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Faculty of Physical Therapy

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Effectiveness of Pilates Exercises in the Treatment of Postpartum Constipation; A Randomized Controlled Study

A Thesis Protocol Submitted by:

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جامعة كفر الشيخ
كلية العلاج الطبيعي
قسم العلاج الطبيعي لصحة المرأة

فاعلية تمارين البيلاتس في علاج الإمساك بعد الولادة : دراسة عشوائية مُحْكَمَة

خطة بحث مقدمة من الباحثة

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أخصائية علاج طبيعي، مستشفى السنبلاوين العام

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قُدِّمت هذه الرسالة استكمالًا لمتطلبات الحصول على درجة الماجستير في العلاج الطبيعي لصحة المرأة

كلية العلاج الطبيعي
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CHAPTER I

Introduction

The postpartum period begins following the expulsion of the placenta and is characterized by a series of significant physiological and anatomical changes as the maternal body gradually returns to a non-pregnant state [1]. During this period, postpartum constipation is a common bowel disorder that may cause pain and discomfort and adversely affect the quality of life of postpartum women [2].

Postpartum constipation refers to difficulty in bowel evacuation after childbirth and is typically characterized by infrequent bowel movements, straining during defecation, hard stools, and a feeling of incomplete evacuation. This condition may occur immediately after delivery or persist for several weeks or months postpartum. It is considered a multifactorial condition resulting from physiological, hormonal, behavioral, and mechanical changes associated with pregnancy and childbirth [3].

The prevalence of constipation during the postpartum period is relatively high, with studies reporting that up to 45% of women may experience constipation after delivery [4]. In addition, postpartum women may develop other anorectal disorders such as hemorrhoids, pelvic floor dysfunction, and fecal incontinence, which can further impair bowel function and reduce overall well-being [5].

The development of postpartum constipation is multifactorial and may be associated with the persistence of elevated progesterone levels, which may affect gastrointestinal smooth muscle function, inadequate fluid and dietary intake, dehydration during labor, and the use of analgesics or opioids during labor and the postpartum period [6]. Additionally, damage to the pelvic floor muscles during childbirth may increase the risk of postpartum constipation [2].

Postpartum women may experience a variety of physical complications, including constipation and other pelvic floor disorders, which may persist beyond the immediate postpartum period and require appropriate management and rehabilitation [4].

Management of postpartum constipation often involves lifestyle modification, dietary regulation, adequate fluid and fiber intake, and pharmacological agents such as laxatives [2]. In addition to these conventional approaches, physical therapy interventions, including pelvic floor and abdominal exercises, may provide a non-pharmacological option for improving constipation symptoms and constipation-related quality of life in postpartum women [7].

Exercise therapy may be a feasible intervention for constipation, as evidence from randomized controlled trials suggests that exercise can improve constipation symptoms and bowel function [8].

Among various exercise approaches, Pilates exercises have been widely used in rehabilitation and women's health physical therapy. Pilates focuses on core stability, controlled breathing, muscle strengthening, and body awareness. These exercises emphasize controlled and precise movements with coordinated activation of the trunk and pelvic musculature, which may contribute to improved postural and pelvic stability [9]. In particular, Pilates involves the activation of deep stabilizing muscles, including the transversus abdominis, multifidus, diaphragm, and pelvic floor muscles, which work synergistically to support lumbopelvic stability and regulate intra-abdominal pressure [10].

During normal defecation, coordinated abdominal muscle contraction and pelvic floor relaxation are essential for generating the intra-abdominal pressure required for effective stool evacuation [11]. Impairment of this coordination may contribute in difficulty of defecation and constipation [12].

Therefore, Pilates exercises may potentially improve bowel evacuation and reduce constipation symptoms in postpartum women by promoting coordinated abdominal and pelvic floor muscle activity and regulating intra-abdominal pressure [7, 13].

