to less interactive methods such as home-based exercises or video instructions (Ferreira & Alburquerque-Sendín, 2013). Also, a randomized controlled trial assessing the efficacy of pelvic stabilization exercises indicated that those performed under the guidance of physiotherapists were more effective than unsupervised alternatives (Stuge et al., 2004). Furthermore, non-pharmacological interventions, including cognitive behavioral therapy, have been recognized for their role in addressing the psychological dimensions of PPLBP, indicating a need for comprehensive treatment plans that incorporate both physical and psychological strategies (Anshu et al., 2024).

Furthermore , studies worldwide have explored PPLBP, highlighting its prevalence and effective management approaches. A study by Suraj in 2022 highlighted that a 6-week conventional therapy program, which included exercises, yoga, core stability, walking, running, aquatic exercise, and aerobics, led to marked reductions in pain levels, enhanced lumbar range of motion, and improved abdominal muscle strength (Suraj B. Kanase & Sanjay Kumar, 2022). This approach also positively impacted the quality of life, though the benefits were noted to be time-consuming (Suraj B. Kanase & Sanjay Kumar, 2022). In contrast, another study by Suraj was in 2021 found Pilates therapy to be even more effective in reducing LBP in postnatal women compared to conventional therapy (Suraj B. Kanase & Sanjay Kumar, 2021). The Pilates intervention resulted to alleviate pain while simultaneously enhancing abdominal muscle strength and lumbar range of motion, ultimately leading to a better quality of life (Suraj B. Kanase & Sanjay Kumar, 2021). Thus, while both methods are beneficial, Pilates appears to offer more immediate and pronounced improvements in PPLBP management.

1.2.2 Local studies

Evidence from regional low- and middle-income countries provides limited but important insight into postpartum low back pain; however, true local data remain scarce. A prospective cohort study conducted at Dilla University General Hospital examined the incidence, risk factors, and quality-of-life impact of LBP following cesarean and vaginal delivery (Barega et al., 2025). Rather than estimating prevalence, this study focused on the new onset of PPLBP and demonstrated that incident cases were common in the postpartum period and were associated with significant functional limitations and reduced health-related quality of life. Differences in pain outcomes were observed between cesarean and vaginal deliveries, suggesting that mode of delivery may influence the development and clinical course of postpartum low back pain. Identified risk factors included obstetric and biomechanical variables, reinforcing the multifactorial nature of this condition.

Despite the relevance of these findings, the study was conducted outside Palestine and did not examine epidural analgesia, long-term pain persistence, or the effectiveness of rehabilitative interventions. To the best of our knowledge, no published studies have investigated the prevalence or incidence of PPLBP among Palestinian women, nor explored its association with epidural analgesia or physiotherapy-based management strategies. Furthermore, existing regional studies largely focus on short-term outcomes and do not comprehensively assess pain-related disability or functional recovery using standardized outcome measures. This lack of locally generated evidence highlights a significant gap in the literature and underscores the importance of the present study in addressing PPLBP within the Palestinian context.

Methods Chapter Three:

3.1 Study design

This study was conducted in two phases to address the research objectives. Phase One utilized an **observational cross-sectional design** to determine the prevalence and characteristics of PPLBP among Palestinian women who delivered with or without epidural analgesia. While Phase Two employed **a Pretest-Posttest experimental Design** aimed to evaluate the effectiveness of a structured HEP for women who reported PPLBP in Phase One.

This cross-sectional study was reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines. A completed STROBE checklist is provided in Appendix (12).

This multi-phase design enabled exploration of the epidemiology of PPLBP in a community sample and assessment of a targeted physiotherapeutic intervention.

3.2 Study sitting

Phase One was implemented mostly online using a structured electronic survey distributed across social media platforms and community networks throughout the West Bank, allowing participation from multiple governorates.

Phase Two combined online and face-to-face formats. Assessments and weekly educational/exercise sessions were conducted via Zoom or in person based on participant preference.

3.3 Study Timeframe

Data collection and intervention activities took place over seven months from June 2025 to December 2025.

- Phase One; Cross sectional survey recruitment was conducted over a three-month period, from June to September 2025.
- Phase Two; Pretest-Posttest Design intervention design was implemented. The pretest was followed by a 4-week HEP, after which posttest assessments were conducted. Data analysis was then performed to evaluate the effectiveness of the intervention. The entire process took place between October and December 2025.

3.4 Study Sample

3.4.1 Sampling method

A convenience sampling method was employed in both study phases. In phase one, the online survey link was distributed widely to reach postpartum women who had received epidural analgesia during childbirth. This method ensured the inclusion of women from diverse regions and backgrounds across the West Bank.

For phase two, eligible participants were selected from those who reported PPLBP in phase one. Women who met the inclusion criteria were contacted individually through phone calls and online communication. Participation was voluntary, and recruitment depended on the woman's willingness to continue into the intervention phase. This selection ensured that the phase two sample accurately represented women experiencing PPLBP following epidural analgesia.

3.4.2 Phase One (Cross-Sectional Study) Sample size

The Phase One population consisted of postpartum women who delivered within the previous week up to two years. The required sample size for the cross-sectional survey was estimated using standard prevalence-based calculations. Assuming an expected prevalence of PPLBP of approximately 30–40%, based on global literature, with a 5% margin of error, 95% confidence level, and an estimated target population of postpartum women across major West Bank governorates, the minimum required sample was calculated to be approximately **369** participants. The final sample obtained **(n = 414)** exceeded this requirement, thus ensuring adequate statistical power and precision for prevalence estimation.

3.4.3 Phase Two (Experimental Study) Sample size

The pretest–posttest intervention phase aimed to detect within-group changes in pain intensity as measured by the Numeric Pain Rating Scale (NPRS). Sample size estimation was conducted using G*Power software (version 3.1) for a paired-samples comparison. Assuming a medium effect size (Cohen's d = 0.5), which is commonly adopted in clinical and rehabilitation research when moderate treatment effects are anticipated, an alpha level of 0.05 and a statistical power of 0.80 were selected in accordance with standard methodological recommendations (Cohen, n.d.; Faul et al., 2007). Based on these parameters, a minimum sample size of 27 participants was required to adequately detect statistically significant within-group changes following the intervention.

Of the **414** women in Phase One (Cross-Sectional Study), **183** met Phase Two eligibility criteria, defined as PPLBP localized below the costal margin and above the inferior gluteal folds, occurring 2 days to 2 years postpartum, and having received epidural analgesia**. Thirty-four** eligible women consented to participate, while others declined due to lack of

interest and time constraints. **Thirty** participants completed the intervention and post-assessment, forming the final Phase Two (Experimental Study) sample.

3.4.3 Inclusion and Exclusion Criteria

3.4.3.1 Phase one (Cross-Sectional Study) inclusion and exclusion criteria

Phase One Inclusion Criteria

- Postpartum women (1 week–2 years after delivery)
- Age 18–59 years
- Able to read and respond to an electronic questionnaire

Phase One Exclusion Criteria

- Pre-existing diagnosed spinal pathology
- Chronic non-pregnancy-related LBP
- Neurological or systemic conditions affecting mobility
- Severe medical or obstetric complications
- Previous lumbar or abdominal surgery

3.4.3.1 Phase two (Experimental Study) inclusion and exclusion criteria

Phase Two Inclusion Criteria

- Reported PPLBP
- Received epidural analgesia
- Met eligibility during Phase One survey
- Willing to participate in a four-week exercise program

Phase Two Exclusion Criteria

- Contraindications to exercise
- Use of medications or therapies that affect musculoskeletal outcomes

3.5 Data Collection

Data collection was performed in two phases.

3.5.1 Phase One (Cross-Sectional Study) Data Collection

The structured online survey consisted of the following domains (appendix 1):

- **Socio-demographic characteristics:** age, height, weight, BMI, occupation, education, residency.

- **Obstetric and medical history:** parity, mode of delivery, complications, epidural use (yes/no), details of epidural administration.
- **PLBP profile:** past history of LBP, and present LBP onset, intensity, duration.
- **Pain management:** first management attempt, physiotherapy management approaches.

3.5.2 Phase Two (Experimental Study) Data Collection

Outcome measures were administered at baseline and after the intervention (appendixes 2,3,4):

3.5.2.1 Primary Outcome

- **The Numerical Pain Rating Scale (NPRS):** The NPRS is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of his/her pain. he consistency of the NPRS has also been validated across various studies involving different patient demographics, ensuring its reliability across diverse populations. Additionally, the NPRS demonstrates strong correlation validity with other established pain measurement scales, making it a reliable tool for clinical assessments (Alghadir et al., 2018)

3.5.2.2 Secondary Outcomes

- **The Brief Pain Inventory (BPI):** is a 16-item, multidimensional self-report instrument originally developed by Dr. Charles S. Cleeland and the Pain Research Group at the MD Anderson Cancer Center to assess cancer-related pain. It has since been extensively validated and widely used in populations experiencing chronic and musculoskeletal pain of diverse etiologies, including postpartum pain populations (Zhou et al., 2025). The BPI assesses pain history, intensity, and location, as well as the degree to which pain interferes with daily activities, thereby capturing the sensory, affective, cognitive, behavioral, and sociocultural dimensions of pain. The instrument is brief, easy to understand, and easily scored, with well-established psychometric properties across multiple languages and cultural contexts, supporting its use in both clinical practice and research.
  In the present study, the validated Arabic version of the BPI was used, as developed and psychometrically evaluated by Ballout et al. (2011) in a Lebanese population. This version was linguistically and culturally adapted for Arabic-speaking populations while preserving the psychometric integrity of the original instrument. Permission for academic and non-commercial use of the Arabic BPI was obtained from the developer.

- **The Oswestry Disability Index (ODI):** is a widely used and well-established self-report questionnaire designed to assess disability related to low back pain. Originally developed by Fairbank and Pynsent, the ODI demonstrates high reliability and validity, including strong test–retest reliability, good internal consistency, and excellent responsiveness to

clinical change, supporting its widespread use in both clinical practice and research. The instrument is easy to administer and score, enables objective quantification of patient-reported functional limitations, and is sensitive to changes following therapeutic interventions.

- In the present study, the validated Arabic version of the ODI was used, as developed and psychometrically evaluated by Ramzy & Quinette Louw Andrea Bailocerkowski (2008) for patients with LBP in Arabic-speaking populations. This version demonstrated satisfactory reliability and validity, supporting its applicability in the current study population.

- Exercise adherence was assessed using weekly self-report logs (0-10) (Appendix 5)

All outcome instruments are validated and widely used in musculoskeletal and postpartum populations

3.6 Study Procedure

The study was conducted in two phases following ethical approval from the Al-Quds University Ethical Committee. All procedures were implemented in accordance with institutional and international research guidelines.

3.6.1 Phase One (Cross-Sectional Study) Procedures

Phase One consisted of a cross-sectional survey designed to identify the prevalence and characteristics of PPLBP among women who delivered with or without epidural analgesia. Participants were recruited using a mixed recruitment approach, combining online distribution and face-to-face recruitment in primary healthcare centers across the West Bank. The online survey link was disseminated via social media platforms, women's health and motherhood groups, community pages, and professional networks, while in-person recruitment was conducted by inviting eligible women attending health centers to participate. This combined strategy was implemented to enhance geographic coverage, include women with varying levels of digital access, and improve sample representativeness.

To minimize selection bias and ensure eligibility, the questionnaire incorporated mandatory screening questions at the beginning of the survey addressing all inclusion and exclusion criteria. Participants who provided responses indicating ineligibility were automatically excluded, as the survey was programmed to terminate and prevent submission if any exclusion criterion was met. This process ensured that only eligible participants were included in the final dataset.

Although online recruitment may inherently favor women with internet access, the addition of face-to-face recruitment in healthcare settings helped mitigate this limitation by reaching women who may be less digitally connected. The use of an online survey platform was further justified by its feasibility, efficiency, and acceptability for postpartum women, allowing participation at convenient times while maintaining standardized data collection. This mixed recruitment and screening approach was therefore considered appropriate for estimating prevalence and examining associations within the target population.

Participants completed a structured questionnaire covering socio-demographic data (age, occupation, education, BMI, residency), medical and obstetric history, delivery details including epidural use, LBP characteristics such as intensity, duration, and onset and pain management. A total of **414 responses** were collected. The final dataset included women with and without epidural analgesia, enabling comparison of PPLBP prevalence across the two groups in alignment with the study hypotheses.

3.6.2 Phase Two (Experimental Study) Procedures

From the Phase One respondents, 183 women met the eligibility criteria for PPLBP. Of these, a convenience sampling method, 34 women consented to join the intervention phase. Four participants withdrew during the first week, resulting in a final sample of 30 women completing Phase Two.

3.6.2.1 Baseline Assessments

Participants were contacted individually and invited to a baseline assessment session. These sessions were conducted either via Zoom or in person, depending on participant preference. During the assessment, the researcher completed all standardized outcome measures through structured interviews as it was mentioned above:

- **Numeric Pain Rating Scale (NPRS)** – primary pain intensity
- **Brief Pain Inventory (BPI)** – pain severity and interference
- **Oswestry Disability Index (ODI)** – functional disability

3.6.2.2 Intervention Delivery

Each participant received a personalized, structured four-week HEP focusing on:

- Core stability
- Flexibility
- Pelvic floor strengthening
- Functional mobility
- Postural control

The program was delivered through **weekly one-on-one Zoom sessions**, during which the researcher demonstrated the weekly exercise set and the educational component.

Participants were instructed to perform the exercises approximately **30–40 minutes in total** divided to **two to three times per day (10 minutes for each)** for the full four-week duration.

3.6.2.3 Monitoring and Support

Weekly follow-up sessions were conducted online to:

- Demonstrate the weekly exercise set
- Provide individualized corrections
- Deliver the educational component
- Track exercise adherence
- Track difficulties encountered
- Implement exercise modification if needed

Participants were also encouraged to report concerns between sessions if needed Adherence to the HEP was monitored using structured weekly self-report logs collected during the follow-up sessions. Participants recorded the scale 1-10. This classification allowed for consistent tracking of intervention fidelity and supported the interpretation of post-intervention outcomes.

3.6.2.4 Post-Intervention Assessments

At the end of the four-week program, participants completed post-intervention assessments using the same outcome tools (NPRS, BPI, ODI). These assessments were again conducted by the researcher to the participants either online or face-to-face based on the participant preference.

All data were securely stored in password-protected digital files accessible only to the researcher. Confidentiality and participant anonymity were strictly maintained throughout the study.

3.7 Suggested program

Phase two (Experimental Study) participants followed distinct approaches to evaluate the effectiveness of a structured HEP in managing PPLBP.

3.7.1 Exercise program

Participants in this group followed a structured four-week HEP designed to enhance core stability, flexibility, functional mobility, and pelvic floor strength.

Postural education and mindfulness-based relaxation techniques were integrated to support musculoskeletal alignment and psychosocial well-being. Participants performed the exercises three times per day, with each session lasting approximately 30–40 minutes.

Instructional videos and illustrated handouts were provided to ensure proper technique and promote independent execution. Weekly one-on-one virtual sessions were conducted to review progress, monitor adherence, address challenges, and provide individualized adjustments to the exercise program. Table (3.1) and Appendix (6) shows the delivered exercise program.

Table 0.1Table: HEP will be as follows for the experimental group:

Week	Exercise	Purpose	Dosage
1	Pelvic Tilts	Lumbar mobility; core activation	10 reps × 2 sets
	Cat–Cow Stretch	Spinal mobility	10 reps × 2 sets
	Bridge	Glute/lumbar strengthening	8 reps × 2 sets
	Pelvic Floor Contractions	Pelvic floor activation	8 contractions × 2 sets
2	Bridge Progression	Increased glute/core stability	Hold 5 sec × 8 reps × 2 sets
	Side-Lying Leg Lifts	Lateral hip strengthening	10 reps/side × 2 sets
	Child's Pose	Lumbar relaxation	10 breaths × 2 rounds
	Core + Pelvic Floor Activation	Deep core control	10 reps × 2 sets
3	Modified Plank (Knees)	Core endurance	Hold 10–15 sec × 5 reps
	Dynamic Posture Training	Safe functional movement	Integrated
	Mindful Breathing	Relaxation	5 minutes
4	Single-Leg Bridge	Advanced glute–core challenge	6 reps/side × 2 sets
	Wall Squats	Quadriceps + postural endurance	8 reps × 2 sets
	Cat–Cow + Pelvic Floor	Mobility + pelvic control	10 reps × 2 sets
	Bird Dog	Core stability	Hold 5–8 sec × 8 reps
	QL Stretch	Lateral trunk mobility	30 sec × 2 each

3.7.2 Educational program

As part of the intervention, participants also received a structured educational program delivered alongside the weekly exercise sessions. This four-week program was designed to equip postpartum women with evidence-based knowledge and practical strategies for managing and preventing LBP. Each week addressed a specific aspect of postpartum recovery, including understanding the mechanisms of PPLBP, maintaining proper posture, safe baby-handling techniques, managing daily activities, and the importance of rest and gradual return to function.

The educational content was delivered through interactive demonstrations, illustrated handouts, and practical self-management tips. In addition, participants received a comprehensive PDF guide that provided instructions on healthy postpartum body mechanics and daily movement strategies tailored for new mothers **(Appendix 7).**

This combination of structured education and supportive materials ensured that participants were well prepared to apply safe practices and navigate postpartum physical demands throughout the study period. Table (3.2) shows the delivered educational program.

Table *0*.2: Educational Program

Week	Topic	Core Content
1	Understanding PPLBP	Etiology, risk factors, postpartum healing
	Posture & Body Mechanics	Feeding posture, safe lifting, newborn handling
2	Daily Activity Management	Ergonomics, pacing, reducing strain
3	General Health Education	Sleep hygiene, rest, nutrition
4	Safe Baby Handling & Monitoring	Lifting/carrying, stroller/crib ergonomics, red flags

3.8 Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) Version 23. All analyses were conducted in alignment with the study aims and hypotheses for both phases. A significance level of $p < 0.05$ and 95% confidence intervals (CI) were adopted.

3.8.1 Descriptive Statistics

Descriptive analyses summarized participant characteristics including age, BMI, obstetric history, and baseline pain-related variables. Continuous variables were reported using means and standard deviations, while categorical variables were presented as frequencies and

percentages. Baseline comparisons were examined to assess group homogeneity in Phase Two(Experimental Study).

3.8.2 Inferential Statistics

Phase One (Cross-Sectional Study)

- Independent samples t-test: Comparison of mean PPLBP pain intensity between women who received epidural analgesia and those who did not**,** to examine differences related to epidural exposure.
- Chi-square test: Used to examine associations between categorical variables (e.g., demographic characteristics).
- One-way ANOVA: Applied to compare mean differences across more than two groups.
- Pearson correlation coefficient (r): Used to assess the strength and direction of relationships between continuous variables.

Phase Two (Experimental Study)

- Paired-samples t-tests: To evaluate the effect of the HEP. Comparing pre- and post-intervention outcomes for NPRS, ODI, and BPI.
- Wilcoxon signed-rank test: Used for within-group comparisons when data were not normally distributed.
- Correlation analyses (Pearson): examined relationships between exercise adherence and clinical improvements.
- Two-way repeated measures ANOVA: explored whether demographic variables (age, BMI, parity) moderated change over time; no significant interaction effects were found.

3.8.3 Assumption Testing

Normality of the outcome variables (ODI, BPI, and NPRS) was assessed using both the Shapiro–Wilk and Kolmogorov–Smirnov tests. Given the relatively small sample size (n = 30), greater emphasis was placed on the Shapiro–Wilk test, as it is considered more sensitive and appropriate for samples smaller than 50.

As shown later in Table 4.28, the pre- and post-intervention scores for ODI, BPI, and NPRS demonstrated non-significant p-values ($p > 0.05$) in the Shapiro–Wilk test, indicating no statistically significant deviation from normality. The Kolmogorov–Smirnov test results were consistent with these findings and supported the assumption of normal distribution. Based on these results, the assumption of normality was satisfied, and parametric statistical tests were therefore considered appropriate and subsequently applied in the analysis.

3.8.4 Effect Size Calculation

- Effect size measure: Cohen's d.
- Purpose: To quantify the magnitude of the intervention effect beyond statistical significance.
- Formula: Cohen's d = Mean difference / Pooled standard deviation
- Interpretation Thresholds

    - Small effect: $d \geq 0.2$
    - Medium effect: $d \geq 0.5$
    - Large effect: $d \geq 0.8$

- Effect size interpretation was used to assess the clinical relevance of the findings

3.9 Ethical consideration

This study was conducted in accordance with the ethical standards of the Al-Quds University Ethical Committee (Appendix 8). Additionally, an official approval letter was secured from the Palestinian Ministry of Health to facilitate access to maternal health centers and support data collection procedures (Appendix 9). The researcher has also completed formal training in research ethics through the TRREE program (2023–2025), successfully completing Modules 1–4, which cover Introduction to Research Ethics, Informed Consent and Vulnerable Populations, Ethical Review Processes, and Responsible Conduct of Research (Appendix 10). This training informed the design and conduct of the study, ensuring the highest standards in the protection of participants' rights and well-being.

Ethical approval was obtained prior to the commencement of the research, and all procedures were reviewed to ensure participant safety and methodological integrity. Participants received a detailed information sheet describing the study's objectives, procedures, potential risks, and anticipated benefits. And a written informed consent was obtained from each participant, with assurance that participation was voluntary and that they could withdraw at any time without consequence (Appendix 11).

Confidentiality was strictly maintained throughout the study. All identifiable data were anonymized and stored in password-protected files accessible only to the research team. To ensure participant safety, particularly during the intervention phase, clear instructions were provided for performing the HEP, and weekly follow-up sessions were conducted to monitor adherence and address any emerging concerns. Potential risks, such as mild discomfort during exercises, were minimized through individualized guidance and continuous supervision. Participants were also provided with contact information for reporting any issues.

The principles of beneficence and justice were upheld by ensuring equitable recruitment and fair treatment of all participants. The study aimed to contribute positively to postpartum health by offering an accessible, evidence-informed intervention. Through these measures, the research maintained high ethical standards and prioritized the well-being, safety, and rights of all participants.

Chapter Four: Results

The results of the study are presented in this chapter, which comprise the participants socio-demographics, and inferential statistics for both phases of the study, are presented in accordance with the study's objectives and hypothesis.

4.1 Phase One (Cross-Sectional Study) Results

Phase One examined the prevalence and characteristics of persistent PPLBP among women who received epidural analgesia during labor. Data were collected using a structured questionnaire covering demographic, medical, and obstetric information, including delivery mode, pregnancy history, comorbidities, LBP history and intensity, and initial management. These data enabled analysis of associations between participant characteristics and current LBP. A total of **414** women were included in this cross-sectional phase. Phase One results are presented using descriptive and inferential statistics. And the recruitment process is illustrated in Figure (4.1).

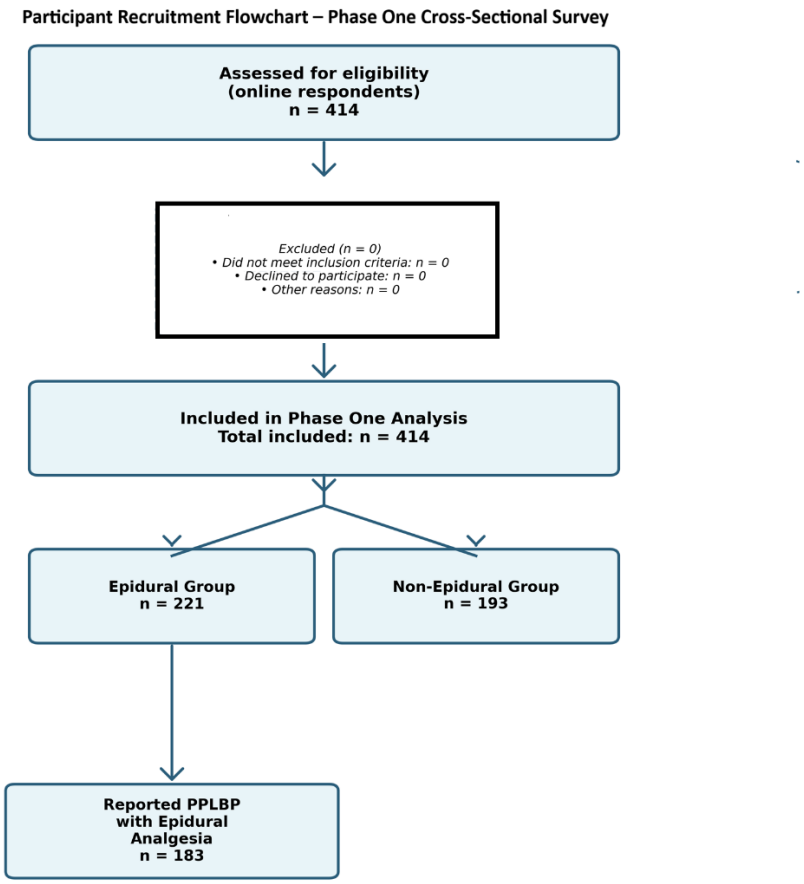


Figure *0*.1 Participant Recruitment Flowchart – Phase One Cross-Sectional Survey

4.1.1 Descriptive statistics (Cross Sectional Study)

In this section, the descriptive statistics for the first phase (cross -sectional study) are presented, providing a detailed summary of participants' socio-demographic characteristics, medical and obstetric profiles, and LBP–related variables.