To our knowledge, limited studies have investigated the therapeutic effect of Pilates exercises on postpartum constipation. Therefore, the present study aims to investigate the effect of Pilates exercises in the treatment of postpartum constipation in order to determine whether this exercise approach can serve as an effective non-pharmacological intervention to improve bowel function and constipation-related quality of life in postpartum women.

Statement of the problem:

This study will be conducted to answer the following research question: Do Pilates exercises have an effect on postpartum constipation?

Purpose of the study:

This study will be conducted to evaluate the effect of Pilates exercises on postpartum constipation and constipation-related quality of life in postpartum women.

Significance of the study:

Postpartum constipation is a common condition that can cause discomfort and negatively affect daily functioning, and overall quality of life in postpartum women [3]. Although several management approaches are available, including dietary and lifestyle modifications, adequate fluid and fiber intake, physical activity, and pharmacological treatments when indicated, there is a need for effective non-pharmacological interventions that can be incorporated into postpartum care [14].

Pilates is a mind–body exercise approach that integrates controlled movement, breathing, concentration, and body awareness. It may provide both physical and psychosocial benefits, including improvements in muscle function, physical well-being, sleep quality, and quality of life. These multidimensional effects may make Pilates a relevant exercise approach for women during the postpartum period [9, 40].

Although Pilates has been investigated for constipation-related bowel outcomes in women with constipation-predominant irritable bowel syndrome [15], evidence regarding its specific therapeutic effect on postpartum constipation remains limited.

Therefore, this study will investigate the effect of Pilates exercises on postpartum constipation, with particular focus on constipation symptoms, bowel function, and constipation-related quality of life, to determine their potential role as a non-pharmacological rehabilitation strategy for postpartum women.

Delimitations:

This study will be delimited to the following

- Postpartum women aged between 22 and 35 years.
- A body mass index (BMI) ranging from 30 to 32 kg/m².
- Women who have given birth vaginally only.
- Postpartum constipation occurring 2–6 weeks after delivery.
- No documented or observable psychiatric or neurological disorders that may interfere with study participation or outcome assessment, such as dementia or psychosis.
- No history of cancer.

- No severe or unstable cardiorespiratory or musculoskeletal conditions that may limit the ability to perform Pilates exercises safely or affect study outcomes.

Hypothesis:

It will be assumed that Pilates exercises will have no significant effect in the treatment of postpartum constipation.

Basic assumptions:

It is assumed that:

1) All participants will not receive any medications or interventions that may affect bowel function during the study.
2) All participants will be cooperative and follow the instructions during the exercise sessions.
3) All participants will perform the same Pilates exercise program under supervision.
4) The study outcomes will be of value for physical therapy in the management of postpartum constipation.
5) The clinical methods used to assess bowel function and pelvic floor performance will be reliable and valid.

CHAPTER II

Review of Literature

Constipation is a common functional bowel disorder characterized by symptoms such as infrequent bowel movements, hard, dry, or lumpy stools that are difficult or painful to pass, or a feeling of incomplete evacuation, anorectal obstruction, or need for manual maneuvers [16].

Postpartum constipation refers to constipation symptoms occurring during the postpartum period, characterized by infrequent and/or incomplete bowel movements, frequent straining, or the need for manual assistance during defecation. Recent evidence suggests that postpartum constipation may occur throughout the postpartum period and up to 12 months after delivery [17].

Prevalence of Postpartum Constipation

The reported prevalence of postpartum constipation varies considerably among studies, depending on the definition used, timing of assessment, and characteristics of the studied population. Previous studies have reported prevalence estimates ranging from approximately 24% to 45.8% , and constipation may persist beyond the early postpartum period in some women, extending up to 12 months after delivery [4, 2].

Biomechanics and Physiology of Normal Defecation

Normal defecation is a complex physiological process that depends on the integrated and coordinated activity of the gastrointestinal tract, pelvic floor, and anal sphincters, together with central, spinal, peripheral, and enteric neural mechanisms [18].