4.1.1.1 Socio-Demographics of the participants of First Phase (Cross Sectional Study)

Table (4.1) and Figures (4.2 – 4.6), indicate that overall participants' number was 414, in which 45.9% of the participants within age 18-29 years. In addition, 41.1% of them have normal weight. As well, approximately half of participants (51.0%) are living in City, and 27.5% of participants live in Bethlehem governorate. While, 67.6% of participants have university degree, and 66.2% of participants are Housewives.

Table 0.1: Socio-Demographics of Participants (Cross Sectional Study)

Variables	Categories	N	%
Age	18-29	190	45.9%
	30-39	185	44.7%
	40-49	33	8.0%
	50-59	6	1.4%
BMI	Under Weight	6	1.4%
	Normal Weight	170	41.1%
	Over Weight	156	37.7%
	Obesity	82	19.8%
Place of Residency	City	211	51.0%
	Village	179	43.2%
	Camp	24	5.8%
Governorate	Ramallah & Al-Bireh	57	13.8%
	Hebron	82	19.8%
	Bethlehem	114	27.5%
	Jericho	4	1.0%
	Salfit	8	1.9%
	Nablus	48	11.6%
	Tulkarem	24	5.8%
	Jenin	40	9.7%
	Qalqilieh	6	1.4%
	Jerusalem	25	6.0%
	Tubas	6	1.4%
Educational Level	Elementary	9	2.2%
	Secondary	37	8.9%
	Diploma	38	9.2%
	University	280	67.6%
	Post Graduate	50	12.1%
Occupation	Office Work	66	15.9%
	Physically Demanding Job	62	15.0%
	House Wife	274	66.2%
	None	12	2.9%

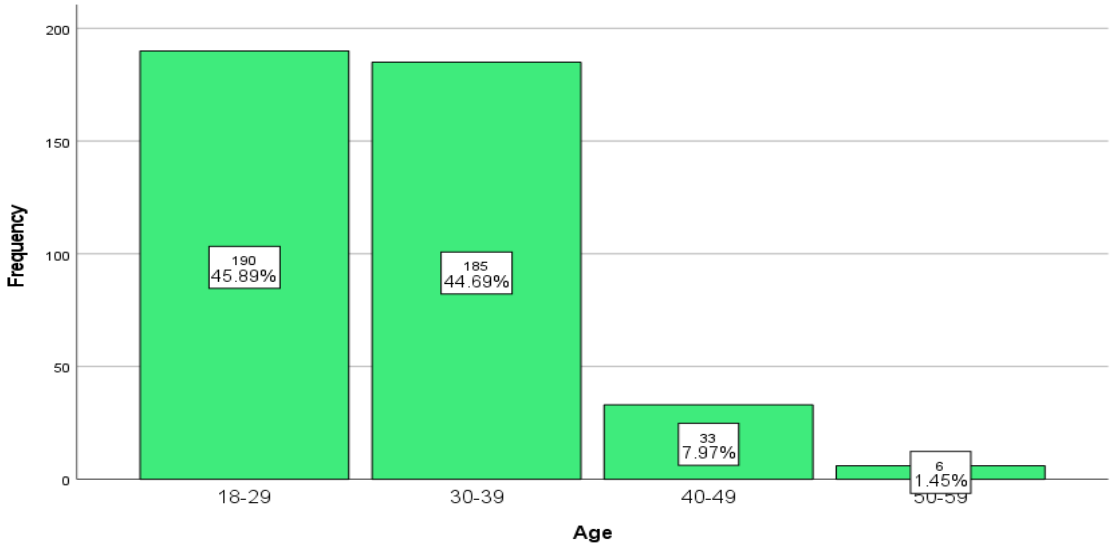


Figure *0*.2: Distribution of Participants due to their Age

Figure *0*.3: Distribution of Participants due to their BMI value

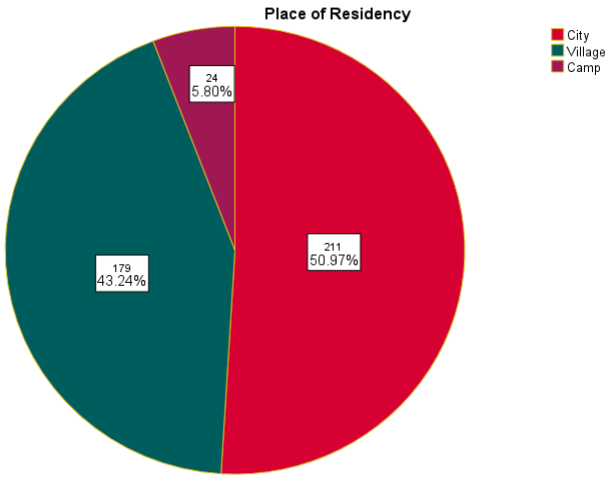


Figure 0.4: Distribution of Participants due to their Place of Residency

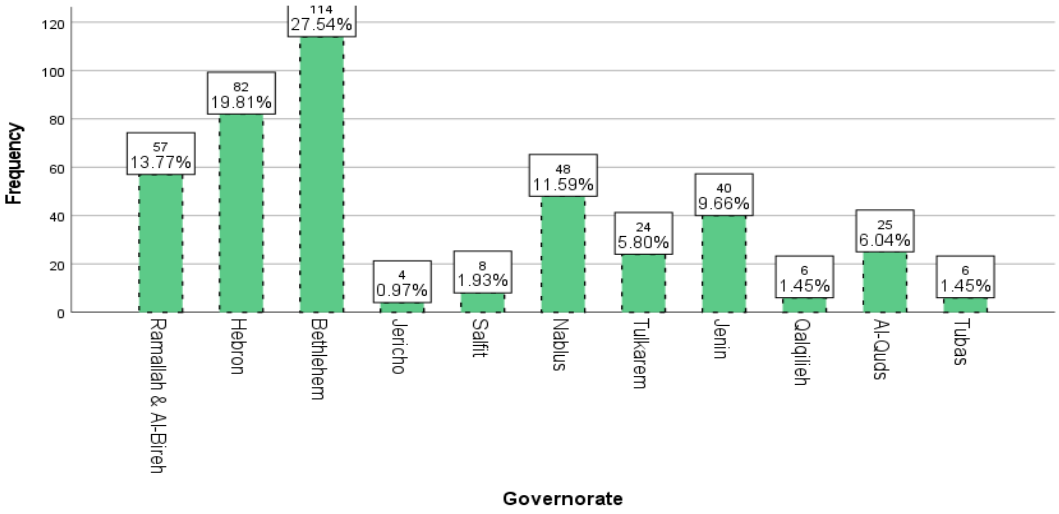


Figure 0.5: Distribution of Participants due to their Governorate

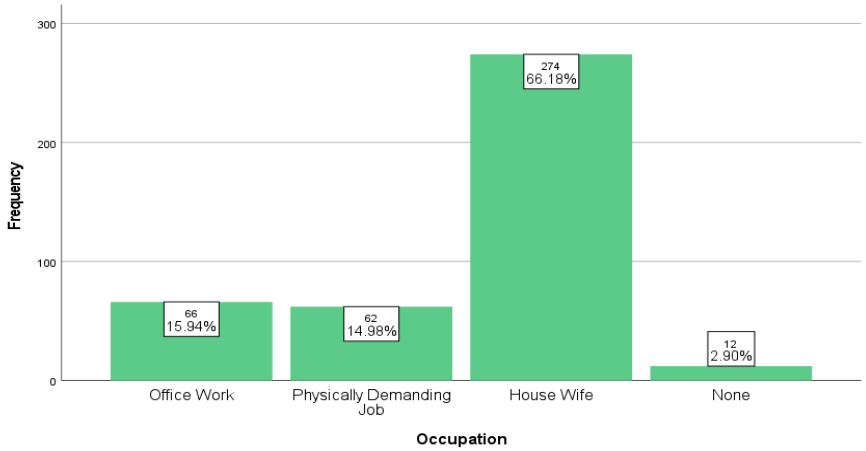


Figure 0.6: Distribution of Participants due to their Occupation

4.1.1.2 Health Status of the Participants (Cross Sectional Study)

Results showed that 97.1% of participants do not have diabetes mellitus, and 95.4% do not have neurological injury. Additionally, the majority of participants (95.9%) do not have hypertension, and 88.6% of participants do not have other comorbidities (Table 4.2).

Table *0*.2: Health Status of Participants in the First Phase of Data Collection

Variables	Categories	N	%	Missing
Having Diabetes Mellitus	Yes	12	2.9%	0
	No	402	97.1%	
Having Neurological signs	Yes	19	4.6%	0
	No	395	95.4%	
Having Hypertension	Yes	17	4.1%	0
	No	397	95.9%	
Having Other Comorbidities	Yes	47	11.4%	0
	No	367	88.6%	

4.1.1.3 Pregnancy History of Participants (Cross Sectional Study)

Results showed that more than half of participants (55.6%) had 2-4 previous pregnancies; and about half of participants (50.7%) had their last delivery since from one year to two years ago. However, 57% of participants had normal delivery, in which 16.9% of overall participants had complications after delivery. Furthermore, Importantly, the results exposed that more than half of participants (53.4%) received Epidural (Table 4.3) (Figures 4.7 – 4.10).

Table *0*.3: Pregnancy Information of Participants in the First Phase of Data Collection

Variables	Categories	N	%	Missing
Number of Previous Pregnancies	1	135	32.6%	0
	2-4	230	55.6%	
	5-6	36	8.7%	
	More Than 6	13	3.1%	
Time Since Last Delivery	Two Days - 6 Weeks	38	9.2%	0
	6 Weeks - 6 Months	88	21.3%	
	6 Months - One Year	78	18.8%	
	One Year -2 years	210	50.7%	
Type of Delivery	Normal Delivery	236	57.0%	0
	Pre-Managed Cesarean	88	21.3%	
	Emergency Cesarean	90	21.7%	
Received Epidural	Yes	221	53.4%	0
	No	193	46.6%	

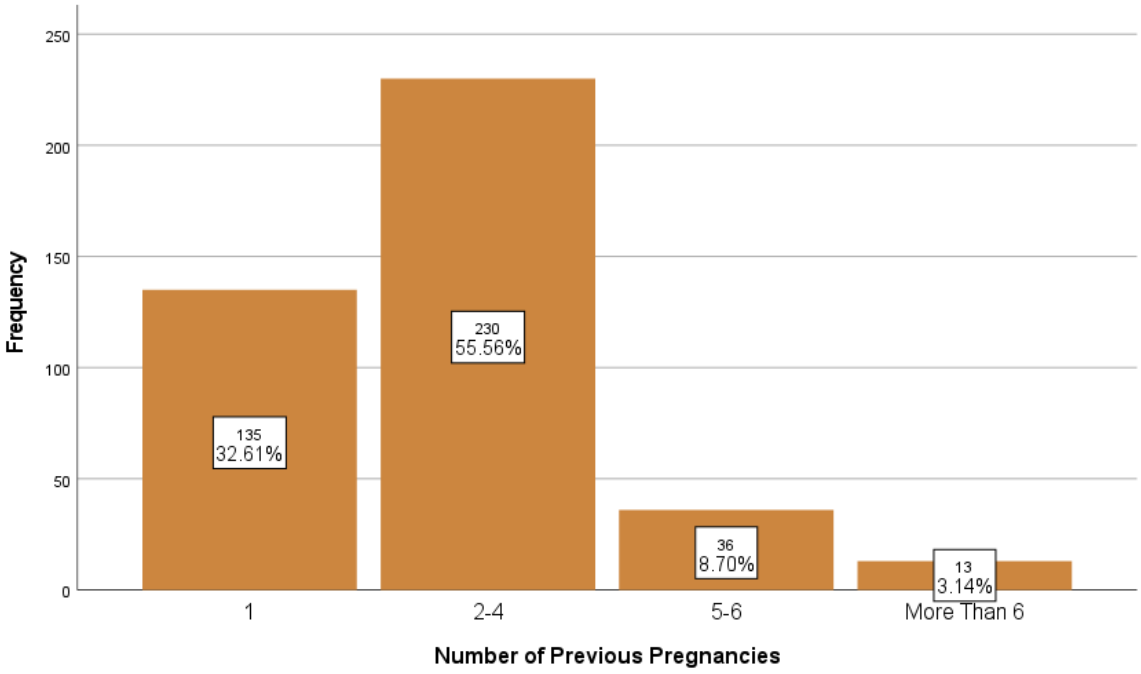


Figure 4.7: Distribution of Participants due to Number of Previous Pregnancies

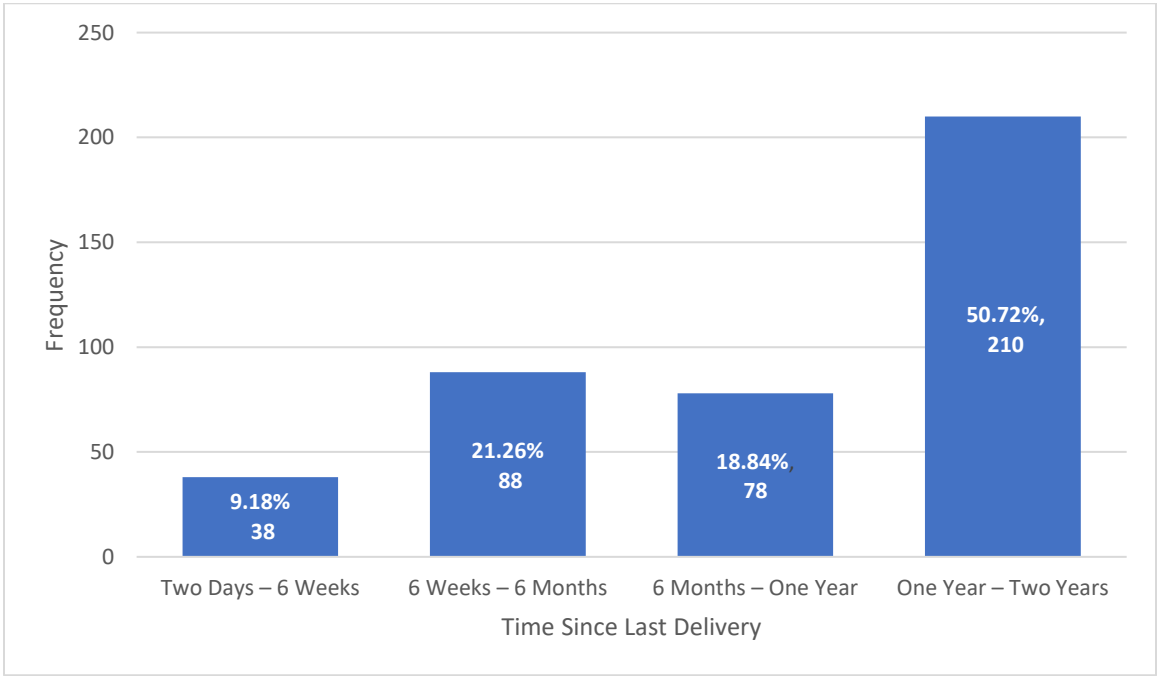


Figure 4.8: Distribution of Participants according to the Time since Last Delivery

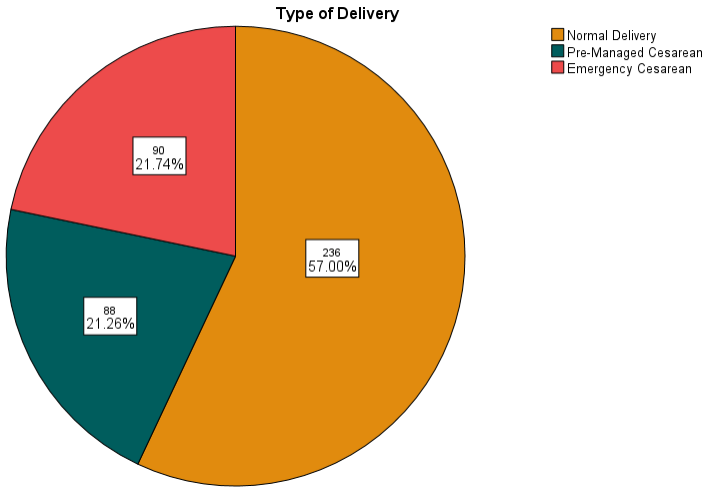


Figure *0*.9: Distribution of Participants due to Type of Delivery

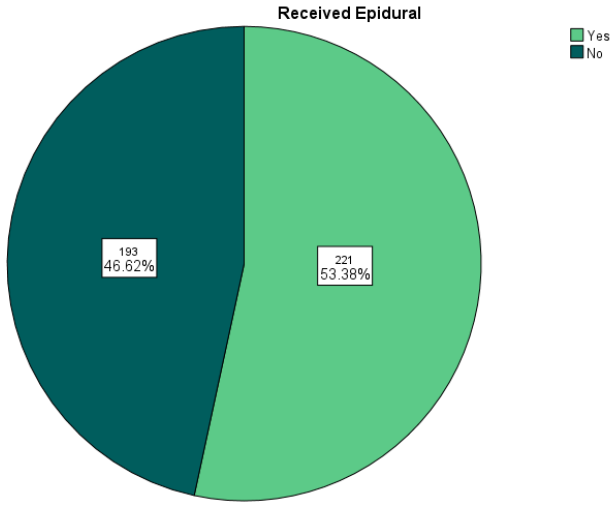


Figure *0*.10: Distribution of Participants due to Received Epidural Analgesia

4.1.1.4 LBP History of Participants (Cross Sectional Study)

Regarding past history of LBP, the results in Table (4.4) and Figure (4.11) showed that 72% of participants had no history of LBP before pregnancy (298) women.

Table 0.4: LBP History of Participants in the First Phase of Data Collection

Variables	Categories	N	%	Missing
History of LBP Before Pregnancy	Yes	116	28.0%	0
	No	298	72.0%	

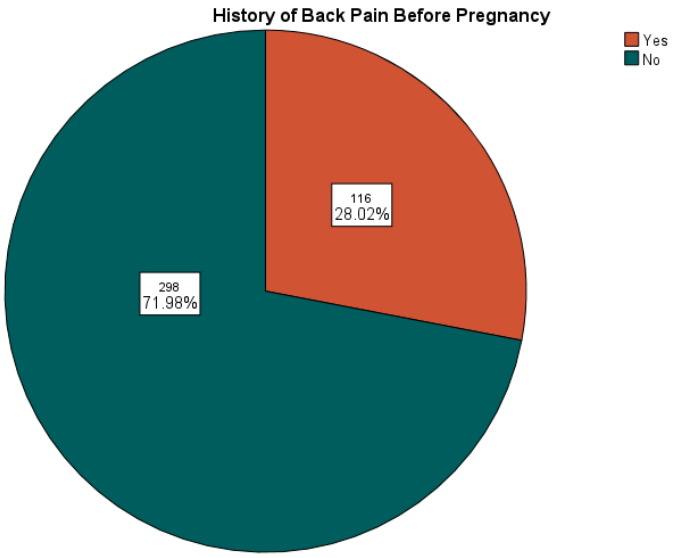


Figure *0*.11: Distribution of Participants due to History of LBP Before Pregnancy

4.1.1.5 Prevalence of PPLBP among participant(Cross Sectional Study)

Out of the total sample, 341 women **(82.37%)** reported experiencing PPLBP, indicating a high prevalence within the study population. Among those reporting PPLBP, nearly half (47.1%) described their pain intensity as moderate, while 20.3% reported severe pain and 1.4% reported very severe or intolerable pain. Only 13.3% of participants reported mild pain, suggesting that the majority of affected women experienced clinically meaningful levels of pain intensity (Table 4.5 and Figures 4.12 – 4.13).

Table 0.5: Prevalence of PPLBP among participant

Variables	Categories	N	%	Missing
Current LBP	Yes	341	82.4%	0
	No	73	17.6%	
Current LBP Intensity	Mild Pain	55	13.3%	74 (17.63%)
	Moderate Pain	195	47.1%	
	Severe Pain	84	20.3%	
	Very Severe Pain / Not Tolerable	6	1.4%	

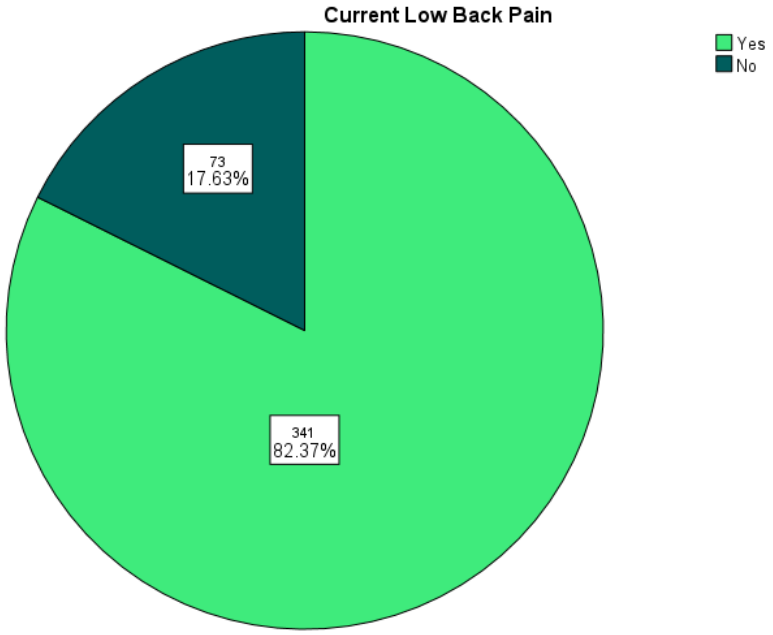


Figure 0.12: Distribution of Participants due to Current LBP

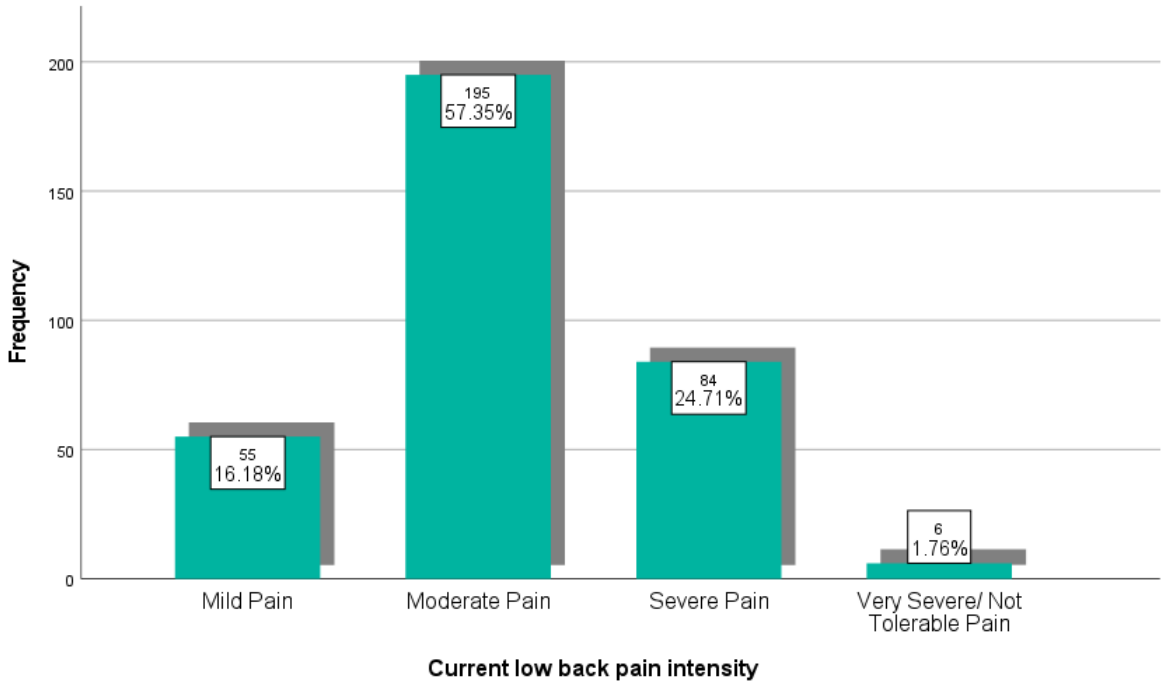


Figure 0.13: Distribution of Participants due to Current LBP Intensity

4.1.1.5 Management of LBP of Participants (Cross Sectional Study)

A total of 32.1% (n = 133) of participants reported using rest only to manage their pain, while 22.2% (n = 92) reported coping with pain without specific treatment. Additionally, 6.3% (n = 26) followed physiotherapy, and another 6.3% (n = 26) reported performing exercise-based activities. Furthermore, 12.3% (n = 51) of participants relied on pain medication for pain management (Table 4.6 and Figure 4.14).

Table 0.6: Management of LBP Information of Participants in the First Phase of Data Collection

Variables	Categories	N	%	Missing
First Management Attempt for LBP	Pain Medication	51	12.3%	76 (18.4%)
	Physiotherapy	26	6.3%	
	Exercises	26	6.3%	
	Rest Only	133	32.1%	
	Coping With Pain	92	22.2%	
	Other	10	2.4%	

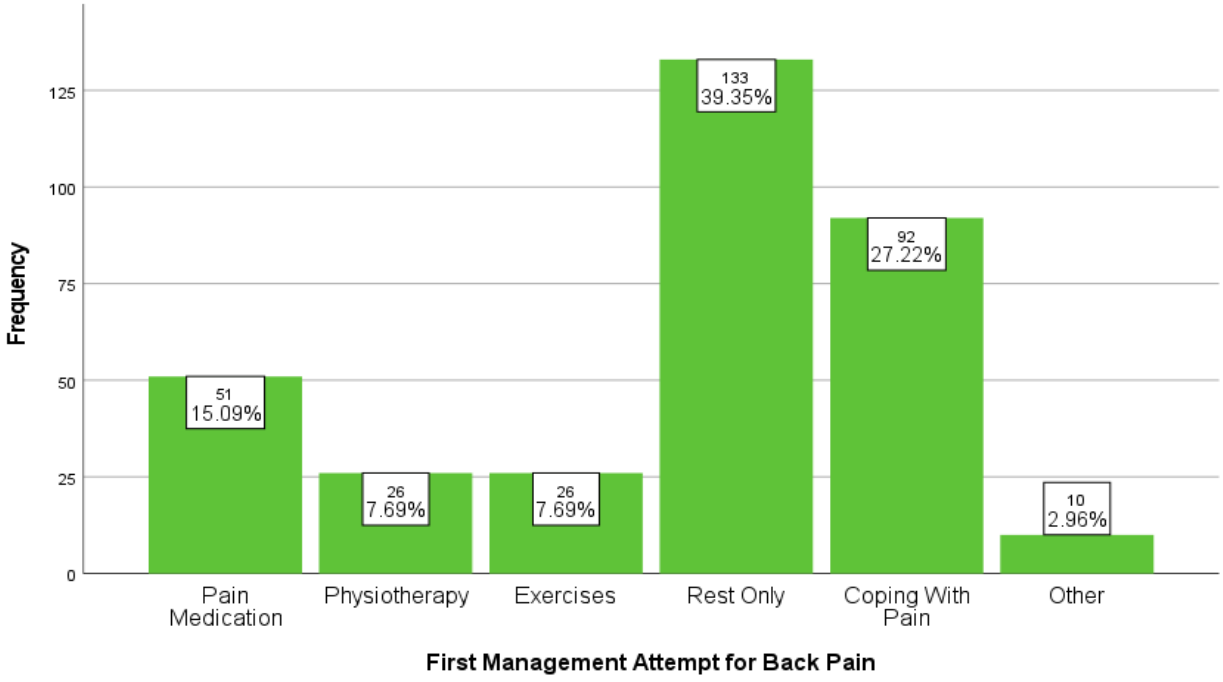


Figure *0*.14: Distribution of Participants according to First Management Attempt for LBP

4.1.1.6 Physiotherapy Management of LBP of Participants (Cross Sectional Study)

Finally, of those women who received physiotherapy, 9.9% of them use massage therapy as well as mobilization. While there were other modalities such as electrotherapy, hot or cold pack and some educational sessions toward managing the pain (Table 4.7 and Figure 4.15).

Table *0*.7: physiotherapy approaches for LBP management of Participants in the First Phase of Data Collection

Variables	Categories	N	%
If you have received physical therapy for your current LBP, please specify the types of treatments you received	Massage Therapy	41	9.9%
	Mobilization	41	9.9%
	Electrotherapy	14	3.4%
	Hot or Cold Therapy	28	6.8%
	Postural Training and Ergonomic Education	13	3.1%
	Dry Needling or Acupuncture	3	.7%
	Educational Sessions	9	2.2%
	All of the Above	27	6.5%

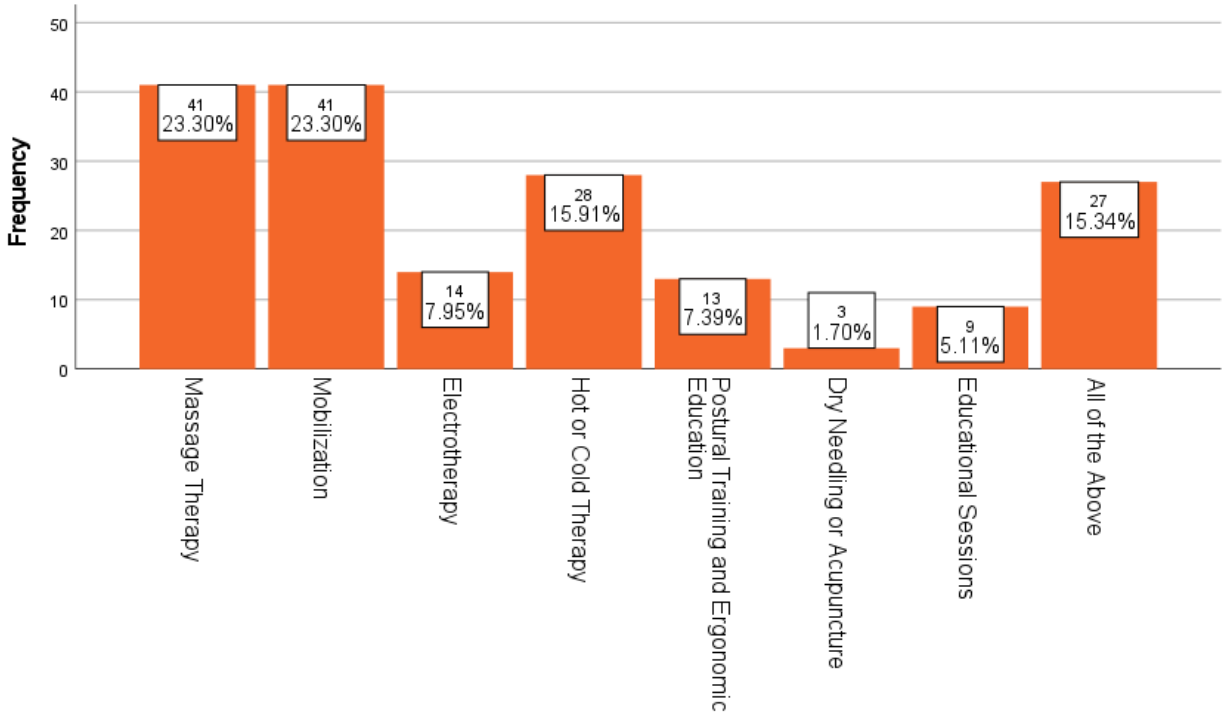


Figure *0*.6: Distribution of Participants due to Type of Physiotherapy Received

4.1.2 Inferential Statistics for the First Phase of the study (Cross Sectional Study)

In this section, the inferential statistics for the first phase of the study are presented, which intend to measure the differences and relationships among variables of the study.

4.1.2.1 Prevalence of PPLBP in Relation to Epidural Analgesia

4.1.2.1.1 Association Between Epidural Analgesia and the Presence of PPLBP

Table (4.8) indicates that there was no statistically significant difference in the prevalence of PPLBP between women who received epidural analgesia during labor and those who did not. The independent samples t-test demonstrated comparable mean values for the epidural group (Mean = 1.17, SD = 0.38) and the non-epidural group (Mean = 1.18, SD = 0.39), with $t(412) = 0.25$ and $p = 0.803$. These findings do not support the hypothesis that epidural analgesia is associated with a higher prevalence of PPLBP among postpartum women in this sample.

Table 4.8: T-test results of differences in receiving Epidural and PPLBP

	Received Epidural	N	Mean	Std. Deviation	T-Value	P-Value
PPLBP	Yes	221	1.172	0.378	0.249	0.803
	No	193	1.181	0.386		

4.1.2.1.2 Association Between Epidural Analgesia and PPLBP Intensity

Table (4.9) shows that there was no statistically significant difference in PPLBP intensity between women who received epidural analgesia during labor and those who did not. Independent samples t-test results indicated comparable mean pain intensity scores between the epidural group (Mean = 2.13, SD = 0.69) and the non-epidural group (Mean = 2.11, SD = 0.68), with $t(338) = 0.17$ and $p = 0.867$. These findings suggest that receiving epidural analgesia was not associated with increased or reduced intensity of PPLBP in the study population.

Table 4.9: T-test results of differences in receiving Epidural and PPLBP Intensity

	Received Epidural	N	Mean	Std. Deviation	T-Value	P-Value
PPLBP Intensity	Yes	182	2.126	0.689	0.168	0.867
	No	158	2.114	0.676		

4.1.2.1 PPLBP and type of delivery (Cross Sectional Study)

Results in Tables (4.10-4.11) revealed that there are significant statistical differences in LBP according to Type of Delivery (F=10.785, P-value=0.000). Therefore, in order to determine the differences between type of delivery groups, Tukey HSD test for multiple comparisons was conducted, and the results showed that differences found between Normal delivery and Pre-managed Cesarean delivery and Emergency Cesarean Delivery, in favor of Normal Delivery (R=0.1818, 0.1611) respectively. This indicates that women who had Normal Delivery reported higher LBP in comparison with pre-managed and emergency cesarean delivery.

Table 0.10: Results of One-Way ANOVA test for differences in LBP according to type of delivery (n=414)

Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.998	2	1.499	10.785	0.000
Within Groups	57.130	411	0.139		
Total	60.128	413			

For more illustration, the following table shows the mean values for each group:

Table 4.11: Mean values and Standard deviations for the differences in LBP according to Type of Delivery

	N	Mean	Std. Deviation
Normal Delivery	236	1.250	0.433
Pre-Managed Cesarean	88	1.068	0.253
Emergency Cesarean	90	1.088	0.286
Total	**414**	**1.176**	**0.381**

4.1.2.2 Current LBP and Number of previous pregnancies(Cross Sectional Study)

Results in Table (4.12) revealed that there is a negative significant statistical relationship between current LBP and number of previous pregnancies (r=-0.179, P-value=0.000). This indicates that women might suffer from LBP based on the number of pregnancies of delivery (normal, or cesarean).

Table *0*.12: Results of Pearson Correlation Coefficient between Current LBP and Number of Previous Pregnancies (n=414)

Correlation		Number of Previous Pregnancies
Current LBP	Pearson Correlation	-0.179**
	Sig. (2-tailed)	0.000
	N	414
**. Correlation is significant at the 0.01 level (2-tailed).		

4.1.2.3 Current LBP and Age (Cross Sectional Study)

ANOVA test has been utilized toward measuring the differences among participated women in current LBP due to their age, in which the results in Tables (4.13 - 4.14) below revealed that there are significant statistical differences in the current LBP due to the age of women (f-value= 5.462, P-value= 0.001). Therefore, Tukey HSD test for multiple comparisons has conducted to determine the mean differences between groups, which indicated that the differences were between women aged from 18-29 years, and those aged from 30-39 and 40-49 years, in favor of women aged from 18-29 year (r=0.128, 0.222) respectively.

Table *0*.13: Results of One-Way ANOVA test for differences in current LBP among women due to their age (n=414)

Source of Variance	Sum of Squares	df	Mean Square	F- Value	P-Value
Between Groups	2.311	3	0.770	5.462	0.001
Within Groups	57.817	410	0.141		
Total	60.128	413			

Table 4.14: Mean Values and Standard Deviations for differences in current LBP among women due to their age

Age Categories	N	Mean	Std. Deviation
18-29	190	1.2526	.43567
30-39	185	1.1243	.33085
40-49	33	1.0303	.17408
50-59	6	1.1667	.40825
Total	**414**	**1.1763**	**.38156**

4.1.2.4 Current LBP and BMI

Results in Table (4.15) revealed that there is a positive significant statistical relationship between current LBP and the BMI classification (R= 0.103, P-value= 0.036). This indicates that whenever the BMI value increase, the current LBP low increase among women.

Table 0.15: Results of Pearson Correlation Coefficient between Current LBP and BMI Classification (n=414)

Correlation		**Current LBP**
Classification of BMI	Correlation Coefficient	0.103*
	Sig. (2-tailed)	0.036
**. Correlation is significant at the 0.01 level (2-tailed).		

4.1.2.5 Current LBP and Time since last delivery

The results in Table (4.16) below, indicated for a negative significant statistical relationship among women between current LBP and time since last delivery (R=-0.147, P-value= 0.003). This means that whenever the time since last delivery increase, the current LBP decreased and vice versa.

Table *0.*16: Results of Pearson Correlation Coefficient between Current LBP and Time Since Last Delivery (n=414)

Correlation		**Current LBP**
Time Since Last Delivery	Pearson Correlation	-0.147**
	Sig. (2-tailed)	0.003

4.1.2.6 Current LBP Intensity and Age

The results in Table (4.17) below, indicated for a positive significant statistical relationship among women between current LBP Intensity and their age (R=0.124, P-value= 0.022). This means that whenever the age of women increases, the current LBP increases.

Table 0.17: Results of Pearson Correlation Coefficient between Current LBP Intensity and Age of Women (n=340)

Correlation		**Current LBP intensity**
Age	Pearson Correlation	0.124*
	Sig. (2-tailed)	0.022
	N	340

4.1.2.7 Current LBP Intensity and First Management Attempt for LBP

ANOVA test has been utilized toward measuring the differences among participated women in current LBP intensity due to their first management of the pain, in which the results in Table (4.18) below revealed that there are significant statistical differences in the current LBP intensity due to the first management of the pain (F-value= 3.885, P-value= 0.002). Therefore, Tukey HSD test for multiple comparisons has conducted to determine the differences between groups, which indicated that the differences were between women who had pain medication, and those who Rest only, in favor of women who had pain medication **(r=0.391).**

Table *0.*18: Results of One-Way ANOVA test for differences in current LBP among women due to their first management of pain (n=338)

Source of Variance	Sum of Squares	df	Mean Square	F	P- Value
Between Groups	8.735	5	1.747	3.885	0.002
Within Groups	149.292	332	0.450		
Total	158.027	337			

4.2 Phase Two (Experimental Study) Results

Phase Two of the study evaluated the effectiveness of the structured HEP in reducing PPLBP among women who had received epidural analgesia. This phase employed a targeted questionnaire and standardized outcome measures to assess changes in pain intensity, functional status, and adherence to the exercise program.

Data collection encompassed socio-demographic variables, validated clinical tools (NPRS, BPI, and ODI), and measures related to social support and exercise adherence. These instruments enabled a comprehensive evaluation of pain severity, functional limitations, daily activity performance, and contextual factors influencing engagement with the intervention.

Of the **414** original participants, 183 met the eligibility criteria for Phase Two (Experimental Study). Thirty-four women agreed to participate, four withdrew during the first week, and a final sample of **30** participants completed this phase.

The findings of Phase Two are presented using pre- and post-intervention descriptive and inferential analyses to determine the overall effectiveness of the program.

The participants recruitment and inclusion process are summarized in the flow diagram Figure (4.16).

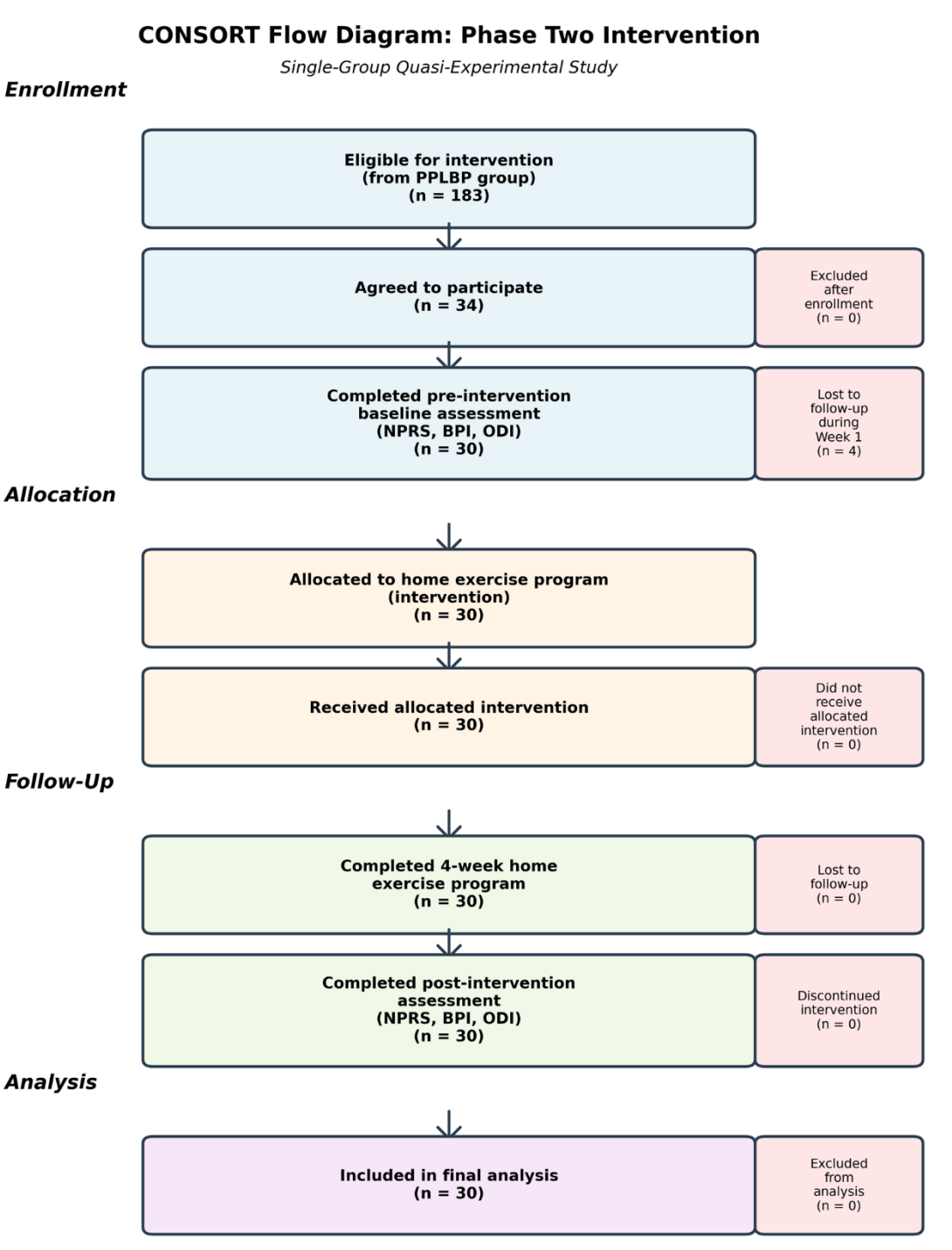


Figure 0.16: CONSORT flow diagram: Phase Two Single-Group pre-post intervention Study(Experimental Study)

4.2.1 Descriptive Statistics of Socio-Demographics for Participants in Phase two (Experimental Study)

Table (4.19) indicates that the majority of participants (56.7%) in the second phase of the study are aged from 18-29 years. Since, 43.3% of participants are underweight. In addition, more than half of participants are living in city, while 33.3% of participants are living in Hebron, and 33.3% live in Bethlehem. The majority of participants (83.3%) have university degree, while 63.3% are housewives. Moreover, 46.7% of participants have 2-4 pregnancies, and 46.7% of participants have their last delivery one year to two years ago, as well as, 46.7% have normal delivery.

Table *0*.19: Socio-Demographics for Participants of Phase two (Experimental Study)

Variables	Categories	N	%
Age	18-29	17	56.7%
	30-39	12	40.0%
	40-49	1	3.3%
BMI	Under Weight	13	43.3%
	Normal Weight	12	40.0%
	Over Weight	5	16.7%
Place of Residency	City	19	63.3%
	Village	10	33.3%
	Camp	1	3.4%
Governorate	Ramallah & Al-Bireh	2	6.7%
	Hebron	10	33.3%
	Bethlehem	10	33.3%
	Salfit	1	3.3%
	Nablus	2	6.7%
	Tulkarem	2	6.7%
	Jenin	2	6.7%
	Jerusalem	1	3.3%
Educational Level	Secondary	3	10.0%
	Diploma	1	3.3%
	University	25	83.3%
	Post Graduate	1	3.3%
Occupation	Office Work	4	13.3%
	Physically Demanding Job	5	16.7%
	House Wife	19	63.3%
	None	2	6.7%
Number of Pregnancies	1	12	40.0%
	2-4	14	46.7%
	5-6	4	13.3%

Time Since Last Delivery	Two Days - 6 Weeks	2	6.7%
	6 Weeks - 6 Months	4	13.3%
	6 Months - One Year	10	33.3%
	One Year – two years	14	46.7%
Type of Delivery	Normal Delivery	14	46.7%
	Pre-Managed Cesarean	9	30.0%
	Emergency Cesarean	7	23.3%

4.2.2 Descriptive of Scales used in the (Experimental Study)

This section summarizes the descriptive results of the ODI, BPI, and NPRS used in Phase Two to assess pain intensity, functional disability, and pain interference.

Pre- and post-intervention distributions are presented to illustrate initial status and observable changes following the exercise program.

4.2.2.1 Distribution of NPRS Pain Categories Before and After the Intervention

Results presented in Table (4.20) and Figure (4.17) indicate a significant improvement in NPRS scores following the implementation of the structured HEP. Fourteen participants reported the absence of pain in the post-test, compared with none at baseline. Additionally, none of the participants reported severe pain in the post-test, whereas 20 participants had reported severe pain during the pre-test assessment.

These findings clearly demonstrate that the suggested program was effective in reducing the intensity and severity of LBP among postpartum women, indicating meaningful clinical improvement following the four-week intervention.

Table *0*.20: Frequencies and Percentages of NPRS

Variable	**Categories**	**Pre-Test**		**Post-Test**	
		N	**%**	**N**	**%**
NPRS	None	0	0	14	46.7%
	Mild Pain	0	0	11	36.7%
	Moderate Pain	10	33.3%	5	16.7%
	Severe Pain	20	66.7%	0	0

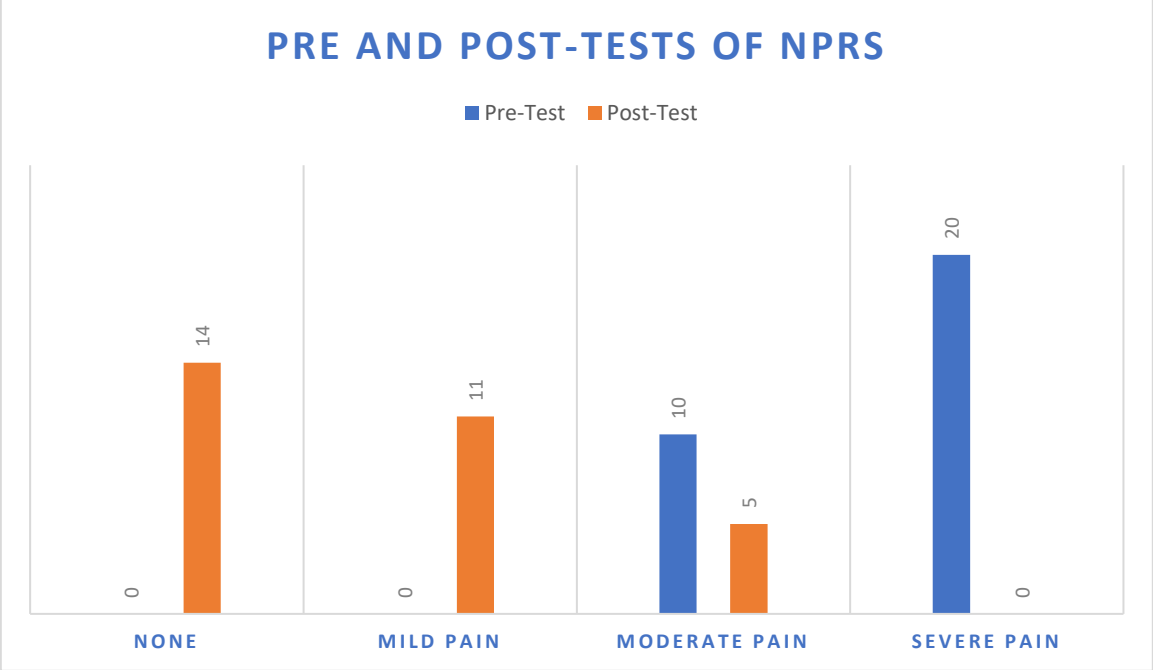


Figure *o*.7: Distribution of participants in pre-test and post-test regarding NPRS

4.2.2.2 Distribution of ODI items Categories Before and After the Intervention

Table (4.21) and Figure (4.18), indicates that 26 participants in the post-test reported that they have minimal disability, compared with no one of participants reported minimal disability in the pre-test. In addition, 4 participants in the post-test reported moderate disability, while 14 participants reported moderate disability in the pre-test. Moreover, 16 participants reported severe disability in the pre-test, therefore no one of participants reported that in the post-test.