During normal defecation, abdominal wall expansion is coordinated with anorectal descent and an increase in rectal and anal pressure, followed by relaxation of the anal sphincter and rectal evacuation. This coordinated abdominopelvic-rectoanal activity facilitates effective stool passage [19].

As fecal material enters the rectum, rectal distension stimulates sensory receptors within the rectal wall and generates the urge to defecate. The external anal sphincter can be voluntarily contracted to postpone defecation or relaxed when defecation is appropriate [20]. The puborectalis muscle contributes to fecal continence by maintaining the anorectal angle, and its relaxation during defecation allows the anorectal angle to straighten and facilitates the passage of stool [20].

Causes and Risk Factors of Postpartum Constipation

The development of postpartum constipation is multifactorial and may be associated with several factors occurring during pregnancy, labor, and the postpartum period, including inadequate fluid and food intake, medication use, perineal pain or trauma, hemorrhoids, and changes in dietary patterns after delivery [21].

1. Hormonal Factors

Hormonal changes during pregnancy may contribute to altered gastrointestinal motility. Progesterone exerts an inhibitory effect on gastrointestinal smooth muscle, promoting smooth muscle relaxation and reducing gastrointestinal motility, which may contribute to delayed intestinal transit and constipation [22]. In the postpartum period, pregnancy-related hormonal changes may continue to influence bowel function during the weeks following delivery and have been associated with postpartum constipation [4].

2. Dietary and Fluid Factors

Dietary and fluid intake plays an important role in the prevention and management of postpartum constipation. Inadequate fluid intake and insufficient dietary fiber may contribute to harder stools and difficulty with bowel evacuation. Therefore, postpartum women should be encouraged to maintain adequate fluid intake and consume a healthy, balanced diet rich in fiber-containing foods, particularly vegetables, fruits, nuts, legumes, and whole grains. Dietary practices involving limited consumption of fruits and vegetables should also be avoided when possible, as they may contribute to constipation during the postpartum period [21].

3. Medication-Related Factors

Medication use during labor and the postpartum period may contribute to postpartum constipation. In particular, narcotic or opioid medications administered during labor or after cesarean birth may contribute to constipation and impaired bowel function [21].

Iron supplementation may also contribute to constipation during the postpartum period. Evidence from postpartum women with iron-deficiency anemia indicates that oral iron supplementation probably results in a higher incidence of constipation compared with intravenous iron therapy [23].

4. Obstetric and Pain-Related Factors

Obstetric factors may influence the development of postpartum constipation. Vaginal delivery has been associated with a higher likelihood of constipation compared with cesarean delivery, while perineal trauma following vaginal birth may further increase the risk. Perineal pain and discomfort may also lead women to delay defecation because of fear of pain during bowel evacuation [24].

5. Pelvic Floor Factors

Pelvic floor injury during childbirth may contribute to postpartum constipation. In particular, damage to the anal sphincter or pelvic floor muscles during childbirth, as well as perineal trauma and pain, may increase the risk of postpartum constipation and interfere with normal bowel evacuation [6].

The relationship between delivery mode and anorectal function has also been investigated in women with postpartum constipation. A retrospective study found that women with spontaneous vaginal delivery had a lower change in maximal contracting sphincter pressure compared with women who underwent cesarean delivery, suggesting differences in anorectal push function following different modes of delivery. However, the number of pregnancies was not significantly associated with anorectal manometry parameters [25].

Diagnosis and Assessment of Postpartum Constipation

The diagnosis of postpartum constipation is primarily based on the presence of bowel-related symptoms; including infrequent or incomplete bowel movements, frequent straining during defecation, and the need for manual assistance to facilitate bowel evacuation. These symptoms may occur during the postpartum period and up to 12 months after delivery [17].

Assessment of postpartum constipation may include evaluation of constipation symptoms, constipation-related quality of life, and relevant physical factors that may influence bowel function. The Patient Assessment of Constipation Symptoms (PAC-SYM) is a validated patient-reported questionnaire designed to assess the severity of constipation symptoms, while the Patient Assessment of Constipation Quality of Life (PAC-QOL) evaluates the impact of constipation on patients' daily functioning and well-being [26, 27].