Table *o*.21: Frequencies of the total score of ODI

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
ODI	Minimal Disability	0	0	26	86.7%
	Moderate Disability	14	46.7%	4	13.3%
	Severe Disability	16	53.3%	0	0
	Crippled	0	0	0	0
	Bed-Bound	0	0	0	0

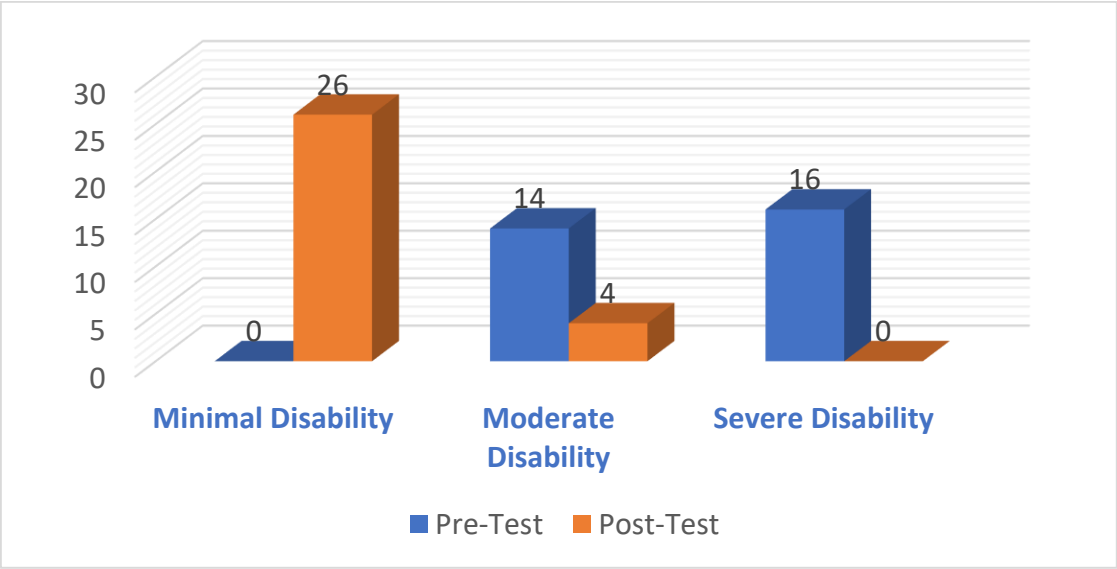


Figure *o*.8: Frequencies of the Total Score of ODI

Results in Table (4.22) show that all of the categories measured in the ODI scale within Pain intensity item were improved after implementing the suggested program. Results showed a significant improvement, by which in the pre-test there was no one of participants having no pain at the moment. While, in the post-test about half participants 14 reported that they have no pain at the moment.

Table *o*.22: Frequencies and Percentages of ODI's Pain Intensity Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Pain Intensity	I have no pain at the moment	0	0	14	46.7%
	The pain is very mild at the moment	0	0	5	16.7%
	The pain is moderate at the moment	2	6.7%	7	23.3%
	The pain is fairly severe at the moment	8	26.7%	4	13.3%
	The pain is very severe at the moment	19	63.3%	0	0
	The pain is the worst imaginable at the moment	1	3.3%	0	0

Table (4.23) revealed that significant improvements in Personal Care item were found, as no one of participants reported that they can look after themselves normally without causing extra pain before the intervention, while after intervention 23 participants reported that they can look after themselves normally without causing extra pain.

Table 4.23: Frequencies and Percentages of ODI's Personal Care Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Personal Care	I can look after myself normally without causing extra pain	0	0	23	76.7%
	I can look after myself normally but it causes extra pain	1	3.3%	6	20.0%
	It is painful to look after myself and I am slow and careful	1	3.3%	1	3.3%
	I need some help but manage most of my personal care	26	86.7%	0	0
	I need help every day in most aspects of self-care	2	6.7%	0	0
	I do not get dressed, I wash with difficulty and stay in bed	0	0	0	0

Table (4.24) revealed that significant improvements (p value = 0.05) in Lifting item were found, as 17 participants reported that Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table before the intervention, while after intervention 3 participants reported that Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table.

Table 4.24: Frequencies and Percentages of ODI's Lifting Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Lifting	I can lift heavy weights without extra pain	0	0	13	43.3%
	I can lift heavy weights but it gives extra pain	2	6.7%	14	46.7%
	Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table	17	56.7%	3	10.0%
	Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned	5	16.7%	0	0
	I can lift very light weights	6	20.0%	0	0
	I cannot lift or carry anything at all	0	0	0	0

Table (4.25) and Figure (4.19) revealed that significant improvements in walking item were found, as in the pre-test one participant reported that Pain does not prevent me walking any distance, while in the post-test 17 participants reported that.

Table (4.25): Frequencies and Percentages of ODI's Walking Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Walking	Pain does not prevent me walking any distance	1	3.3%	17	56.7%
	Pain prevents me from walking more than 2 kilometers	16	53.3%	12	40.0%
	Pain prevents me from walking more than 1 kilometer	12	40.0%	1	3.3%
	Pain prevents me from walking more than 500 meters	1	3.3%	0	0
	I can only walk using a stick or crutches	0	0	0	0
	I am in bed most of the time	0	0	0	0

Figure (4.19): Frequencies of Walking Items (Pre-Post-Tests)

Table (4.26) revealed that significant improvements in sitting item occurred between pre and post-tests, as in the pre-test 18 participants reported that Pain prevents me sitting more than one hour, while in the post-test 3 participants reported that.

Table *0*.5: Frequencies and Percentages of ODI's Sitting Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Sitting	I can sit in any chair as long as I like	1	3.3%	7	23.3%
	I can only sit in my favorite chair as long as I like	6	20.0%	20	66.7%
	Pain prevents me sitting more than one hour	18	60.0%	3	10.0%
	Pain prevents me from sitting more than 30 minutes	4	13.3%	0	0
	Pain prevents me from sitting more than 10 minutes	1	3.3%	0	0
	Pain prevents me from sitting at all	0	0	0	0

Table (4.27) revealed that significant improvements in standing item exposed, as in the pre-test 10 participants reported that Pain prevents me from standing for more than 30 minutes, while in the post-test no one of participants reported that.

Table *0*.6: Frequencies and Percentages of ODI's Standing Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Standing	I can stand as long as I want without extra pain	1	3.3%	8	26.7%
	I can stand as long as I want but it gives me extra pain	5	16.7%	17	56.7%
	Pain prevents me from standing for more than 1 hour	10	33.3%	5	16.7%
	Pain prevents me from standing for more than 30 minutes	10	33.3%	0	0
	Pain prevents me from standing for more than 10 minutes	3	10.0%	0	0
	Pain prevents me from standing at all	1	3.3%	0	0

Table (4.28) and Figure (4.20) revealed that significant improvements in sleeping item were identified, as in the pre-test no one of participants reported that My sleep is never disturbed by pain, while in the post-test 11 participants reported that My sleep is never disturbed by pain.

Table *0*.7: Frequencies and Percentages of ODI's Sleeping Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Sleeping	My sleep is never disturbed by pain	0	0	11	36.7%
	My sleep is occasionally disturbed by pain	13	43.3%	18	60.0%
	Because of pain I have less than 6 hours sleep	7	23.3%	1	3.3%
	Because of pain I have less than 4 hours sleep	2	6.7%	0	0
	Because of pain I have less than 2 hours sleep	7	23.3%	0	0
	Pain prevents me from sleeping at all	1	3.3%	0	0

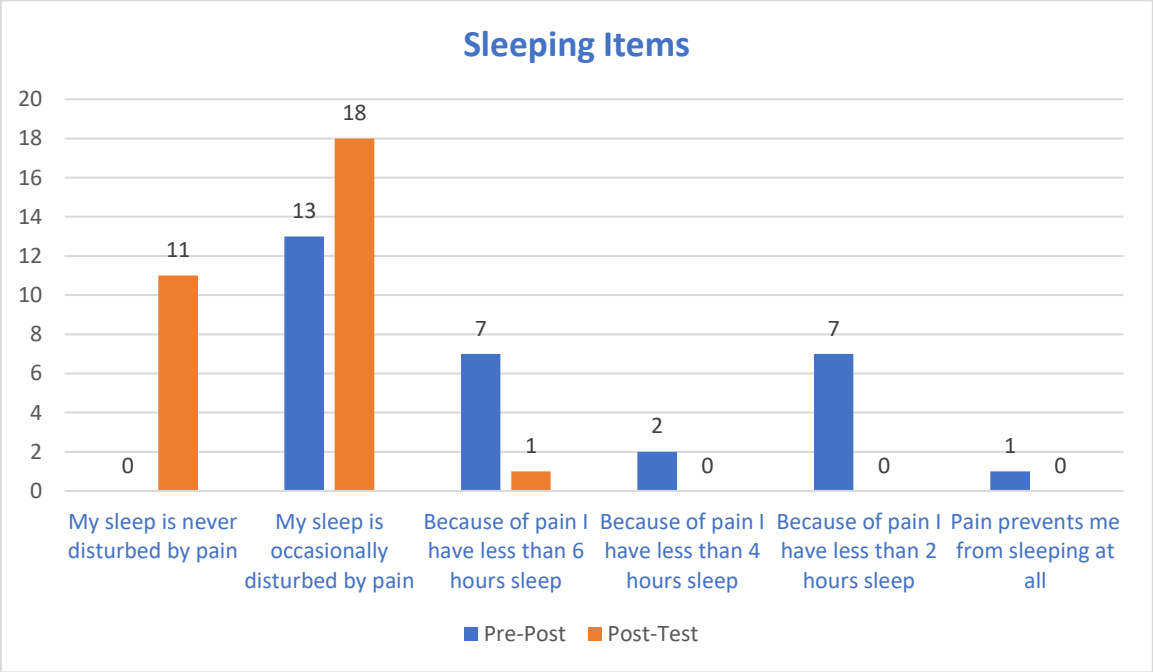


Figure *0*.20: Frequencies of Sleeping Items (Pre-Post-Tests)

Table (4.29) revealed that significant improvements in Social Life item were observed, as in the pre-test 7 participants reported that their social life is normal and gives them no extra pain, while in the post-test 25 participants reported that their social life is normal and gives them no extra pain.

Table (4.8): Frequencies and Percentages of ODI's Items

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Social Life	My social life is normal and gives me no extra pain	7	23.3%	25	83.3%
	My social life is normal but increases the degree of pain	18	60.0%	4	13.3%
	Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport	5	16.7%	1	3.3%
	Pain has restricted my social life and I do not go out as often	0	0	0	0
	Pain has restricted my social life to my home	0	0	0	0
	I have no social life because of pain	0	0	0	0

Table (4.30) revealed that significant improvements in Travelling item were observed, as in the pre-test one participant reported that I can travel anywhere without pain, while in the post-test 15 participants reported that I can travel anywhere without pain.

Table (4.30: Frequencies and Percentages of ODI's Travelling Item

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Travelling	I can travel anywhere without pain	1	3.3%	15	50.0%
	I can travel anywhere but it gives me extra pain	9	30.0%	11	36.7%
	Pain is bad but I manage journeys over two hours	13	43.3%	4	13.3%
	Pain restricts me to journeys of less than one hour	2	6.7%	0	0
	Pain restricts me to short necessary journeys under 30 minutes	5	16.7%	0	0
	Pain prevents me from travelling except to receive treatment	0	0	0	0

Overall, these findings indicate that the suggested program provoked in the post-test superior functional gains in pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sleeping, social life, travelling, when compared with the pre-test.

4.2.2.3 Distribution of BPI items Categories Before and After the Intervention (Experimental Study)

Regarding BPI, all variables demonstrated statistically significant improvements following implementation of the proposed program. For the item "pain at its least during the last 24 hours," 18 participants reported no pain in the post-test, whereas none reported no pain in the pre-test. Additionally, for "pain at its worst during the last 24 hours," 15 participants reported very severe pain at pre-test, while no participants reported very severe pain at post-test. Similarly, for average pain during the last 24 hours, 15 participants reported severe pain in the pre-test, whereas no participants reported severe pain in the post-test. For the item "pain right now," none of the participants reported no pain at pre-test, while 23 participants reported no pain at post-test.

Regarding pain location, six participants reported bilateral back pain in the pre-test; however, no participants reported bilateral back pain in the post-test.

In addition, three participants reported numbness or tingling pain in the pre-test, whereas none reported these symptoms in the post-test. The most notable improvement was observed in pain pattern, where nine participants reported constant pain at pre-test, while in the post-test all participants reported intermittent pain (Table 4.31).

Table *0*.31: Frequencies and Percentages of BPI Pain Sections

Variable	Categories	Pre-Test		Post-Test	
		N	%	N	%
Pain at Its Least in the last 24 hrs	No Pain	0	0	18	60.0%
	Mild Pain	16	53.3%	10	33.3%
	Moderate Pain	13	43.3%	2	6.7%
	Severe Pain	1	3.3%	0	0
	Very Severe Pain	0	0	0	0
Pain at Its Worst the last 24 hrs	No Pain	0	0	2	6.7%
	Mild Pain	0	0	8	26.7%
	Moderate Pain	3	10.0%	18	60.0%
	Severe Pain	12	40.0%	2	6.7%
	Very Severe Pain	15	50.0%	0	0
Average of Pain the last 24 hrs	No Pain	0	0	3	10.0%
	Mild Pain	0	0	23	76.7%
	Moderate Pain	15	50.0%	4	13.3%
	Severe Pain	15	50.0%	0	0
	Very Severe Pain	0	0	0	0

Pain Right Now	No Pain	0	0	23	76.7%
	Mild Pain	13	43.3%	6	20.0%
	Moderate Pain	15	50.0%	1	3.3%
	Severe Pain	1	3.3%	0	0
	Very Severe Pain	1	3.3%	0	0
Pain Site	Middle of the Back//**	19	63.3%	26	86.7%
	Both Sides (Left and Right)	6	20.0%	0	0
	Left	4	13.3%	2	6.7%
	Right	1	3.3%	2	6.7%
Pain Description	Tightness / Stiffness	7	23.3%	14	46.7%
	Aching Pain	14	46.7%	11	36.7%
	Numbness / Tingling	3	10.0%	0	0
	Sharp Pain	3	10.0%	2	6.7%
	Throbbing Pain	2	6.7%	1	3.3%
	Burning Pain	1	3.3%	2	6.7%
Pain Pattern	Constant	9	30.0%	0	0
	Intermittent	21	70.0%	30	100%

Moreover, no one of participants in the pre-test reported that pain has no interference toward general activity, but in the post-test 16 participants reported that. In another hand, one participant in the post-test reported that pain has high interference in the "mood" item, compared with 17 participants reported that in the pre-test. In addition, one participant in the post-test reported that pain has high interference in "work" item, compared with 11 participants reported that in the pre-test. As well, no one of participants in the post-test reported that pain has high interference in "enjoyment of life" item, compared with 6 participants reported that in the pre-test.

On the other hand, 3 participants in the post-test reported that pain has moderate interference in "fatigue" item, compared with 17 participants reported that in the pre-test (Table 4.32).

Table *0*.32: Frequencies and Percentages of BPI Activity Sections

Variable	**Categories**	**Pre-Test**		**Post-Test**	
		N	**%**	**N**	**%**
General Activity	No Interference	0	0	16	53.3%
	Low Interference	8	26.7%	10	33.3%
	Moderate Interference	10	33.3%	4	13.3%
	High Interference	12	40.0%	0	0

Mood	No Interference	0	0	18	60.0%
	Low Interference	7	23.3%	10	33.3%
	Moderate Interference	6	20.0%	1	3.3%
	High Interference	17	56.7%	1	3.3%
Work	No Interference	1	3.3%	14	46.7%
	Low Interference	3	10.0%	11	36.7%
	Moderate Interference	15	50.0%	4	13.3%
	High Interference	11	36.7%	1	3.3%
Enjoyment of Life	No Interference	1	3.3%	25	83.3%
	Low Interference	7	23.3%	3	10.0%
	Moderate Interference	16	53.3%	2	6.7%
	High Interference	6	20.0%	0	0
Fatigue	No Interference	0	0	15	50.0%
	Low Interference	4	13.3%	11	36.7%
	Moderate Interference	17	56.7%	3	10.0%
	High Interference	9	30.0%	1	3.3%

This emphasize that suggested program implemented in this study, has effectiveness among reducing the pain intensity among women who suffer from LBP.

4.2.3 Inferential Statistics for Phase Two (Experimental Study)

This section presents the inferential statistical analyses conducted to evaluate the effectiveness of the structured HEP among participants in Phase Two. These analyses aim to determine whether the observed changes in pain intensity, functional disability, and pain interference were statistically significant following the intervention. Tests of normality were first performed to confirm the suitability of parametric analyses. Subsequently, paired comparisons between pre- and post-intervention scores for the ODI, BPI, and NPRS were conducted, followed by additional analyses examining the relationships between exercise adherence and clinical outcomes, as well as potential differences in outcomes based on key demographic variables. The findings reported in this section provide a rigorous assessment of the intervention's impact and the factors that may influence participant response.

4.2.3.1 Normality Test for ODI, BPI, and NPRS tests

The normality of the data gathered for this study was examined using the Shapiro-Wilk and Kolmogorov-Smirnov tests. The findings of the Shapiro-Wilk test were mostly taken into account while evaluating the distribution of the variables because it is more suitable for small sample sizes ($n < 50$).

As presented in Table (4.33), the ODI, BPI, and NPRS pre and post variables followed a normal distribution, as their p-values were greater than 0.05. Based on these findings, the parametric statistical tests were consequently employed.

Table *0*.33: Results of Normality Test (Experimental Study)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
ODI-PRE	0.124	30	0.20	0.962	30	0.35
ODI-POST	0.206	30	0.10	0.885	30	0.08
BPI-PRE	0.125	30	0.20	0.945	30	0.12
BPI-POST	0.228	30	0.13	0.878	30	0.07
NPRS- PRE	0.423	30	0.09	0.597	30	0.10
NPRS-POST	0.291	30	0.10	0.774	30	0.18

4.2.3.2 Pre–Post Intervention Differences in NPRS scores (Experimental Study)

Table (4.34) revealed that there are statistically significant differences was found between the pre-test and post-test in the NPRS ($p = 0.000$). Which the post-test revealed a highly significant improvement within a very large effect size (Cohen's $D = 2.21$).

Table *0*.34: Results of Paired Samples T-Test for differences between Pre and Post-tests for (NPRS)

Variables	**Mean ± STD**	**t-value**	**df**	**Sig.**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
NPRS-PRE	3.67 ± 0.48	12.104	29	0.000	1.64	2.30
NPRS-POST	1.70 ± 0.74					

4.2.3.3 Pre–Post Intervention Differences in ODI Scores (Experimental Study)

Table (4.35) revealed that there are statistically significant differences was found between the pre-test and post-test in the ODI ($p = 0.000$). Which the post-test revealed a highly significant improvement within an extremely large effect size (Cohen's $D = 3.22$).

Table *0.*9: Results of Paired Samples T-Test for differences between Pre and Post-tests for (ODI)

Variables	Mean ± STD	t-value	df	Sig.	95% Confidence Interval of the Difference	
					Lower	Upper
ODI-PRE	2.54 ± 0.51	17.65	29	0.000	11.76	14.84
ODI-POST	1.13 ± 0.35					

4.2.3.4 Pre–Post Intervention Differences in BPI Scores

Table (4.36) revealed that there are statistically significant differences was found between the pre-test and post-test in the BPI (p = 0.000). Which the post-test revealed a highly significant improvement within a very large effect size (Cohen's D = 2.34).

Table 0.10: Results of Paired Samples T-Test for differences between Pre and Post-tests for (BPI)

Variables	Mean ± STD	t-value	df	Sig.	95% Confidence Interval of the Difference	
					Lower	Upper
BPI-PRE	25.54 ± 3.76	12.83	29	0.000	11.77	16.23
BPI-POST	11.54 ± 4.87					

4.2.3.5 Relationship Between Exercise Adherence and NPRS(Experimental Study)

Table (4.37) and Figure (4.21) revealed that there is a negative significant statistical relationship between exercise adherence by the participants and the NPRS total score (R=-0.724, p-value=0.000). This indicates that participants who had high exercise adherence, report a low NPRS level.

Table *0.*11: Pearson Correlation Coefficient for the relationship between Exercise Adherence and NPRS

		Exercise Adherence	NPRS
Exercise Adherence	Pearson Correlation	1	-0.724**
	Sig. (2-tailed)		0.000
	N	30	30
**. Correlation is significant at the 0.01 level (2-tailed).			

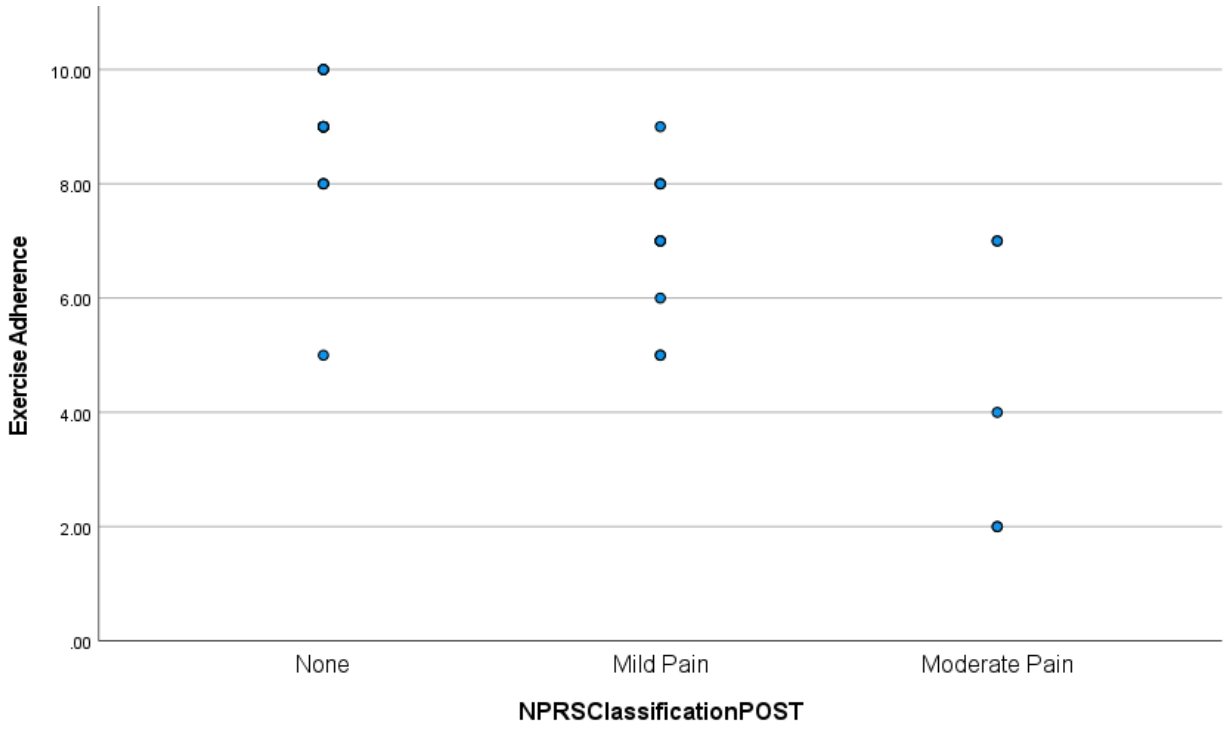


Figure *o*.91: Relationship between Exercise Adherence and NPRS

4.2.3.6 Differences in Outcome measures due to demographics of participants (Experimental Study)

4.2.3.6.1 Age of Participants

Table (4.38) revealed that there is no significant statistical relationship between age of participants and ODI pre-post-tests, in which there are significant improvements over pre-post-tests among participants regardless their age (p-value= 0.168). In addition, the results did not show significant statistical relationship between age of participants and BPI and NPRS pre-post-tests (p-value= 0.907, 0.484) respectively.

Table *o*.12: Results of Two-Way Repeated Measures ANOVA (Age)

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ODI * Age	Sphericity Assumed	30.574	2	15.287	1.906	0.168
	Greenhouse-Geisser	30.574	2	15.287	1.906	0.168
	Huynh-Feldt	30.574	2	15.287	1.906	0.168
	Lower-bound	30.574	2	15.287	1.906	0.168

BPI * Age	Sphericity Assumed	3.725	2	1.863	0.098	0.907
	Greenhouse-Geisser	3.725	2	1.863	0.098	0.907
	Huynh-Feldt	3.725	2	1.863	0.098	0.907
	Lower-bound	3.725	2	1.863	0.098	0.907
NPRS * Age	Sphericity Assumed	0.601	2	0.300	0.746	0.484
	Greenhouse-Geisser	0.601	2	0.300	0.746	0.484
	Huynh-Feldt	0.601	2	0.300	0.746	0.484
	Lower-bound	0.601	2	0.300	0.746	0.484

4.2.3.6.2 BMI of Participants

Table (4.39) showed that there is no significant statistical relationship between the outcome measures (ODI, BPI, NPRS) and the value of BMI among participants (p-value= 0.231, 0.632, 0.550) respectively.

Table *a*.13: Results of Two-Way Repeated Measures ANOVA (BMI)

Source		**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
ODI * BMI	Sphericity Assumed	25.446	2	12.723	1.549	0.231
	Greenhouse-Geisser	25.446	2	12.723	1.549	0.231
	Huynh-Feldt	25.446	2	12.723	1.549	0.231
	Lower-bound	25.446	2	12.723	1.549	0.231
BPI * BMI	Sphericity Assumed	17.285	2	8.642	0.466	0.632
	Greenhouse-Geisser	17.285	2	8.642	0.466	0.632
	Huynh-Feldt	17.285	2	8.642	0.466	0.632
	Lower-bound	17.285	2	8.642	0.466	0.632
NPRS * BMI	Sphericity Assumed	0.497	2	0.248	0.610	0.550
	Greenhouse-Geisser	0.497	2	0.248	0.610	0.550
	Huynh-Feldt	0.497	2	0.248	0.610	0.550
	Lower-bound	0.497	2	0.248	0.610	0.550

4.2.3.6.3 Number of Previous Pregnancies among Participants (Experimental Study)

Table (4.40) showed that the relationships between the outcome measures (ODI, BPI, NPRS), and groups of the number of previous pregnancies are not statistically significant (p-value= 0.206, 0.151, and 0.547) respectively.

Table *o*.14: Results of Two-Way Repeated Measures ANOVA (Number of Previous Pregnancies)

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ODI * Number of Previous Pregnancies	Sphericity Assumed	27.263	2	13.632	1.674	0.206
	Greenhouse-Geisser	27.263	2	13.632	1.674	0.206
	Huynh-Feldt	27.263	2	13.632	1.674	0.206
	Lower-bound	27.263	2	13.632	1.674	0.206
BPI * Number of Previous Pregnancies	Sphericity Assumed	67.661	2	33.830	2.028	0.151
	Greenhouse-Geisser	67.661	2	33.830	2.028	0.151
	Huynh-Feldt	67.661	2	33.830	2.028	0.151
	Lower-bound	67.661	2	33.830	2.028	0.151
NPRS * Number of Previous Pregnancies	Sphericity Assumed	0.501	2	0.251	0.616	0.547
	Greenhouse-Geisser	0.501	2	0.251	0.616	0.547
	Huynh-Feldt	0.501	2	0.251	0.616	0.547
	Lower-bound	0.501	2	0.251	0.616	0.547

4.2.3.6.4 Occupation of Participants (Experimental Study)

Table (4.41) showed that the relationships between the outcome measures (ODI, NPRS), and groups of occupation variable are not statistically significant (p-value= 0.515, 0.525) respectively. While, a statistically significant relationship found between BPI pre-post-tests and occupation of participants (p-value=0.020). This indicates that the occupation of participants influences the BPI scale results between pretest and posttest.

Table *o*.41: Results of Two-Way Repeated Measures ANOVA (Occupation)

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ODI * Occupation	Sphericity Assumed	20.451	3	6.817	0.782	0.515
	Greenhouse-Geisser	20.451	3	6.817	0.782	0.515
	Huynh-Feldt	20.451	3	6.817	0.782	0.515
	Lower-bound	20.451	3	6.817	0.782	0.515
BPI * Occupation	Sphericity Assumed	160.962	3	53.654	3.907	0.020
	Greenhouse-Geisser	160.962	3	53.654	3.907	0.020
	Huynh-Feldt	160.962	3	53.654	3.907	0.020
	Lower-bound	160.962	3	53.654	3.907	0.020

NPRS * Occupation	Sphericity Assumed	0.929	3	0.310	0.763	0.525
	Greenhouse-Geisser	0.929	3	0.310	0.763	0.525
	Huynh-Feldt	0.929	3	0.310	0.763	0.525
	Lower-bound	0.929	3	0.310	0.763	0.525

4.3 Discussion

4.3.1 Prevalence of PPLBP

This study identified a notably high prevalence of PPLBP among Palestinian women, with 82.4% reporting current symptoms. This figure substantially exceeds those reported in comparable international settings, including 44% in South Africa (Madzivhandila et al., 2023) and 67% immediately postpartum in Sweden, with 37% persisting at 18 months (Ostgaard, 2016). Notably, a recent study by and Afiah Malik et al., (2025) conducted among 176 primigravida women in Pakistan reported a 100% prevalence of PPLBP, with nearly 90% of participants experiencing moderate disability as measured by the ODI. These findings further underscore the magnitude of the problem in low- and middle-income countries, particularly among first-time mothers, and suggest that even uncomplicated deliveries may lead to significant musculoskeletal impairment in the early postpartum period.

The striking similarity in prevalence between the current Palestinian cohort and Afiah Malik et al., (2025) Pakistani sample suggests shared contextual and systemic risk factors across low- and middle-income countries. These may include limited access to postpartum physiotherapy services, insufficient early mobilization guidance, and a sociocultural emphasis on prolonged rest rather than active recovery. In Palestine specifically, only 6.3% of participants reported accessing any form of postpartum physiotherapy, while 32.1% relied solely on rest—highlighting a critical service and knowledge gap in maternal rehabilitation.

These findings are consistent with the multifactorial etiology of PPLBP discussed in Chapter Two, where biomechanical stress (e.g., increased lumbar loading from household tasks), hormonal changes (e.g., relaxin-induced ligamentous laxity), and psychosocial contributors (e.g., low support systems, heightened stress) interact to increase pain risk (Herman Sehmbi et al., 2017; Lim et al., 2020). Moreover, the current data reveal that only 6.3% of women accessed physiotherapy postpartum, while 32.1% relied on rest alone, underscoring a critical service gap.

4.3.2 Epidural Analgesia and PPLBP

Among study participants, 53.4% received epidural analgesia during labor. No evidence of a long-term relationship between epidural analgesia and PPLBP was observed.

This finding is consistent with Abbasi et al. (2014), who reported no differences in pain intensity or duration between women who received epidural analgesia and those who did not. Similarly, Howell et al. (2002) and Malevic et al. (2019) found no lasting differences in pain perception or disability attributable to epidural use during childbirth.

Contrasting earlier studies (Butler & Fuller, 1998; Russell et al., 1993) which suggested higher rates of chronic LBP among epidural recipients, these inconsistencies may reflect methodological limitations in earlier research, such as small sample sizes, inadequate control for confounders, outdated anesthesia protocols, and short or inconsistent follow-up intervals. Contemporary improvements in epidural technique including more precise catheter placement, use of lower-concentration local anesthetics, and optimized dosing protocols, may help mitigate musculoskeletal risks previously observed (Halliday et al., 2022; Macarthur et al., 1995).

Overall, while transient LBP following epidural use cannot be completely ruled out, these findings support the growing body of evidence suggesting that epidural analgesia is not an independent predictor of long-term PPLBP. Rather, a constellation of physical and demographic factors may better explain pain variability.

4.3.3 Maternal Characteristics and Pain Predictors: A Comparative Analysis

This study identified several maternal characteristics significantly associated with PPLBP, supporting the biopsychosocial framework underpinning the research. Consistent with prior findings, younger women (aged 18–29 years) reported higher mean scores on the Numeric Pain Rating Scale (NPRS). This may be attributable to earlier re-engagement in physically demanding caregiving tasks—such as lifting, breastfeeding, and prolonged standing—during a period of musculoskeletal vulnerability. Prior studies have similarly suggested that younger women may have less neuromuscular efficiency and fewer coping strategies for managing musculoskeletal strain (Komatsu et al., 2020; Russell et al., 1993).

A significant positive correlation was also found between elevated Body Mass Index (BMI) and pain intensity, consistent with existing biomechanical models. Excess weight may increase axial loading and spinal compression, particularly when compounded by weakened abdominal and pelvic floor musculature (Herman Sehmbi et al., 2017; Lim et al., 2020). Matsuda et al., (2020) reported that excessive gestational weight gain (≥15 kg) was associated with persistent lumbopelvic pain four months postpartum, with an adjusted odds ratio of 2.35. Further, (Benzon et al., 2016) emphasized that postpartum pain syndromes are best understood within a biopsychosocial model, wherein mechanical, hormonal, and psychosocial stressors, such as joint hypermobility and emotional distress, interact to influence outcomes.

Interestingly, higher parity was associated with lower reported pain intensity in this study. It is plausible that multiparous women benefit from greater neuromuscular adaptation, improved postural control, and enhanced psychological resilience gained through previous childbirth experiences. Afiah Malik et al., (2025) reported that all primigravid participants in their study experienced PPLBP, underscoring the musculoskeletal demands and adaptive challenges faced by first-time mothers. In contrast, (Yamada et al., 2021) observed that women with multiple vaginal deliveries exhibited increased pelvic incidence and sacral slope markers of long-term postural adaptation, which may predispose them to chronic musculoskeletal strain. These contrasting findings suggest a possible shift in PPLBP etiology: primiparous women may be more susceptible to acute postpartum overload, while multiparous women may experience pain due to cumulative structural changes.

Notably, this study also found statistically significant differences in PPLBP by delivery type ($F = 10.785$, $p = .000$), with women who underwent normal vaginal delivery reporting higher pain intensity than those with pre-managed or emergency cesarean delivery. Post hoc analysis using Tukey's HSD indicated meaningful differences between vaginal and cesarean groups ($R = 0.1818, 0.1611$). This is suggesting that labor-related mechanical strain, rather than epidural use alone may be a more salient risk factor for PPLBP. (Komatsu et al., 2020) emphasized the interplay of obstetric, biomechanical, and psychosocial factors in postpartum pain trajectories. Additionally, (Lim et al., 2020) proposed that pelvic misalignment and loss of spinal stability during labor contribute independently to musculoskeletal symptoms. However, these findings diverge from those of Nawshin & Sanam (2024), who reported higher disability and pain levels in women who delivered via cesarean section, as measured by the ODI. Their explanation centered on post-surgical limitations and delayed physical recovery. However, the current study suggests that labor-related mechanical stressors, such as prolonged pushing and unassisted delivery, may also increase lumbar strain, particularly in the early postpartum period.

Collectively, these findings validate the conceptual framework presented in Chapter Two, emphasizing that PPLBP arises from a constellation of interacting physiological, behavioral, and psychosocial factors. This reinforces the need for individualized postpartum care approaches that address not only obstetric history but also physical conditioning, coping strategies, and postnatal demands.

4.3.4 Effectiveness of the home exercise program (HEP).

The findings from the second phase of this study provide evidence supporting the effectiveness of a structured four-week home exercise program (HEP) in reducing pain and disability among women with persistent postpartum low back pain. Clinically meaningful improvements were observed across all outcome measures, with substantial reductions in pain intensity and functional limitation.

The decrease in NPRS and BPI scores reflects not only reduced pain severity but also improved pain interference, while the marked reduction in ODI scores indicates a transition from moderate to minimal disability, suggesting enhanced functional independence.

These outcomes are consistent with previous research demonstrating the benefits of core stabilization, pelvic floor strengthening, and functional movement training in postpartum populations (Ferreira & Albuquerque-Sendín, 2013; Stuge et al., 2004). In addition, the educational component of the intervention, focusing on ergonomics during infant care, postural awareness, and safe body mechanics, likely contributed to sustained symptom improvement by addressing modifiable behavioral and biomechanical factors, as supported by recent evidence (Kim & Shin, 2023).

Importantly, the home-based delivery model, supplemented by weekly virtual follow-ups, proved feasible and acceptable, highlighting its potential applicability in contexts where access to clinic-based physiotherapy is limited. The high adherence and engagement observed further suggest that remote physiotherapy interventions may represent a practical and scalable approach for postpartum rehabilitation, particularly in low-resource settings.

4.3.4 Comparison with Existing Literature

The high prevalence of PPLBP observed in this study is consistent with global findings that PPLBP is both common and under-addressed. While the literature remains mixed regarding the relationship between epidural analgesia and chronic LBP, the present findings support more recent evidence suggesting no significant long-term association.

In terms of intervention, the observed effectiveness of the HEP aligns with the findings from international research highlighting the benefits of structured, evidence-based exercise programs. However, what distinguishes this study is its regional focus: To the best of the author's knowledge, this is the first empirical investigation to document both the prevalence and intervention outcomes for PPLBP in Palestine.

The study also contributes valuable cultural insights. For example, a notable proportion of women reported relying solely on rest to manage postpartum pain, a behavior that, while traditional, may delay recovery.

Future research incorporating narrative or mixed-method approaches would offer deeper understanding of how cultural and psychological variables shape recovery trajectories.

Finally, the successful implementation of a home-based, physiotherapist-guided program supports the integration of such models into routine postnatal care. Educational content on safe lifting, posture, and gradual return to physical activity should be standardized within postpartum services.

4.5 Strengths of the Study

- **Novel contribution**: To our knowledge it is one of few studies to report both PPLBP prevalence and intervention outcomes in West Bank \Palestine.
- **Robust design**: Combined epidemiological and interventional approaches strengthen internal validity.
- **Validated measurement tools**: Use of NPRS, BPI, and ODI ensured reliability of clinical outcomes.
- **High adherence**: The culturally adopted home program achieved high engagement and feasibility

4.6 Limitations

- Cross-sectional data limit causal inference.
- Absence of a control group in Phase Two limits internal attribution of effects.
- Short-term follow-up does not assess long-term sustainability.
- Sample bias: Participants in Phase Two may reflect motivated subgroups.
- Generalizability is limited to urban, digitally connected populations.
- Lacks randomization, so other factors (confounding variables) might explain changes, not just the intervention.
- Phase Two (Experimental Study) was restricted to women who received epidural analgesia limited subgroup comparisons and may have introduced selection bias due to non-stratified intervention allocation.

As participants were recruited online and largely from urban settings, the findings may not be generalized to rural populations or non-Palestinian contexts with differing postpartum care structures.

These limitations should inform cautious interpretation and guide the design of future randomized and mixed-methods studies.

4.7 Final Summary

This study highlights PPLBP as a prevalent and functionally impairing condition among Palestinian women. No significant association was found between epidural analgesia and long-term pain, but age, BMI, and parity were significant predictors. A four-week, culturally tailored home exercise program effectively reduced pain and disability, offering a feasible model for postpartum rehabilitation in resource-limited contexts. Future work should explore longitudinal and qualitative designs to inform culturally responsive maternal health strategies. Future research and clinical innovation should prioritize scalable, culturally adapted rehabilitation strategies to close the maternal health gap in underserved regions.

Chapter Five: Conclusion & Recommendations

5.1 Conclusion

This study examined the prevalence of PPLBP among Palestinian women who delivered with and without epidural analgesia and evaluated the effectiveness of a four-week HEP for women experiencing PPLBP. The findings of Phase One demonstrated that PPLBP is a highly prevalent condition, affecting 82.4% of all postpartum women surveyed. This demonstrates that PPLBP is a highly prevalent condition, affecting more than four out of five postpartum women, regardless of delivery method or use of epidural analgesia.

Although the study found no strong association between epidural analgesia and PPLBP, maternal factors such as age, BMI, mode of delivery and parity showed significant relationships with pain severity. These results reinforce the multifactorial nature of PPLBP and highlight the importance of understanding individual, biomechanical, and lifestyle influences within the postpartum period.

Phase Two of the study confirmed that a structured HEP focusing on pelvic floor strengthening, flexibility, and core stabilization significantly reduced pain intensity and improved functional mobility. The high adherence and positive outcomes indicate that home-based physiotherapy is both feasible and effective for postpartum women, especially in resource-limited settings where access to rehabilitation services may be limited. The findings demonstrate the value of integrating physiotherapy interventions early in the postpartum period to prevent chronic musculoskeletal conditions.

Overall, this research provides one of the first comprehensive examination of PPLBP in Palestinian women and contributes important regional data to the global understanding of postpartum musculoskeletal health. The results underscore the urgent need for improved postpartum care, including routine screening, educational interventions, and accessible physiotherapy programs. Implementing such strategies has the potential to enhance maternal well-being, support functional recovery, and improve the overall quality of life for Palestinian mothers.

5.2 Recommendations

Based on the findings of both phases of this study, the following recommendations are offered for clinical practice, health policy, and future research to address PPLBP more effectively and sustainably.

5.2.1 Recommendations for Clinical Practice

- Implement routine postpartum musculoskeletal screening using validated tools (e.g., NPRS, ODI) during maternal health visits to facilitate early identification and intervention for PPLBP.
- Integrate structured, evidence-based home exercise programs (HEPs) into postpartum care plans, as they are low-cost, accessible, and demonstrated to be effective in reducing pain and disability.
- Strengthen referral pathways to physiotherapy services, ensuring that women with musculoskeletal complaints receive timely and appropriate rehabilitation support.
- Provide culturally sensitive education to postpartum women regarding posture, ergonomics, safe infant handling, breastfeeding positioning, and gradual resumption of physical activity.
- Train primary-care providers—including midwives, nurses, and general practitioners—in basic physiotherapeutic assessment and guidance to support decentralized care delivery.

5.2.2 Recommendations for Policy and Healthcare Systems

- Expand access to community-based physiotherapy services, especially for postpartum women in rural and underserved regions.
- Develop and distribute culturally appropriate, literacy-sensitive educational materials addressing PPLBP, safe movement patterns, and the benefits of physical activity.
- Include postpartum rehabilitation as a formal component of national maternal health strategies and clinical care guidelines.
- Promote telehealth and virtual physiotherapy services to overcome logistical and geographic barriers to rehabilitation.
- Establish national health indicators for postpartum musculoskeletal health to inform policy planning, service provision, and resource allocation.

5.2.3 Recommendations for Future Research

- Conduct randomized controlled trials (RCTs) comparing the effectiveness of clinic-based versus home-based physiotherapy interventions for PPLBP.
- Investigate the long-term outcomes of HEPs by assessing pain, disability, and quality of life at 3, 6, and 12 months postpartum.

- Explore the contributions of pelvic floor dysfunction, diastasis recti, and poor ergonomics to the development and persistence of PPLBP.
- Examine psychosocial influences—such as postpartum stress, fatigue, anxiety, and social support—on pain perception and recovery trajectories.
- Use qualitative or mixed-methods research to better understand cultural beliefs, health-seeking behaviors, and barriers to physiotherapy among Palestinian women.
- Assess the cost-effectiveness of home-based physiotherapy programs to guide policy-level decisions in low-resource maternal health systems.

References:

- Abbasi, S., Hamid, M., Ahmed, Z., & Nawaz, F. H. (2014). Prevalence of low back pain experienced after delivery with and without epidural analgesia: A non-randomised prospective direct and telephonic survey. *Indian Journal of Anaesthesia*, *58*(2), 143. https://doi.org/10.4103/0019-5049.130814
- Afiah Malik, Momna Asghar, Hira Shafiq, Esha Malik, Soha Malik, & Maryam Azam. (2025). Prevalence of Post-Partum Low Back Pain Among Primigravida Females: A Cross-Sectional Survey. *Journal of Health, Wellness and Community Research*, e708. https://doi.org/10.61919/r3prbs43
- Ahmed, A. H., Hassan, S. I., Hassan, A., & Taman, S. (2023). Effect of Kinesio Tape on Postpartum Low Back Pain and Functional Disability in Women after Cesarean Section. *Assiut Scientific Nursing Journal*, *11*(37), 141–152. https://doi.org/10.21608/ASNJ.2023.207977.1579
- Alghadir, A. H., Anwer, S., Iqbal, A., & Iqbal, Z. A. (2018). Test–retest reliability, validity, and minimum detectable change of visual analog, numerical rating, and verbal rating scales for measurement of osteoarthritic knee pain. *Journal of Pain Research*, *11*, 851–856. https://doi.org/10.2147/JPR.S158847
- Anshu, Dr. A., Meena, Dr. A., & Maini, Dr. L. (2024). Post-pregnancy low back pain: A systematic review. *International Journal of Clinical Obstetrics and Gynaecology*, *8*(5), 177–180. https://doi.org/10.33545/gynae.2024.v8.i5c.1525
- Antonakou, A., & Papoutsis, D. (2016). The Effect of Epidural Analgesia on the Delivery Outcome of Induced Labour: A Retrospective Case Series. *Obstetrics and Gynecology International*, *2016*, 5740534. https://doi.org/10.1155/2016/5740534
- Asif, A., Amjad, F., Dastgir, H., Asif, W., Adil, A., & Afzal, M. (2023). Prevalence of Neck and Low Back Pain in Women During Post-Partum Period. *The Healer Journal of Physiotherapy and Rehabilitation Sciences*, *2*(4), 271–278. https://doi.org/10.55735/HJPRS.V2I4.93
- Ballout, S., Noureddine, S., Huijer, H. A. S., & Kanazi, G. (2011). Psychometric evaluation of the arabic brief pain inventory in a sample of lebanese cancer patients. *Journal of Pain and Symptom Management*, *42*(1), 147–154. https://doi.org/10.1016/j.jpainsymman.2010.09.019
- Barega, M. T., Hemba, Y., Redela, A., Girma, T., Milkiyas Wonte, M., Dimma, A., Assen, S., & Eanga, S. (2025). Incidence, risk factors, and quality of life of low back pain after cesarean delivery and vaginal delivery at Dilla University General Hospital: a prospective cohort study. *Frontiers in Medicine*, *12*, 1495335. https://doi.org/10.3389/FMED.2025.1495335
- Benzon, H. T., Asher, Y. G., & Hartrick, C. T. (2016). Back pain and neuraxial anesthesia. *Anesthesia and Analgesia*, *122*(6), 2047–2058. https://doi.org/10.1213/ANE.0000000000001270

- Boyle, E. M., Evans, K., Coates, S., Fary, R. E., Bennell, K., Sterling, M., Rebbeck, T., & Beales, D. J. (2024). Patient experiences of referral practices and primary care physiotherapy for chronic nonspecific low back pain. *Physiotherapy Theory and Practice*, *40*(6), 1326–1342. https://doi.org/10.1080/09593985.2022.2141599
- Butler, R., & Fuller, J. (1998). Back pain following epidural anaesthesia in labour. *Canadian Journal of Anaesthesia = Journal Canadien d'anesthesie*, *45*(8), 724–728. https://doi.org/10.1007/BF03012141
- Chaudry, S., Rashid, F., Imtiaz, S., & Shah, H. (2012). Effectiveness of core stabilization exercises along with postural correction in postpartum back pain. *Rawal Medical Journal:*
- Chauhan, G., & Tadi, P. (2022). Physiology, Postpartum Changes. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK555904/
- Chia, Y. Y., Lo, Y., Chen, Y. B., Liu, C. P., Huang, W. C., & Wen, C. H. (2016). Risk of chronic low back pain among parturients who undergo cesarean delivery with neuraxial anesthesia a nationwide population-based retrospective cohort study. *Medicine (United States)*, *95*(16). https://doi.org/10.1097/MD.0000000000003468
- Chou D, Abalos E, Gyte GML, & Gülmezoglu AM. (2013). Paracetamol/acetaminophen (single administration) for perineal pain in the early postpartum period. *Cochrane Database of Systematic Reviews*. https://sci-hub.se/https://pubmed.ncbi.nlm.nih.gov/23440827/
- Cohen, J. (n.d.). *Statistical Power Analysis for the Behavioral Sciences Second Edition*.
- Dalia M. kamel, Neveen A. Abdel raoof, & Sayed A. Tantawy. (2016). Efficacy of lumbar mobilization on postpartum low back pain in Egyptian females: A randomized control trial. *Journal of Back and Musculoskeletal Rehabilitation, 29*(1), 55–63. https://sci-hub.se/https://journals.sagepub.com/doi/abs/10.3233/BMR-150598
- Dowell, D., Ragan, K. R., Jones, C. M., Baldwin, G. T., & Chou, R. (2023). CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022. *MMWR. Recommendations and Reports*, *71*(3), 1–95. https://doi.org/10.15585/MMWR.RR7103A1
- East, C. E., Sherburn, M., Nagle, C., Said, J., & Forster, D. (2012). Perineal pain following childbirth: Prevalence, effects on postnatal recovery and analgesia usage. *Midwifery*, *28*(1), 93–97. https://doi.org/10.1016/J.MIDW.2010.11.009
- EMILY MCQUAID, LISA R. LEFFERT, & BRIAN T. BATEMAN. (2018). The Role of the Anesthesiologist in Preventing Severe Maternal Morbidity and Mortality. *Clinical Obstetrics and Gynecology*. https://sci-hub.se/https://pubmed.ncbi.nlm.nih.gov/29319586/

- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods 2007 39:2*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146
- Ferreira, C. W. S., & Alburquerque-Sendín, F. (2013). Effectiveness of physical therapy for pregnancy-related low back and/or pelvic pain after delivery: A systematic review. In *Physiotherapy Theory and Practice* (Vol. 29, Issue 6, pp. 419–431). https://doi.org/10.3109/09593985.2012.748114
- Foster, N. E., Mullis, R., Young, J., Doyle, C., Lewis, M., Whitehurst, D., & Hay, E. M. (2010). IMPaCT back study protocol. Implementation of subgrouping for targeted treatment systems for low back pain patients in primary care: A prospective population-based sequential comparison. *BMC Musculoskeletal Disorders*, *11*(1), 1–14. https://doi.org/10.1186/1471-2474-11-186/TABLES/2
- Gebhardt, D. L., & Baker, T. A. (2022). Designing criterion measures for physically demanding jobs. *Military Psychology*, *35*(4), 335. https://doi.org/10.1080/08995605.2022.2063008
- Ghani, A.-, . S., Shah, I., . S., & Ullah, S. (2022). Postpartum Women with Urinary Incontinence and Low Back Pain. *Pakistan Journal of Medical & Health Sciences*, *16*(08), 954–954. https://doi.org/10.53350/PJMHS22168954
- Halliday, L., Nelson, S. M., & Kearns, R. J. (2022). Epidural analgesia in labor: A narrative review. *International Journal of Gynecology and Obstetrics*, *159*(2), 356–364. https://doi.org/10.1002/IJGO.14175
- Helge Franke, D. O. a , J.-D. F. B. S. a , S. B. M. S. D. O. b , G. F. PhD. , B. S. (2017). *Osteopathic manipulative treatment for low back and pelvic girdle pain during and after pregnancy: A systematic review and meta-analysis.* Journal of Bodywork and Movement Therapies. https://sci-hub.se/https://www.bodyworkmovementtherapies.com/article/S1360-8592(17)30114-6/abstract
- Henos Enyew Ashagrie, Demeke Yilkal Fentie, & Habtamu Getinet Kassahun. (2020). A review article on epidural analgesia for labor pain management: A systematic review. *International Journal of Surgery*. https://sci-hub.se/https://www.sciencedirect.com/science/article/pii/S2405857220300280
- Herman Sehmbi, Rohan D'Souza, & Anuj Bhatia. (2017). Low Back Pain in Pregnancy: Investigations, Management, and Role of Neuraxial Analgesia and Anaesthesia: A Systematic Review. . *Gynecologic and Obstetric Investigation, 52*(5), 417–436. https://sci-hub.se/https://pubmed.ncbi.nlm.nih.gov/28514779/
- hiba saif. (2022). *View of FREQUENCY OF ANTERO POSTERIOR PELVIC TILT IN POSTPARTUM PATIENT OF CHRONIC LOW BACK PAIN*. https://journals.uol.edu.pk/PJPT/article/view/1858/1012

- Howell, C. J., Dean, T., Lucking, L., Dziedzic, K., Jones, P. W., & Johanson, R. B. (2002). Randomised study of long term outcome after epidural versus non-epidural analgesia during labour. *BMJ : British Medical Journal*, *325*(7360), 357. https://doi.org/10.1136/BMJ.325.7360.357
- Jenifer O. Fahey. (2017). Best Practices in Management of Postpartum Pain. . *The Journal of Perinatal and Neonatal Nursing*. https://sci-hub.se/https://pubmed.ncbi.nlm.nih.gov/28277399/
- Kamel, D. M., Raoof, N. A. A., & Tantawy, S. A. (2016). Efficacy of lumbar mobilization on postpartum low back pain in Egyptian females: A randomized control trial. *Journal of Back and Musculoskeletal Rehabilitation*, *29*(1), 55–63. https://doi.org/10.3233/BMR-150598
- Kim, W. D., & Shin, D. (2023). Effects of Pelvic-Tilt Imbalance on Disability, Muscle Performance, and Range of Motion in Office Workers with Non-Specific Low-Back Pain. *Healthcare 2023, Vol. 11, Page 893*, *11*(6), 893. https://doi.org/10.3390/HEALTHCARE11060893
- Komatsu, R., Ando, K., & Flood, P. D. (2020). Factors associated with persistent pain after childbirth: a narrative review. *British Journal of Anaesthesia*, *124*(3), e117–e130. https://doi.org/10.1016/J.BJA.2019.12.037
- Koppenaal, T., Pisters, M. F., Kloek, C. J. J., Arensman, R. M., Ostelo, R. W. J. G., & Veenhof, C. (2022). The 3-Month Effectiveness of a Stratified Blended Physiotherapy Intervention in Patients With Nonspecific Low Back Pain: Cluster Randomized Controlled Trial. *Journal of Medical Internet Research*, *24*(2), e31675. https://doi.org/10.2196/31675
- Kuhn, J. C., Hauge, T. H., Rosseland, L. A., Dahl, V., & Langesæter, E. (2016). Hemodynamics of phenylephrine infusion versus lower extremity compression during spinal anesthesia for cesarean delivery: A randomized, double-blind, placebo-controlled study. *Anesthesia and Analgesia*, *122*(4), 1120–1129. https://doi.org/10.1213/ANE.0000000000001174
- Kwak, K.-H. (2017). Postdural puncture headache KJA. *Korean J Anesthesiol*, *70*(2), 136–143. https://doi.org/10.4097/kjae.2017.70.2.136
- Leffert, L. R. (2019). Is Insufficient Evidence Sufficient? In *Anesthesia and Analgesia* (Vol. 129, Issue 5, pp. 1202–1204). Lippincott Williams and Wilkins. https://doi.org/10.1213/ANE.0000000000004437
- Leighton, B. L., & Halpern, S. H. (2002). The effects of epidural analgesia on labor, maternal and neonatal outcomes: a systematic review. *American Journal of Obstetrics and Gynecology*, *186*(5 SUPPL.). https://doi.org/10.1067/mob.2002.121813
- Lim, G., Levine, M. D., Mascha, E. J., & Wasan, A. D. (2020). Labor Pain, Analgesia, and Postpartum Depression: Are We Asking the Right Questions? *Anesthesia and Analgesia*, *130*(3), 610. https://doi.org/10.1213/ANE.0000000000004581

- Loughnan, B. A., Carli, F., Romney, M., Doré, C. J., & Gordon, H. (2002). Epidural analgesia and backache: A randomized controlled comparison with intramuscular meperidine for analgesia during labour. *British Journal of Anaesthesia*, *89*(3), 466–472. https://doi.org/10.1093/bja/89.3.466
- Macarthur, A., Macarthur, C., & Weeks, S. (1995). Epidural anaesthesia and low back pain after delivery: a prospective cohort study. *BMJ : British Medical Journal*, *311*(7016), 1336. https://doi.org/10.1136/BMJ.311.7016.1336
- Madzivhandila, P. M., Cochrane, M. E., & Nkuna, R. D. (2023a). Prevalence and Characteristics of Women with Persistent LBP Postpartum. *The Open Pain Journal*, *16*(1). https://doi.org/10.2174/18763863-V16-230825-2023-5
- Madzivhandila, P. M., Cochrane, M. E., & Nkuna, R. D. (2023b). Prevalence and Characteristics of Women with Persistent LBP Postpartum. *The Open Pain Journal*, *16*(1). https://doi.org/10.2174/18763863-V16-230825-2023-5
- Maisaroh, A., Pintoko Kalanjati, V., Prasetiowati, L., Abdurrachman, A., & Sakina, S. (2025). Effect of dry cupping therapy and acupuncture on the pain scale in low back pain in postpartum women: A systematic review and meta-analysis. *© 2025 Journal of Pharmacy & Pharmacognosy Research*, *13*(1), 299–310. https://doi.org/10.56499/jppres24.2072_13.1.299
- Mäkelä, K., Palomäki, O., Korpiharju, H., Helminen, M., & Uotila, J. (2023). Satisfaction and dissatisfaction with pain relief and birth experience among induced and spontaneous-onset labours ending in vaginal birth: A prospective cohort study. *European Journal of Obstetrics & Gynecology and Reproductive Biology: X*, *18*, 100185. https://doi.org/10.1016/J.EUROX.2023.100185
- Malevic, A., Jatuzis, D., & Paliulyte, V. (2019). Epidural Analgesia and Back Pain after Labor. *Medicina*, *55*(7), 354. https://doi.org/10.3390/MEDICINA55070354
- Matsuda, N., Kitagaki, K., Perrein, E., Tsuboi, Y., Ebina, A., Kondo, Y., Murata, S., Isa, T., Okumura, M., Kawaharada, R., Horibe, K., & Ono, R. (2020). Association between Excessive Weight Gain during Pregnancy and Persistent Low Back and Pelvic Pain after Delivery. *Spine*, *45*(5), 319–324. https://doi.org/10.1097/BRS.0000000000003271
- Meena Sekar, B. Sathyaprabha, N.Venkatesh, & R.Siva Kumar. (2020). Effect of Postnatal Exercises and Education on Lowback Pain in Early Postnatal Mothers. *Indian Journal of Public Health Research & Development*. https://doi.org/10.37506/IJPHRD.V11I6.9824
- Mutaguchi, M., Murayama, R., Takeishi, Y., Kawajiri, M., Yoshida, A., Nakamura, Y., Yoshizawa, T., & Yoshida, M. (2022). Relationship between low back pain and stress urinary incontinence at 3 months postpartum. *Drug Discoveries & Therapeutics*, *16*(1), 23–29. https://doi.org/10.5582/DDT.2022.01015

- Nawshin, N., & Sanam, S. (n.d.). *The Impact of Low Back Pain on Functional Status of Postpartum Women: Survey in Bangladesh*. *8*, 2024.
- Ogbeivor, C., & Elsabbagh, L. (2021). Management approach combining prognostic screening and targeted treatment for patients with low back pain compared with standard physiotherapy: A systematic review & meta-analysis. *Musculoskeletal Care*, *19*(4), 436–456. https://doi.org/10.1002/MSC.1541
- Ostgaard, A. (2016). *LBP postpartum* .
- OZgen, S., Celiker, reyhan, tOraman, F., & Baykan, nigar. (2014). BACK PAIN AFTER LABOUR UNDER EPIDURAL ANALGESIA. In *J. ANESTH* (Vol. 22, Issue 4).
- Popovich, J. M., Cholewicki, J., Reeves, N. P., Destefano, L. A., Rowan, J. J., Francisco, T. J., Prokop, L. L., Zatkin, M. A., Lee, A. S., Sikorskii, A., Pathak, P. K., Choi, J., Radcliffe, C. J., & Ramadan, A. (2024). The effects of osteopathic manipulative treatment on pain and disability in patients with chronic low back pain: a single-blinded randomized controlled trial. *Journal of Osteopathic Medicine*, *124*(5), 219–230. https://doi.org/10.1515/JOM-2022-0124/ASSET/GRAPHIC/J_JOM-2022-0124_FIG_002.JPG
- Preethi, P. A., Vijayalakshmi, K., Moses, S., Mathipriya, K., Nancy, E. D., & Pavithralochani, V. (2022). Effects of Kinesiotaping along with abdomen and pelvic floor exercise on diastasis recti abdominis for postpartum women in normal delivery versus LSCS. *Biomedicine (India)*, *42*(1), 143–147. https://doi.org/10.51248/.V42I1.823
- Rafiqi Hehsan, M., Fadzlina Wan Muhd Shukeri, W., Kamalrujan Hassan, S., & Pek Sung, H. (2022). Does Epidural During Labour Lead To Chronic Low Backpain? A Malaysian Retrospective Study. *Malaysian Journal of Medicine and Health Sciences*, *18*(1), 2636–9346.
- Ramzy, R., & Quinette Louw Andrea Bailocerkowski, S. (2008). *Validation of the Arabic Version of the Oswestry Disability Index Developed in Tunisia for low back pain patients in the UAE*.
- Rimaitis, K., Klimenko, O., Rimaitis, M., Morkunaite, A., & Macas, A. (2015). Labor epidural analgesia and the incidence of instrumental assisted delivery. *Medicina*, *51*(2), 76–80. https://doi.org/10.1016/J.MEDICI.2015.02.002
- Rishi, P., Yadav, J., Anand, P., & Yadav, B. (2022). Efficacy of Kinesio Taping among Females with Postpartum Low Back PainA Quasi-experimental Study. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH*. https://doi.org/10.7860/JCDR/2022/51643.15975
- Romano, M., Cacciatore, A., Giordano, R., & Rosa, B. La. (2010). Postpartum period: three distinct but continuous phases. *Journal of Prenatal Medicine*, *4*(2), 22. https://pmc.ncbi.nlm.nih.gov/articles/PMC3279173/

- Russell, R., Groves, P., Taub, N., O'Dowd, J., & Reynolds, F. (1993). Assessing long term backache after childbirth. *BMJ : British Medical Journal*, *306*(6888), 1299. https://doi.org/10.1136/BMJ.306.6888.1299
- S Chungade, N., Mahishale, A., Dalal, A., & Angolkar, M. (2020). Musculoskeletal pain syndrome in postpartum women. *Nepal Journal of Obstetrics and Gynaecology*, *15*(2). https://doi.org/10.3126/NJOG.V15I2.32901
- Sakamoto, A., Nakagawa, H., Nakagawa, H., & Gamada, K. (2018). Effect of exercise with a pelvic realignment device on low-back and pelvic girdle pain after childbirth: A randomized control study. *Journal of Rehabilitation Medicine*, *50*(10), 914–919. https://doi.org/10.2340/16501977-2487
- Sarkar, P. K., Singh, P., Dhillon, M. S., Singh, A., & Bhattacharya, S. (2021). Impact of two intervention packages on the health and fitness of ante - and post-natal women attending in a teaching hospital. *Journal of Family Medicine and Primary Care*, *10*(10), 3738. https://doi.org/10.4103/JFMPC.JFMPC_427_21Z
- Schwerla, F., Rother, K., Rother, D., Ruetz, M., & Resch, K. L. (2015). Osteopathic manipulative therapy in women with postpartum low back pain and disability: A pragmatic randomized controlled trial. *Journal of the American Osteopathic Association*, *115*(7), 416–425. https://doi.org/10.7556/JAOA.2015.087/MACHINEREADABLECITATION/RIS
- Sh AHMED, D., Nahas, E. M., El-shamy, F. F., & Morsy, M. S. (2018). Effect of Shock Wave Therapy on Postpartum Low Back Pain. *Cairo Univ*, *86*(2), 893–901. www.medicaljournalofcairouniversity.net
- Smith, T., Singh, G., Mcnamee, G., & Newton, C. (2024). Musculoskeletal physiotherapists' discharge practices for people treated with low back pain: A United Kingdom survey. *Musculoskeletal Care*, *22*(1). https://doi.org/10.1002/msc.1851
- Stuge, B., Lærum, E., Kirkesola, G., & Vøllestad, N. (2004). The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain after Pregnancy: A Randomized Controlled Trial. *Spine*, *29*(4), 351–359. https://doi.org/10.1097/01.BRS.0000090827.16926.1D
- Suraj B. Kanase, & Sanjay Kumar. (2021). Influence of Pilate Therapy and Conventional Therapy in Post Natal Women with Back Pain. *Journal of Ecophysiology and Occupational Health*, *21*(4), 164–167. https://informaticsjournals.co.in/index.php/JEOH/article/view/28914/20774
- Suraj B. Kanase, & Sanjay Kumar. (2022). Influence of Conventional Therapy in Post Natal Women with Back Pain. *Journal of Ecophysiology and Occupational Health*, *22*(3), 122–126. https://informaticsjournals.co.in/index.php/JEOH/article/view/30769/21598

- Sylvester Caesar, C., & Petronilla, O. C. (2019). Correlation Between the Intensities of Pregnancy-Related Low Back Pain and Urinary Incontinence in Pregnant and Postpartum Women in Enugu, Nigeria. In *OJHAS* (Vol. 18, Issue 1).
- Tabassam, F., Hassam Rehm, M., Zafar, A., Mian, T. M., Riaz, M. U., & Shaheen, R. (2021). *Urinary Incontinence in Women with Low Back Pain After Post Partum Period*. *15*(11). https://doi.org/10.53350/pjmhs2115113126
- Timerga, S., Walle, G., Mebratu, W., & Befkadu, A. (2025). Assessment of the Association Between Neuraxial Anesthesia and Back Pain After Delivery: A Systematic Review and Meta-Analysis. *Anesthesiology Research and Practice*, *2025*(1), 2105413. https://doi.org/10.1155/ANRP/2105413
- Tseng, P.-C., Puthussery, S., Pappas, Y., & Gau, M.-L. (2012). *A systematic review of randomised controlled trials on the effectiveness of exercise programs on Lumbo Pelvic Pain among postnatal women*. https://doi.org/10.1186/s12884-015-0736-4
- V Charlier, G. B. P. Y. D. J. M. F. J. F. B. (2012). *Obstetrical epidural analgesia and postpartum backache*.
- Wisner, K. L., Stika, C. S., & Clark, C. T. (2014). Double duty: Does epidural labor analgesia reduce both pain and postpartum depression? In *Anesthesia and Analgesia* (Vol. 119, Issue 2, pp. 219–221). Lippincott Williams and Wilkins. https://doi.org/10.1213/ANE.0000000000000322
- World Health Organization. (2024). *Epidural Rates by Country 2024*. WHO. https://worldpopulationreview.com/country-rankings/epidural-rates-by-country
- Wu, J. C., Yu, X. L., Ji, H. J., Lou, H. Q., Gao, H. J., Huang, G. Q., & Zhu, X. L. (2023). Pelvic floor dysfunction and electrophysiology in postpartum women at 6–8 weeks. *Frontiers in Physiology*, *14*, 1165583. https://doi.org/10.3389/FPHYS.2023.1165583/BIBTEX
- Wu, J., Ling, K., Song, W. T., & Yao, S. L. (2020). Perspective on the low labor analgesia rate and practical solutions for improvement in China. *Chinese Medical Journal*, *133*(5), 606–608. https://doi.org/10.1097/CM9.0000000000000660
- Wuytack, F., Smith, V., & Cleary, B. J. (2016). Oral non-steroidal anti-inflammatory drugs (single dose) for perineal pain in the early postpartum period. *The Cochrane Database of Systematic Reviews*, *7*(7). https://doi.org/10.1002/14651858.CD011352.PUB2
- Yamada, T., Yamato, Y., Hasegawa, T., Yoshida, G., Yasuda, T., Banno, T., Arima, H., Oe, S., Mihara, Y., Ushirozako, H., Ide, K., Watanabe, Y., Hosino, H., & Matsuyama, Y. (2021). Association between Pelvic Parameters and Vaginal Delivery. *Asian Spine Journal*, *16*(2), 248. https://doi.org/10.31616/ASJ.2020.0676

- Yazdanpanahi, Z., Ghaemmaghami, M., Akbarzadeh, M., Zare, N., & Azisi, A. (2017). Comparison of the Effects of Dry Cupping and Acupressure at Acupuncture Point (BL23) on the Women with Postpartum Low Back Pain (PLBP) Based on Short Form McGill Pain Questionnaires in Iran: A Randomized Controlled Trial. *Journal of Family & Reproductive Health*, *11*(2), 82. https://pmc.ncbi.nlm.nih.gov/articles/PMC5742668/
- Yoo, H., Shin, D., & Song, C. (2015). Changes in the spinal curvature, degree of pain, balance ability, and gait ability according to pregnancy period in pregnant and nonpregnant women. *Journal of Physical Therapy Science*, *27*(1), 279. https://doi.org/10.1589/JPTS.27.279
- Yue, L., Sun, M. S., Chen, H., Mu, G. Z., & Sun, H. L. (2021). Extracorporeal Shockwave Therapy for Treating Chronic Low Back Pain: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *BioMed Research International*, *2021*, 5937250. https://doi.org/10.1155/2021/5937250

Appendixes

Appendix 1 Phase One (Cross-Sectional Study) Data Collection Sheet

أوراق جمع البيانات لمقترح البحث بعنوان:

انتشار آلام أسفل الظهر بعد التسكين فوق الجافية في النساء الفلسطينيات بعد الولادة وتأثير برامج التمارين المنزلية على تخفيف ذلك: تصميم شبه تجريبي

تهديكم جامعة القدس – برنامج الماجستير في العلاج الطبيعي أطيب التحيات، ويسرنا دعوتكم للمشاركة في هذا البحث العلمي الذي يُعد جزءًا من متطلبات نيل درجة الماجستير للباحثة أخصائية العلاج الطبيعي سوسن عليان، وبإشراف الدكتورة إسراء حمدان.

يحمل البحث عنوان:

"انتشار آلام أسفل الظهر المستمرة بعد التخدير فوق الجافية لدى النساء الفلسطينيات بعد الولادة وفعالية برنامج تمارين علاجية فيزيائية منزلية: دراسة شبه تجريبية"

وقد تم اختيار هذا الموضوع نظرًا لندرة الدراسات التي تناولت هذه المشكلة من جوانبها المختلفة، خاصة في السياق الفلسطيني. ويتكون البحث من مرحلتين:

◈ المرحلة الأولى (هذه الاستبانة): تهدف إلى جمع بيانات أساسية حول مدى انتشار آلام أسفل الظهر المستمرة بين النساء الفلسطينيات بعد الولادة، خصوصًا ممن تلقين تخديرًا فوق الجافية (إبرة الظهر) أثناء الولادة. وتشمل هذه المرحلة استبيانًا من عدة أقسام، يركز على المعلومات الديمغرافية والتاريخ الطبي والتوليدي.

◈ المرحلة الثانية (لاحقًا): سيتم التواصل مع من ترغب في المتابعة طوعًا لتطبيق برنامج تمارين علاج طبيعي منزلي مجاني، يتضمن جلسات استشارية ومتابعة، وذلك لتقييم تأثير التدخل العلاجي ومقارنة النتائج قبل وبعد البرن.

نؤكد أن جميع المعلومات التي سيتم جمعها ستُستخدم لأغراض بحثية فقط، وستُعامل بسرية تامة.

المشاركة طوعية بالكامل، ويمكنكِ الانسحاب في أي وقت دون أي التزام.

نشكر لكِ وقتكِ وتعاونكِ القيّم، ومساهمتكِ تمثّل دعمًا حقيقيًا لتحسين جودة رعاية النساء بعد الولادة في فلسطين.

ورقة تجميع بيانات المرحلة الأولى: تقييم خط الأساس

القسم الأول: المعلومات الشخصية والديمغرافية

الاسم (اختياري)	
العمر	(□ 18–29 □ 30–39 □ 40–49□ 50–59)
الارتفاع (سم)	
الوزن (كجم)	
مكان الإقامة	□)المدينة □ القرية □ المخيم (
الحالة الزوجية	□)عازبة □ متزوجة □ مطلقة □ أرملة (
المستوى التعليمي	□)الابتدائية □ الثانوية □ دبلوم □ جامعة □ دراسات عليا (

العمل	□)العمل المكتبي □ يتطلب وظائف جسدية □ ربة منزل □ لا شيء (

القسم الثاني: تاريخ الطب والتوليد

سكري	(□ نعم □ لا)
إصابة عصبية	(□ نعم □ لا)
ارتفاع ضغط الدم	(□ نعم □ لا)
أمراض أخرى	(□ نعم □ لا، إذا كان نعم، حدد)
عدد حالات الحمل السابقة	**(□ 1 □ 2–4 □ 5–6 □ أكثر من 6)**
الوقت منذ اخر ولادة	**يومان – 6 أسابيع □6أسابيع - 6شهور□6شهور – سنة □أكثر من سنة□)**
نوع الولادة	**(□ عادي □ ولادة قيصرية محددة مسبقا □ ولادة قيصرية طارئة)**
تلقيت ابرة ظهر	**(□ نعم □ لا)**
المدة (الساعات، إذا كانت معروفة)	
المضاعفات	**(□ نعم □ لا، إذا كان نعم، حدد)**
تاريخ سابق مع آلام الظهر قبل الحمل	**(□ نعم □ لا)**
آلام أسفل الظهر الحالية	**(□ نعم □ لا)**
طريقة العلاج الأولى لآلام الظهر	**(□ دواء الألم □ العلاج الطبيعي □ تمارين □ الراحة فقط □ أخرى)**
إذا كنتي قد تعالجت بالعلاج الطبيعي ما هي العلاجات التي تلقيتها	**تمارين علاجية, العلاج اليدوي (تحريك المفاصل/العضلات), مساج، العلاج بالاجهزة، تطبيق الكمادات الساخنة او الباردة، الوخز بالابر الجافة، تعليمات تصحيح الوضعية، جلسات توعوية**

اذا كنت تعانين حاليًا من آلام في الظهر وترغبين بالانتقال إلى المرحلة الثانية من الدراسة؟ زودينا بالتالي:
الاسم :
رقم الهاتف:

Appendix 2 Numeric Pain Rating Scale (NPRS) – Phase Two

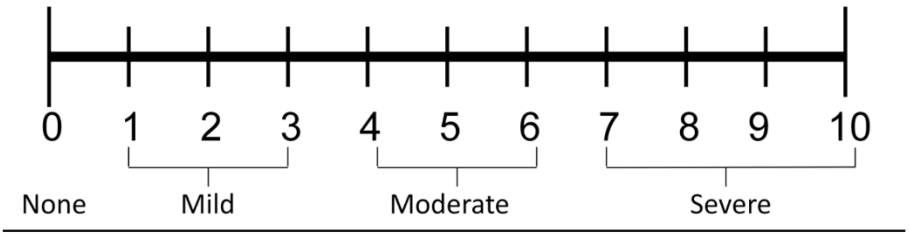
The Numeric Pain Rating Scale Instructions

General Information:

- The patient is asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours.
- The average of the 3 ratings was used to represent the patient's level of pain over the previous 24 hours.

Patient Instructions (adopted from (McCaffery, Beebe et al. 1989):

"Please indicate the intensity of current, best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)"



Reference:
McCaffery, M., Beebe, A., et al. (1989). Pain: Clinical manual for nursing practice, Mosby St. Louis, MO.

Appendix 3 Oswestry Disability Index (ODI) – Phase Two

الفقرة 1:شدة الآلام:
0-□ليس لدي آلام في أسفل ظهري حاليا .
1-□أشعر حاليا بآلام خفيفة في أسفل ظهري .
2-□أشعر حاليا بآلام متوسطة في أسفل ظهري .
3-□أشعر حاليا بآلام شديدة الى حد ما في أسفل ظهري.
4-□أشعر حاليا بآلام شديدة جدا في أسفل ظهري.
5-□أشعرحاليا بآلام في اسفل ظهري أكثر مما يمكن تصورها .

الفقرة 2:العناية الشخصية – كالإغتسال ولبس الثياب:
0-□ - يمكنني أن أعتني بنفسي واهتم بأموري الخاصة بشكل طبيعي دون أن يزيد ذلك في الآلام أسفل ظهري.
1-□ - يمكنني أن أعتني بنفسي واهتم بأموري الخاصة ولكن ذلك يزيد في الآلام اسفل ظهري.
2-□ - يمكنني أن أعتني بنفسي واهتم بأموري الخاصة ولكن يأخذ ذلك مني وقتا أطول من المعتاد.
3-□ - أحتاج إلى بعض المساعدة ولكن يمكنني القيام بمعظم أموري الخاصة بنفسي .
4-□ - أحتاج إلى المساعدة بشكل يومي للقيام بأموري الخاصة .
5-□ - أبقى في سريري وأغسل بصعوبة ولا أستطيع أن ألبس ثيابي .

الفقرة 3:رفع الأشياء ونقلها:
0-□ - أستطيع أن أرفع الأشياء الثقيلة من غير أن يزيد ذلك في الآلام أسفل ظهري.
1-□ - أستطيع أن أرفع الأشياء الثقيلة ولكن ذلك يزيد في الآلام أسفل ظهري .
2-□ -الآلام أسفل ظهري تمنعني من رفع الأشياء الثقيلة إذا كانت على الأرض لكن يمكنني رفعها إذا كانت في مكان مرتفع-على- كالطاولة مثلا.
3-□ -الآلام أسفل ظهري تمنعني من رفع الأشياء الثقيلة لكن بإمكاني رفع الأشياء الخفيفة ومتوسطة الوزن إذا كانت في مكان مرتفع-على-.
4-□ -أستطيع رفع الأشياء خفيفة الوزن فقط .
5-□ - لا أستطيع رفع أو حمل أي شيء على الإطلاق.

الفقرة 4:المشي:
0-□ -لاتمنعني الآلام أسفل ظهري من المشي لأي مسافة (كالمشي بجوار المنزل).
1-□ - الآلام أسفل ظهري تمنعني من المشي أكثر من ألف وخمسمئة متر (كيلو ونصف) .
2-□ - الآلام أسفل ظهري تمنعني من المشي أكثر من ألف متر (كيلومتر واحد).
3-□ - الآلام أسفل ظهري تمنعني من المشي أكثر من أربعمئة متر.
4-□ - لا أستطيع المشي دون الاستعانة بعصا أو عكاز.
5-□ - أبقى في الفراش معظم الوقت وازحف للوصول الى المرحاض (دورة المياه).

الفقرة 5:الجلوس :
0-□ -يمكنني الجلوس على أي كرسي المدة التي أريدها.
1-□ -يمكنني الجلوس فقط على كرسي مريح المدة التي أريدها.
2-□ - الآلام أسفل ظهري تمنعني من البقاء جالسا على أي كرسي أكثر من ساعة .
3-□ -الآلام أسفل ظهري تمنعني من البقاء جالسا على أي كرسي أكثر من نصف ساعة.
4-□ -الآلام أسفل ظهري تمنعني من الجلوس لأكثر من عشر دقائق .
5-□ -الآلام أسفل ظهري تمنعني من الجلوس مطلقا.

الفقرة 6:الوقوف:
0-□ - أستطيع البقاء واقفا المدة التي أريد ها دون أن يزيد ذلك في الآلام أسفل ظهري.
1-□ - أستطيع البقاء واقفا المدة التي أريدها ولكن ذلك يزيد في الآلام أسفل ظهري.
2-□ -الآلام أسفل ظهري تمنعني من الوقوف لأكثر من ساعة.
3-□ - الآلام أسفل ظهري تمنعني من الوقوف لأكثر من نصف ساعة.
4-□ - الآلام أسفل ظهري تمنعني من الوقوف لأكثر من عشر دقائق.
5-□ - الآلام أسفل ظهري تمنعني من الوقوف مطلقا.

الفقرة 7:النوم :
0-□ - نومي لايضطرب أبدا بسبب الآلام أسفل ظهري.
1-□ - يضطرب نومي احيانا بسب الآلام أسفل ظهري .
2-□ - أنام أقل من6 ساعات يوميا بسبب الآلام أسفل ظهري.
3-□ - أنام أقل من4 ساعات يوميا بسبب الآلام أسفل ظهري .
4-□ - أنام أقل من ساعتين يوميا بسبب الآلام أسفل ظهري.
5-□ - لا أستطيع النوم مطلقا بسبب الآلام أسفل ظهري.

الفقرة 8:الحياة الجنسية (هذه الفقرة للمتزوجين أو من سبق لهم الزواج ومارسوا الحياة الجنسية , إذا لم ينطبق عليك هذا الشرط الرجاء الانتقال للفقرة رقم 9):

0-□ - حياتي الجنسية عادية ولا تسبب زيادة في الآلام أسفل ظهري.
1-□ - حياتي الجنسية عادية ولكنها تسبب زيادة في بعض الآلام أسفل ظهري .
2-□ - حياتي الجنسية تكاد تكون عادية ولكنها تسبب لي الآلاما شديدة في أسفل ظهري
3-□ - حياتي الجنسية نادرة جداً بسبب الآلام أسفل ظهري.
4-□ - حياتي الجنسية تقريباً مقطوعة بسبب الآلام أسفل ظهري.
5-□ - الآلام أسفل ظهري تمنعني من الحياة الجنسية مطلقا.
6-□لم يسبق لي الزواج ولم امارس الحياة الجنسية.

الفقرة 9:الحياةالاجتماعية (زيارة و استقبال الأقارب والأصحاب،الخروج مع الأصدقاء, المشاركة في الاحتفالات أو الأنشطة الإجتماعية ...):

0-□ - حياتي الإجتماعية عادية ولا تزيد في الآلام أسفل ظهري.
1-□ - حياتي الإجتماعية عادية ولكنها تزيد من حدة الآلام في أسفل ظهري.
2-□ - الآلام أسفل ظهري لا تؤثر على حياتي الاجتماعية ولكنها تقلل من أعمالي التي تتطلب مجهودا كبيرا.
3-□ - تأثرت حياتي الاجتماعية وتقلصت علاقاتي مع الأخرين بسبب الآلام أسفل ظهري.
4-□ - بسبب الآلام أسفل ظهري أصبحت حياتي الاجتماعية منحصرة في المنزل .
5 □ - حياتي الإجتماعية انقطعت بسبب الآلام أسفل ظهري.

الفقرة 10:السفر:
0-□ - استطيع السفر إلى أي مكان من غير أن يزيد ذلك في الآلام أسفل ظهري.
1-□ - استطيع السفر إلى أي مكان ولكنه يزيد في الآلام أسفل ظهري.
2-□ - الآلام أسفل ظهري شديدة ولكني استطيع تحمل السفر في حدود الساعتين.
3-□ - الآلام أسفل ظهري تقيد رحلاتي (سفري) لأقل من ساعة.
4-□ - الآلام أسفل ظهري تقيد رحلاتي القصيرة الضرورية (سفري القصير) لأقل من نصف ساعة.
5-□ - الآلام أسفل ظهري تمنعني من السفر لأي مكان إلا لتلقي العلاج.
-لم أسافر يوما ما (لم أفعل ذلك)6-□

Appendix 4 Brief Pain Inventory (BPI) – Phase Two(Ballout et al., 2011)

الجامعة الأميريكية في بيروت

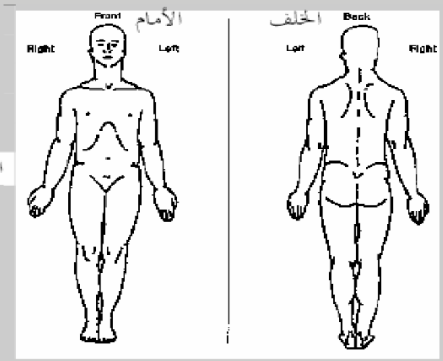
Arabic Brief Pain Inventory (Short Form)

Patient Initials: _____ **Date:** _____

Patient No. _____ **Time:** _____

١. خلال حياتنا ، نعاني من بعض الآلام بين حين وآخر (كالصداع البسيط أو التواء عضلة أو ألم الأسنان).
هل عانيت خلال الأسبوع الماضي من ألم يختلف من هذه الأنواع من الآلام العادية؟
١. نعم ٢. لا

٢. على الرسم التالي, **حدد مواضعَ الألم** الذي تشعر به. ضع علامة X في الموضع الأشدّ ألماً.



اليمين اليمين

٣. قيّم ألمك بوضع دائرة حول الرّقم الذي يصف ألمك في **أسوأ** حالاته خلال الأربع والعشرين ساعة الماضية.

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا أشعر بألم										**أسوء ما يمكن تصوره من ألم**

٤. من فضلك, قيّم ألمك بوضع دائرة حول الرّقم الذي يصف ألمك في **أدنى** حالاته خلال الأربع والعشرين ساعة الماضية.

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا أشعر بألم										**أسوء ما يمكن تصوره من ألم**

٥. قيّم ألمك بوضع دائرة حول الرّقم الذي يصف **معدّل الألم** الذّي تشعر به **إجمالاً**.

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا أشعر بألم										**أسوء ما يمكن تصوره من ألم**

٦. حَدِّد درجة ألمك بوضع دائرة حول الرقم الذي يصف درجة ألمك **الآن**.

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا أشعر بألم										**أسوء ما يمكن تصوره من ألم**

٧. ما هي أنواع العلاجات أو الأدوية التي تتلقاها لمعالجة ألمك؟

_____

٨. خلال الأربع والعشرين ساعة الماضية, كم كانت **درجة الأرتياح من الألم** لديك بعد تناولك الأدوية أو العلاجات للألم؟ من فضلك, ضع دائرة حول النسبة المئوية التي تصف مدى **ارتياحك**.

٪ ٠	٪ ١٠	٪ ٢٠	٪ ٣٠	٪ ٤٠	٪ ٥٠	٪ ٦٠	٪ ٧٠	٪ ٨٠	٪ ٩٠	٪ ١٠٠
لم يحصل أي ارتياح										ارتياح كامل

٩. ضع دائرة حول الرقم الذي يصف مدى التأثير السلبي أو العرقلة التي سبَّبها لك الألم خلال الأربع والعشرين ساعة الماضية في النواحي التالية:

أ. نشاطك العام

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

ب. مزاجك

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

ج. قدرتك على المشي

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

د. العمل العادي (يشمل ذلك العمل خارج المنزل و العمل المنزلي)

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

ه. علاقاتك مع الآخرين

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

و. نومك

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

ز. إستمتاعك بالحياة

٠	١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
لا عرقلة										**عرقلة كاملة**

مقياس الألم البصري (Visual Analog Scale)

الخط أدناه مقياس يمثل درجة الألم الذي قد تشعر به.

من فضلك, ضع علامة | على الخط أدناه محدّداً المكان الذي يصف درجة ألمك **الآن**.

لا يوجد ألم — **أسوء ألم يمكن تصوره**

نشكرك لملئ هذه الإستمارة!

Appendix 5 Exercise Adherence Self-Reported Logs

سجل الالتزام والمتابعة اليومية للتمارين الرياضية

برنامج 4 أسابيع - 2-3 جلسات يومياً

كيفية استخدام هذا السجل:

- **قيّمي التزامك:** في نهاية كل يوم، قيّمي مستوى التزامك الذاتي من 0 إلى 10 (0 = لم تلتزمي إطلاقاً، 10 = التزام كامل ومثالي).
- **سجّلي الجلسات:** ضعي علامة (✓) عند إتمام الجلسة، وعلامة (✗) إذا لم تتمكني من أدائها.
- **دوّني ملاحظاتك:** استخدمي خانة الملاحظات لتسجيل شعورك، الصعوبات التي واجهتك، أو إنجازاتك اليومية.

الأسبوع	اليوم	التزام ذاتي (0-10)	الجلسة 1 (✗/✓)	الجلسة 2 (✗/✓)	الجلسة 3 (✗/✓)	ملاحظات (اختياري)
الأسبوع 1	الإثنين					
	الثلاثاء					
	الأربعاء					
	الخميس					
	الجمعة					
	السبت					
	الأحد					
الأسبوع 2	الإثنين					
	الثلاثاء					
	الأربعاء					
	الخميس					
	الجمعة					
	السبت					
	الأحد					
الأسبوع 3	الإثنين					
	الثلاثاء					
	الأربعاء					
	الخميس					
	الجمعة					
	السبت					
	الأحد					
الأسبوع 4	الإثنين					
	الثلاثاء					
	الأربعاء					
	الخميس					
	الجمعة					
	السبت					
	الأحد					

استمري في التقدم! كل يوم تلتزمين فيه يقربك أكثر من أهدافك الصحية. أنت قوية وقادرة! 💪

Appendix 6 Home Exercise Program (HEP) – Four Weeks

WEEK1

تم الإنشاء بو اسطة Sawsan Aliyan, PT, MPT Nov 27th, 2025

لصفحة 4

COMMENTS

هذا البرنامج المنزلي صُمّم خصيصًا ليكون رفيقًا لكنّ في رحلة التعافي بعد الولادة، فهو يساعد على تقوية الجسم، دعم العمود الفقري، وتحسين الراحة اليومية بطريقة عملية وآمنة يمكن ممارستها في البيت. إنّ التزامكنّ به ليس مجرد تمرين، بل خطوة محبة لكنّ ولعائلاتكنّ. فأنتم أمهاتنا العزيزات، وراحتكنّ غالية على قلوبنا.

تمرين الساعة الحوضية عند الرقم 6 (إمالة الحوض للأمام)

استلقي على ظهرك في وضعية مريحة، اثني ركبتيك، وضعي قدميك على الأرض بحيث يكون بينهما مسافة تقريبًا بعرض الحوض.

تخيّلي أنّ هناك ساعة مرسومة على منطقة الحوض والبطن.

المطلوب هو إمالة الحوض للأمام وكأن عقرب الساعة يتحرك باتجاه الرقم 6. عندها، أسفل ظهرك سيرتفع قليلًا عن الأرض ويظهر فراغ صغير تحته.

ضعي إبهاميك على العظمين البارزين في مقدمة الحوض (عظمة الحوض الأمامية اللي بتحسيها طالعة تحت البطن من الجنبين) حتى تشعري بالحركة بوضوح.

خلال الحركة، الحوض بيتحرج للأمام (ميل أمامي)، وبعدها رجّعيه بلطف لوضعية الاسترخاء.

كرري التمرين بحركات هادئة، سلسة، وبالتحكم.

الأوقات10 يكرر
ثواني 3 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

تمرين تمدّد القطة والبقرة

ضعي يديك تحت الكتفين مباشرة، وركبتيك تحت الوركين.

في الوضعية الأولى (وضعية القطة): اسحبي بطنك إلى الداخل، ارفعي ظهرك إلى الأعلى، وقرّبي ذقنك نحو صدرك.

في الوضعية الثانية (وضعية البقرة): اخفضي بطنك إلى الأسفل، ارفعي رأسك وذيلك إلى الأعلى، واتركي ظهرك ينحني بلطف نحو الأسفل.

تنقّلي بين الوضعيتين ببطء مع الحفاظ على تنفّس هادئ ومنتظم.

الأوقات10 يكرر
ثواني 3 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

تكبير

تمرين الجسر

استلقي على ظهرك، اثني ركبتيك وضعي قدميك مسطحتين على الأرض بحيث تكون المسافة بينهما بعرض الحوض تقريبًا.

امپلي الحوض قليلًا للداخل، ثم شدّي عضلات الأرداف وارفعي الحوض ببطء عن الأرض.

اثبتي للحظة وأنت في الوضعية المرفوعة، ثم أنزلي الحوض ببطء حتى تعودي إلى وضع الاستلقاء.

انتبهي ألّا ترفعي جسمك عاليًا جدًا حتى لا تُجهدي عضلات أسفل الظهر.

الأوقات8 يكرر
ثواني 3 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

تمرين شدّ عضلات قاع الحوض مع المساعدة من العضلات المقربة للفخذين

الوضعية: استلقي على ظهرك مع ثني الركبتين، وضعي مكعب يوغا (أو وسادة صغيرة) بين ركبتيك. يمكنك وضع يديك على أسفل الأضلاع، أو أسفل البطن، أو بجانب الجسم.

الحركة:

خذي شهيقًا عميقًا بحيث يتمدّد صدرك وجذعك من جميع الاتجاهات، وحافظي على استرخاء عضلات البطن العليا.

عند الزفير: اضغطي بلطف على المكعب بين ركبتيك، وفي الوقت نفسه اسحبي عضلات قاع الحوض للداخل وكأنك تحاولين إيقاف تدفق البول أو منع خروج ريح.

شدّي أسفل البطن برفق مع سحب عظم العانة قليلًا باتجاه السرة، مع الانتباه إلى عدم المبالغة في شدّ البطن.

بعد ذلك خذي شهيقًا من جديد واسترخي تمامًا.

الأوقات8 يكرر
ثواني 3 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

المجموع 5

تمرين الجسر (Bridge)

الهدف: تقوية عضلات الورك، المؤخرة، وأسفل الظهر. الطريقة:

استلقِ على ظهرك، وانثِ ركبتيك بحيث تكون القدمان على الأرض بمسافة عرض الوركين.

شدّ بطنك قليلًا.

ارفع وركيك للأعلى ببطء حتى يصبح جسمك من الركبتين إلى الكتفين بخط مستقيم.

اثبت 10 ثوانٍ، ثم أنزل وركيك ببطء إلى الأرض.

كرّر التمرين 10 مرات.

الأوقات10 يكرر
ثواني 10 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

تكبير

تمرين رفع الورك والساق الجانبي (Hip abduction with knee to chest – sidelying)

الهدف: تقوية عضلات الورك الجانبية والفخذ. الطريقة:

استلقِ على جانبك، مع وضع الرأس على يدك أو وسادة صغيرة.

انثِ الركبة العليا قليلًا نحو صدرك.

من هنا، ارفعي ساقك للأعلى ببطء حتى تصبح مستقيمة وموازية لجسمك، وأصابع القدم للأمام.

انزلي الساق ببطء إلى وضع البداية.

كرّري 10 مرات لكل جهة.

الأوقات10 يكرر
ثواني 3 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

تمرين وضع الطفل (Child's Pose – Prayer Stretch)

الهدف: إطالة عضلات الظهر والورك وتهدئة الجسم. الطريقة:

ضعي نفسك في وضع الزحف (اليدين والركبتين على الأرض).

حركي وركيك ببطء إلى الخلف باتجاه الكعبين.

مدي ذراعيك للأمام على الأرض، واسمحي للصدر أن يقترب من الأرض.

استرخي في هذا الوضع وتنفسي بعمق.

اثبتي 20–30 ثانية وكرّري عدة مرات.

الأوقات10 يكرر
ثواني 20 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

تمرين عضلات الجذع وقاع الحوض (Core and Pelvic Floor Activation)

الهدف: تنشيط عضلات البطن العميقة وقاع الحوض لتحسين الثبات. الطريقة:

استلقي على ظهرك وانثِ ركبتيك.

اشفطي عضلات قاع الحوض للأعلى وللداخل (كما لو أنك تحاولين منع التبول).

في نفس الوقت، اسحبي سرتك قليلًا نحو الداخل دون حبس النفس.

حافظي على شد العضلات، ودعي ركبة واحدة تنزل ببطء إلى الجانب.

تأكدي أن الحوض لا يتحرك، فقط مفصل الورك.

ازفري واعيدي الركبة إلى الوسط، ثم كرّري بالجانب الآخر.

استمري حتى تشعري بتعب بسيط في العضلات العميقة.

الأوقات10 يكرر
ثواني 10 يمسك
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

تكبير

تمرين التنفس الحجابي أثناء الجلوس (Diaphragmatic Breathing – Seated)

الهدف: تحسين التنفس العميق وتخفيف التوتر. الطريقة:

اجلس على كرسي في وضع مريح.

ضع يدًا على صدرك والأخرى على بطنك قرب السرة.

خذ شهيقًا ببطء من أنفك، وحاول أن ترفع اليد التي على بطنك فقط، بينما تبقى اليد على صدرك ثابتة.

ازفر ببطء من الفم ودع البطن يعود للأسفل.

كرّر التمرين 10 مرات مع تنفس هادئ ومنتظم.

الأوقات10 يكرر
مجموعات2 مكتمل
الأوقات يوم واحد 2 يؤدي

شاهد الفيديو

تكبير

WEEK3

تم الإنشاء بواسطة Sawsan Aliyan, PT, MPT Nov 5th, 2025

لمصرع 3

البلانك المعدّل على الركبتين (Modified Plank on Knees)

الهدف: تقوية عضلات الجذع، الكتفين، والمؤخرة. الطريقة:

ضعي نفسك على الأرض بحيث تكون الركبتان والمرفقان على السطح.

ارفعي جسمك قليلًا حتى يصبح من الرأس إلى الركبتين بخط مستقيم.

شدّي عضلات البطن والورك (كأنك تمنعين بطنك من الترهل للأسفل).

حافظي على الوضعية من 10 إلى 20 ثانية، ثم استريحي.

كرّري 5–10 مرات.

الأوقات10	يكرر
ثواني 20	يمسك
مجموعات2	مكتمل
الأوقات يوم واحد 2	يؤدي

تكبير

تمرين تمدد رباط الفخذ الخارجي (Standing Iliotibial Band Stretch – ITB)

الهدف: إطالة العضلات الجانبية للفخذ وأسفل الظهر. الطريقة:

قفي مستقيمة.

ضعي الساق المصابة خلف الساق السليمة.

ارفعي الذراع المقابلة للساق المصابة فوق رأسك.

انحني بجسمك جانبًا باتجاه الساق السليمة حتى تشعري بتمدد لطيف على جانب الفخذ والورك.

حافظي على التمدد 20–30 ثانية ثم بدّلي الجهة.

الأوقات10	يكرر
ثواني 20	يمسك
مجموعات2	مكتمل
الأوقات يوم واحد 2	يؤدي

شاهد الفيديو

تكبير

تمرين الجسر بساق واحدة (One-Leg Bridging)

الهدف: تقوية عضلات المؤخرة والورك والبطن. الطريقة:

استلقي على ظهرك وانثِ ركبتيك.

ضعي ذراعيك على صدرك أو بجانبيك للتوازن.

ارفعي ساقًا واحدة عن الأرض، ومدّيها مستقيمة للأمام.

شدّي بطنك وارفعي الورك للأعلى ببطء باستخدام الساق الثانية فقط.

اثبتي للحظة، ثم انزلي الورك ببطء.

كرّري 10 مرات لكل ساق.

الأوقات10	يكرر
ثواني 5	يمسك
مجموعات2	مكتمل
الأوقات يوم واحد 2	يؤدي

تكبير

طباعة / حفظ PDF

الجمع 4

تمرين السكوات على الحائط (WALL SQUATS)

الأوقات5	يكرر
ثواني 3	يمسك
مجموعات3	مكتمل
الأوقات يوم واحد 2	يؤدي

شاهد الفيديو

تكبير

قفي واسندي ظهرك على حائط أو باب ذو سطح أملس.

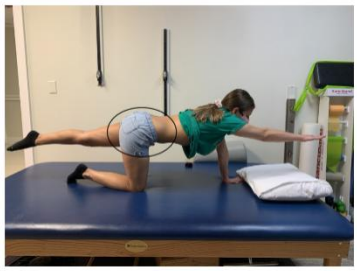
افتحي قدميك بحيث تكون المسافة بينهما بعرض الكتفين.

ابدئي بثني ركبتيك وانزلي للأسفل كأنك ستجلسين، مع إبقاء ظهرك ملاصقًا للحائط.

ثم ارفعي جسمك مرة أخرى للوقوف.

كرري الحركة عدة مرات.

ملاحظة مهمة: يجب أن تتحرك ركبتيك بنفس اتجاه إصبع القدم الثاني، ولا تتجاوز الركبتان مقدمة القدم



تمرين بيرد دوغ – رفع متعاكس للذراع والساق (Bird Dog)

الأوقات5	يكرر
ثواني 3	يمسك
مجموعات3	مكتمل
الأوقات يوم واحد 2	يؤدي

تكبير

ابدأي بوضعية على أربع: اليدان تحت الكتفين، والركبتان تحت الوركين.

مدّي الساق اليمنى للخلف وامسكي الأرض بأصابع القدم فقط.

في نفس الوقت، مدّي الذراع اليسرى للأمام وضعي أطراف الأصابع على الأرض.

ارفعي الساق قليلًا نحو الأعلى، مع إبقاء الحوض والبطن مواجهين للأرض بدون التفاف.

طوال الحركة (Core) ثبتي عضلات الجذع.

ارفعي الذراع قليلًا أيضًا بدون تدوير الكتفين، وحافظي على لوحي الكتفين متقاربين.

عودي للوضعية الأساسية وكرري على الجهة الأخرى.

تمرين القطة والبقرة مع التركيز على قاع الحوض (Cat-Cow – Pelvic Floor Focus)

الأوقات5	يكرر
ثواني 3	يمسك
مجموعات3	مكتمل
الأوقات يوم واحد 2	يؤدي

شاهد الفيديو

تكبير

هذا التمرين يساعد على الربط بين حركة عظمة الذنب وعضلات قاع الحوض.

ضعي يديك تحت كتفيك وركبتيك تحت الوركين.

وضعية البقرة (استشاق):

أرخ بطنك للأسفل.

ارفعي عظمة الذنب للأعلى.

تخيلي أن عضلات قاع الحوض تسترخي وتتمدد.

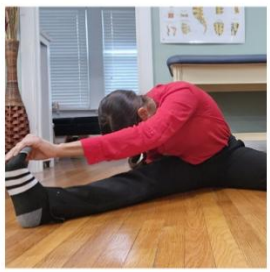
وضعية القطة (زفير):

اسحبي بطنك للداخل وشغّلي عضلاتك الأساسية.

لفي عظمة الذنب للأسفل.

تخيلي أن قاع الحوض ينقبض (مثل تمرين الكيجل).

عند الاستشاق مرة أخرى: أرخ الانقباض وارفعي عظمة الذنب... ثم كرري التمرين.



إطالة العضلة القطنية العميقة (Quadratus Lumborum Stretch)

الأوقات10	يكرر
ثواني 30	يمسك
مجموعات2	مكتمل
الأوقات يوم واحد 2	يؤدي

تكبير

اجلسي على الأرض أو السرير وافتحي ساقيك قدر المستطاع.

أمسكي الذراع من نفس جهة التمديد.

انحني بالجسم للأمام باتجاه أصابع القدم في الجهة المقابلة.

انحني فقط للدرجة التي تشعرين فيها بالتمدد في أسفل ظهرك على الجانب المراد تمديده.

يمكنك سحب أصابع قدمك للخلف في الوقت نفسه لزيادة التمدد في أوتار الركبة لنفس الجانب.

تنفسي بشكل هادئ واستمرّي في التمدد لمدة 30 ثانية تقريبًا.

كرري التمدد على الجهة الأخرى.

Appendix 7 Educational Guide on Postpartum Body Mechanics and Daily Movement Strategies

ديناميكية الحركة للأم الجديدة

الاخصائية سوسن عليان- 0598030199
ماجستير جامعة القدس- أبوديس

نصائح لتقوية وحماية جسمك بعد الولادة)ميكانيكية الجسم للأم الجديدة(

من المهم جدًا أن تعتني بجسمك أثناء حمل الطفل أو إرضاعه أو تبديل حفاضه أو حتى أثناء الجلوس والوقوف .الطريقة الصحيحة .في الحركة والجلوس تحميك من الألم والتعب

أولاً :خذي وقتك واهتمي بطريقة حركتك
احرصي أن تتحركي بوعي وببطء عند رفع الطفل أو حمله أو إرضاعه .بضع ثوانٍ إضافية كفيلة بتقليل الضغط على ظهرك ورقبتك .ويديك

عند دخول السيارة أو إخراج الطفل منها
- اجلسي أولاً بجانب مقعد الطفل داخل السيارة.
- بعدها ارفعي الطفل إلى حضنك، ثم أخرجيه من السيارة وهو أمامك، لا من الجنب.
بهذه الطريقة تتجنبين لفّ ظهرك أو شدّ عضلاتك ✔.

حمل مقعد الطفل (car seat)
- المقعد الكبير أو الثقيل احمليه أمام جسمك، لا على جانبك من المقبض.
- يمكنك التوازن بوضع حقيبة الحفاض أو حقيبة يدك في الجهة المقابلة.
هذا يقلل الضغط على جانب واحد من ظهرك وكتفك →.

عند تغيير الحفاض أو تحميم الطفل
- اختاري طاولة أو سرير بارتفاع مناسب عند مستوى خصرك حتى لا تضطري للانحناء كثيرًا.
- إن كان حوض المطبخ مرتفعًا ومريحًا، فهو أفضل من الانحناء على حوض الحمام.
كلما كان السطح مرتفعًا ومقربًا منك، قلّ الضغط على أسفل ظهرك ✔.

رفع الطفل بأمان
- اجعلي الطفل قريبًا من صدرك قدر الإمكان أثناء الرفع أو الإنزال.
- ازفري أثناء الرفع بدل حبس النفس)الزفير يقلل الضغط على الظهر(.
- تجنبي الرفع من وضع الالتفاف أو الالتواء.
- استخدمي قوة ساقيك وليس ظهرك عند الرفع.

طرق مختلفة لحمل الطفل
بدّلي طريقة الحمل بين:
- حمل كرة القدم (football carry)
- الحمل على الورك (hip carry)
- الحمل من الأمام أو على الكتف

.المهم أن يبقى وزن الطفل قريب من مركز جسمك، وعمودك الفقري مستقيم

الجلوس الصحيح أثناء الرضاعة أو الراحة

.استخدمي كرسي يدعم منحنيات ظهرك الطبيعية -
.تأكدي أن قدميك تلامسان الأرض وأن الوركين والركبتين على نفس المستوى -
.يجب أن تدعم مساند الذراعين ساعديك دون رفع كتفيك أو إسقاطهما للأسفل -

الوقوف السليم

.اجعلي جسمك في محاذاة طبيعية :الأذنان – الكتفين – الوركين – خلف الركبتين – الكعبين في خط واحد -
.لا تحاولي فرد ظهرك أكثر من اللازم، فقط اسمحي له بالانحناء الطبيعي -

أوضاع النوم المريحة

.تجنبي النوم على البطن -
:الوضع الأفضل هو الاستلقاء على الجانب مع -
.وسادة مناسبة تحت الرأس -
.وسادة بين الركبتين لتخفيف الضغط على الورك والظهر -
.عند النوم على الظهر، ضعي وسادة تحت الركبتين، ويمكن وضع منشفة ملفوفة صغيرة تحت الرقبة وأسفل الظهر -

عند النهوض من السرير أو الأرض

.لا تنهضي مباشرة إلى وضع الجلوس
:بل
.استديري على جانبك 1.
.استخدمي ذراعيك لدفع نفسك إلى الجلوس 2.

.هذا يقلل الضغط على البطن والظهر ✅

أثناء الرضاعة أو إطعام الطفل 🍼
.اجلسي بشكل مريح مع دعم جيد للظهر -
.استخدمي وسائد لتقريب الطفل إليك، ولا تنحني نحوه -
:عند الإرضاع في السرير -
.إما استلقي تمامًا، أو اجلسي تمامًا مع دعم جيد للظهر -
.لا تجلسي بشكل نصف مائل لأن ذلك يضغط على الظهر -

لتخفيف آلام الرقبة "(رقبة الأم الجديدة" 🤕
.بين الحين والآخر أثناء الرضاعة، حرّكي رقبتك بلطف وانظري حولك ولأعلى وخلفك -
.غيّري الجهة التي ترضعين منها كل مرة -
.هذا يفيدك ويفيد طفلك أيضًا، لأنه يطوّر نظره بشكل متوازن ✅

تمددي وافتحي صدرك 💪
:الكثير من العناية بالطفل تتطلب الانحناء للأمام، مما يسبب
تقوس الظهر العلوي -
شدّ الصدر للأمام -
إجهاد الذراعين والمعصمين -
.خصّصي وقتًا كل يوم لتمارين فتح الصدر وتمديد العمود الفقري للخلف قليلاً لتخفيف التصلب ✨

حافظي على صحة يديك ومعصميك 🤲
.لا تثني معصميك بشكل مفرط أثناء حمل الطفل -
.قومي بتمارين تمدد ومساج لليدين والمعصمين يوميًا -
.هذا يمنع ألم متلازمة النفق الرسغي الشائعة بعد الولادة ✅

...وأخيرًا 💝
🌸 استمتعي بطفلك وبحياتك الجديدة كأم
العناية بنفسك لا تقل أهمية عن العناية بطفلك — فكلما كنتِ بصحة أفضل، زاد عطاؤك وراحتك معه

Appendix 8 Ethical Approval – Al-Quds University Research Ethics Committee

Al Quds University
Faculty of Health Professions
Jerusalem –Abu Dis

جامعة القدس
كلية المهن الصحية
القدس – أبو ديس

Research Ethics Subcommittee of Faculty of Health Professions
Letter of approval

March 21, 2025
Ref. No.: RESC/2025-45

Dear Applicants, (**Dr. Esra Hamdan, Ms. Sawsan Aliyan**)
Program: **MSc Physiotherapy Department**

The Research Ethics subcommittee of the Faculty of Health Professions has recently reviewed your proposal entitled (**Prevalence of Persistent Low Back Pain Post-Epidural in Palestinian Women: Impact of Physiotherapy Home Exercises**) submitted by (**Dr. Esra Hamdan**). Your proposal is deemed to meet the requirements of research ethics at Al-Quds University, but further assessment is required by the Central Research Ethics Committee of Al-Quds University. We wish you all best for the conduct of the project.

Hussein ALMasri, PhD

Hussein ALMasri

Associate Professor of Medical Imaging
Research Ethics Subcommittee Chair
Faculty of Health Professions

CC: File
CC: Committee members

Tel. Fax: 02 2791243 Email: dean@hpro.alquds.edu تلفاكس: 02 2791243

Appendix 9 Official Approval Letter from the Ministry of Health to Facilitate Research Data Collection

State of Palestine
Ministry of Health
Education in Health and Scientific
Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

Ref.: .....
Date:.....

الرقم: ...C.Co/١٩٤٦/٢٠٢٤...
التاريخ: ...٢٠٢٤/٨/٢٧...

عطوفة الوكيل المساعد لشؤون الصحة العامة وصحة الاسرة المحترم،،،

تحية واحترام،،،

الموضـــوع: تسهيل مهمة بحث

يرجى تسهيل مهمة **الطالبة: سوسن اعليان – طالبة دراسات عليا ماجستير العلاج الطبيعي/**

جامعة القدس، في عمل بحث بعنوان:

"انتشار آلام أسفل الظهر المستمرة بعد التخدير فوق الجافية لدى النساء الفلسطينيات بعد الولادة وفعالية برنامج تمارين علاجية فيزيائية منزلية: دراسة شبه تجريبية"

من خلال السماح للباحثة بجمع معلومات من المريضات عينة الدراسة، وذلك في:

- **عيادات الرعاية الاولية في مديريات الصحة في :**
  - **مديرية الصحة المركزية في البالوع رام الله**
  - **مديرية الصحة في بيت لحم**
  - **مديرية الصحة في الخليل**

مع العلم ان مشرفة الدراسة: د. اسراء حمدان.

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، وعدم التعرض للمعلومات التعريفية للمرضى.

على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحترام،،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: منسقة برنامج ماجستير العلاج الطبيعي المحترمة/ جامعة القدس

Telfax.:09-2333901 scientificresearch.dep@gmail.com تلفاكس: 09-2333901

Appendix 10 Certificates of Completion – TRREE Research Ethics Training Modules

Zertifikat
Certificat
Certificado
Certificate

TRREE

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

sawsan aliyan

a complété avec succès - has successfully completed

Module 2 (2023) - Research Ethics Evaluation

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2025/01/20

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM

Programme de formation continue (2 crédits)
Continuing Education Program (2 credits)

HKU Med LKS Faculty of Medicine Clinical Trials Centre

Ce programme est soutenu par - This program is supported by :

Zertifikat
Certificat
Certificado
Certificate

TRREE

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

sawsan aliyan

a complété avec succès - has successfully completed

Module 1 (2023) - Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2025/01/20

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM

Programme de formation continue (2 crédits)
Continuing Education Program (2 credits)

HKU Med LKS Faculty of Medicine Clinical Trials Centre

Ce programme est soutenu par - This program is supported by :

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

sawsan aliyan

a complété avec succès - has successfully completed

Module 3 (2023) - Informed Consent

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2025/01/20

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM

HKU Med LKS Faculty of Medicine Clinical Trials Centre

Ce programme est soutenu par - This program is supported by :

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

sawsan aliyan

a complété avec succès - has successfully completed

Module 4 - Good Clinical Practice (GCP-E6(R2) 2016)

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2025/02/11

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM

HKU Med LKS Faculty of Medicine Clinical Trials Centre

Ce programme est soutenu par - This program is supported by :

Appendix 11 Informed Consent Form – Phase Two Participants

نموذج الموافقة المستنيرة – المشاركات في المرحلة الثانية
بحث رسالة ماجستير – جامعة القدس

نموذج معلومات المشارك والموافقة المستنيرة

عنوان الدراسة: انتشار آلام أسفل الظهر بعد التخدير فوق الجافية لدى النساء الفلسطينيات بعد الولادة، وتأثير برامج التمارين المنزلية على التخفيف منها :تصميم شبه تجريبي

الباحثة
سوسن محمد عليان عليان
طالبة ماجستير – قسم العلاج الطبيعي
جامعة القدس

المشرفة
د .إسراء حمدان
كلية المهن الصحية – جامعة القدس

أنتِ مدعوة للمشاركة في المرحلة الثانية من دراسة بحثية تهدف إلى تقييم تأثير برنامج تمارين منزلية على آلام أسفل الظهر بعد الولادة .تُجرى هذه الدراسة كجزء .من متطلبات الحصول على درجة الماجستير في العلاج الطبيعي بجامعة القدس

هدف الدراسة: تهدف هذه المرحلة إلى قياس فعالية برنامج تمارين علاجية منزلية في التخفيف من آلام أسفل الظهر وتحسين القدرة الحركية لدى النساء بعد الولادة

إجراءات المشاركة:
في حال موافقتكِ على المشاركة، سيتم ما يلي
تعبئة ثلاثة استبيانات قصيرة قبل وبعد تطبيق البرنامج التدريبي لمدة 4 أسابيع :
(NPRS) مقياس التقييم العددي للألم
(BPI) استبيان شدة الألم وتأثيره
(ODI) استبيان إعاقة أسفل الظهر
الحصول على برنامج تمارين منزلية لمدة 4 أسابيع بالإضافة إلى دليل تثقيفي حول ميكانيكا الجسم اليومية
التواصل الأسبوعي للمتابعة

المخاطر والفوائد :لا توجد مخاطر متوقعة سوى احتمال حدوث ألم عضلي طفيف مؤقت
تشمل الفوائد المحتملة تخفيف الألم وتحسين القدرة الحركية، إلى جانب تلقي إرشادات علاج طبيعي مجانية

المشاركة طوعية :مشاركتكِ طوعية بالكامل، ولكِ الحق في الانسحاب في أي وقت دون ذكر الأسباب ودون أي تأثير سلبي

السرية :ستتم معالجة جميع المعلومات بسرية تامة، ولن تُستخدم البيانات إلا لأغراض علمية فقط

بيان الموافقة
.أقر بأنني قرأت وفهمت جميع المعلومات المتعلقة بهذه الدراسة، وأوافق على المشاركة طوعًا، وأفهم أن لي الحق في الانسحاب في أي وقت دون تقديم مبرر

اسم المشاركة: _____
توقيع المشاركة: _____
التاريخ: _____

اسم الباحثة: _____
توقيع الباحثة: _____
التاريخ: _____

Appendix 12 STROBE Checklist for Phase One (Cross-Sectional Study)

STROBE Statement Checklist for Cross-Sectional Studies

Completed Checklist with Page References

Item No	Section/Topic	Recommendation	Page Number(s) in Thesis
Title and Abstract			
1(a)	Title/Abstract	Indicate the study's design with a commonly used term in the title or the abstract	Title Page, Abstract (p. i–ii)
1(b)	Abstract	Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract (p. i–ii)
Introduction			
2	Background/rationale	Explain the scientific background and rationale for the investigation being reported	p. 1–2
3	Objectives	State specific objectives, including any prespecified hypotheses	p. 3–4
Methods			
4	Study design	Present key elements of study design early in the paper	p. 21, 33
5	Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p. 21
6	Participants	Give the eligibility criteria, and the sources and methods of selection of participants	p. 22–23
7	Variables	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	p. 23–24
8*	Data sources/measurement	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	p. 23–24
9	Bias	Describe any efforts to address potential sources of bias	p. 23, 30
10	Study size	Explain how the study size was arrived at	p. 22
11	Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	p. 29
12(a)	Statistical methods	Describe all statistical methods, including those used to control for confounding	p. 29–31

Item No	Section/Topic	Recommendation	Page Number(s) in Thesis
12(b)	Statistical methods	Describe any methods used to examine subgroups and interactions	p. 29–31
12(c)	Statistical methods	Explain how missing data were addressed	p. 29–31
12(d)	Statistical methods	If applicable, describe analytical methods taking account of sampling strategy	p. 29–31
12(e)	Statistical methods	Describe any sensitivity analyses	p. 29–31
Results			
13(a)*	Participants	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	p. 33, Figure 4.1
13(b)	Participants	Give reasons for non-participation at each stage	p. 33, Figure 4.1
13(c)	Participants	Consider use of a flow diagram	Figure 4.1 (p. 33)
14(a)*	Descriptive data	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	p. 34–38, Table 4.1–4.6
14(b)	Descriptive data	Indicate number of participants with missing data for each variable of interest	p. 34–38, Table 4.1–4.6
15*	Outcome data	Report numbers of outcome events or summary measures	p. 38–39
16(a)	Main results	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	p. 39–45
16(b)	Main results	Report category boundaries when continuous variables were categorized	p. 39–45
16(c)	Main results	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	p. 39–45
17	Other analyses	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	p. 39–45
Discussion			
18	Key results	Summarise key results with reference to study objectives	p. 67–68
19	Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	p. 71

Item No	Section/Topic	Recommendation	Page Number(s) in Thesis
20	Interpretation	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p. 67–72
21	Generalisability	Discuss the generalisability (external validity) of the study results	p. 72
Other Information			
22	Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Acknowledgment (p. v)

Note: Items marked with an asterisk (*) indicate that information should be given separately for exposed and unexposed groups where applicable.

Reference: The STROBE checklist is best used in conjunction with the Explanation and Elaboration article available at www.strobe-statement.org.

Completion Statement: *All 22 items of the STROBE Statement for cross-sectional studies have been mapped to the thesis page numbers provided.*

انتشار آلام أسفل الظهر بعد التخدير فوق الجافية لدى النساء الفلسطينيات بعد الولادة وتأثير برامج التمارين المنزلية على تخفيفها

اعداد: سوسن محمد عليان

بأشراف: الدكتورة اسراء حمدان

الملخص

الخلفية: يُعد ألم أسفل الظهر بعد الولادة من الاضطرابات العضلية الهيكلية الشائعة التي قد تؤثر بشكل ملحوظ على التعافي الوظيفي وجودة الحياة لدى النساء بعد الولادة. وعلى الرغم من الانتشار الواسع لاستخدام التخدير فوق الجافية أثناء المخاض، لا يزال دوره في استمرار ألم أسفل الظهر بعد الولادة موضع جدل، كما أن الأدلة العلمية المتوفرة من الدول ذات الدخل المنخفض والمتوسط ما تزال محدودة.

الهدف :هدفت هذه الدراسة إلى تقييم مدى انتشار ألم أسفل الظهر بعد الولادة (Postpartum Low Back Pain - PPLBP) لدى النساء الفلسطينيات، ودراسة العلاقة بين استخدام التخدير فوق الجافية أثناء الولادة واستمرار الألم، إضافةً إلى تقييم فعالية برنامج تمارين منزلية علاجي في تقليل شدة الألم وتحسين القدرة الوظيفية.

المنهجية :استُخدم تصميم دراسي مكوّن من مرحلتين. شملت المرحلة الأولى دراسة مقطعية استهدفت 414 سيدة بعد الولادة من مختلف محافظات الضفة الغربية، بهدف تحديد معدل انتشار PPLBP والعوامل المرتبطة به وطرق التدبير المتبعة. أما المرحلة الثانية فكانت دراسة شبه تجريبية بتصميم قبلي–بعدي شملت 30 مشاركة يعانين منPPLBP ، حيث خضعن لبرنامج تمارين منزلية علاجي لمدة أربعة أسابيع بإشراف أخصائي علاج طبيعي عن بُعد. تم تقييم النتائج باستخدام مقياس شدة الألم الرقمي (NPRS)، ومقياس أوسويستري للإعاقة(ODI) ، ومقياس موجز الألم.(BPI)

النتائج :بلغ معدل انتشار ألم أسفل الظهر بعد الولادة 82.4%، وهو معدل مرتفع مقارنةً بالدراسات الدولية. لم تُظهر النتائج وجود علاقة ذات دلالة إحصائية طويلة الأمد بين استخدام التخدير فوق الجافية واستمرار الألم. في المقابل، ارتبطت شدة الألم بعوامل أخرى مثل صغر العمر، وارتفاع مؤشر كتلة الجسم, و الولادة الطبيعية، و انخفاض عدد مرات الحمل السابقة. كما أظهر برنامج التمارين المنزلية تحسنًا ملحوظًا في شدة الألم والقدرة الوظيفية، حيث انخفض متوسط درجات NPRS من 6.2 إلى 2.8، و ODIمن 38.7% إلى 18.4%، و BPIمن 5.4 إلى 2.5.

الاستنتاج :يُعد ألم أسفل الظهر بعد الولادة مشكلة شائعة ومؤثرة وظيفيًا بين النساء الفلسطينيات، ويتأثر بعوامل ديموغرافية وبدنية أكثر من ارتباطه باستخدام التخدير فوق الجافية. وقد أثبت برنامج التمارين المنزلية فعاليته وجدواه وقبوله الثقافي، مما يدعم دمجه ضمن خدمات الرعاية الصحية بعد الولادة، خاصة في البيئات محدودة الموارد.

الكلمات المفتاحية :ألم أسفل الظهر بعد الولادة، التخدير فوق الجافية، برنامج تمارين منزلية، العلاج الطبيعي، صحة الأم، فلسطين.