Physical assessment may also include measurement of abdominal circumference at the umbilical level as an additional clinical outcome following

exercise-based intervention. The abdominal muscles contribute to the generation of intra-abdominal pressure, and normal defecation depends on coordinated activity between the abdominal and pelvic floor muscles. Impaired coordination of the abdominal muscles has been demonstrated in women with defecatory disorders, suggesting that improved abdominal muscle function and abdomino-pelvic coordination may contribute to more effective intra-abdominal pressure generation and bowel evacuation [28, 29].

Pelvic floor muscle function may also be assessed objectively using perineometry, which measures changes in intravaginal pressure during voluntary pelvic floor muscle contraction. This method provides a quantitative measure of pelvic floor muscle performance and can be used to evaluate changes in muscle function following exercise-based interventions [30].

Treatment and Prevention

Prevention and management of postpartum constipation involve both non-pharmacological and pharmacological approaches. Lifestyle modifications, including adequate dietary fiber and fluid intake, a balanced diet, regular physical activity, and appropriate bowel habits, are recommended to help prevent and relieve constipation during the postpartum period [21].

When lifestyle and dietary measures are insufficient, pharmacological treatment with laxatives may be considered to relieve constipation symptoms. Laxatives include several classes, such as bulk-forming, osmotic, stimulant, and stool-softening agents, and the choice of treatment should be individualized according to symptom severity and patient-related factors [21].

Exercise is an important component of postpartum recovery and may provide a useful non-pharmacological approach for improving physical function and overall well-being. Regular postpartum exercise has been associated with improvements in abdominal and pelvic muscle function, physical fitness, and

psychological well-being [31]. Pilates is a low-impact mind–body exercise that combines controlled movement, breathing, core activation, flexibility, and postural control, making it a potentially suitable exercise approach during the postpartum period [9].

Pilates and Its Potential Role in Postpartum Constipation

Recent studies have investigated Pilates as an exercise-based intervention for improving abdominal muscle structure and function in postpartum women. A randomized controlled study involving primiparous postpartum women reported that a four-week Pilates program significantly reduced inter-recti distance and waist circumference and improved abdominal muscle endurance compared with a control group. These findings suggest that Pilates may contribute to the recovery of abdominal muscle function following childbirth and may have potential benefits for postpartum women with abdominal muscle impairment [31].

Pelvic floor function is another potential mechanism through which exercise may influence postpartum bowel function. Pilates incorporates pelvic floor activation within coordinated trunk and breathing exercises; however, evidence regarding its direct effect on pelvic floor muscle function remains inconsistent. A systematic review and meta-analysis found no significant difference in pelvic floor muscle function measured by perineometry between healthy women practicing Pilates and control groups, indicating that further research is needed to establish the effectiveness of Pilates for improving pelvic floor muscle function [32].

Recent evidence has also investigated the effects of Pilates on bowel function in women with constipation-predominant irritable bowel syndrome (IBS-C). A randomized controlled trial involving 60 women found that an eight-week Pilates program combined with dietary advice significantly increased the frequency of complete spontaneous bowel movements and improved IBS symptoms compared with dietary advice alone. These findings provide preliminary evidence

that Pilates may have beneficial effects on bowel function; however, the study population consisted of women with IBS-C rather than postpartum constipation, and therefore its findings cannot be directly generalized to postpartum women [15].

Despite the potential benefits of exercise-based interventions, evidence specifically addressing postpartum constipation remains limited. A Cochrane review on interventions for preventing constipation after giving birth found insufficient evidence to determine the effectiveness of available preventive interventions, highlighting the need for further high-quality research [2]. In addition, a Cochrane review evaluating interventions for treating postpartum constipation found insufficient evidence to establish the effectiveness of available treatments, further supporting the need for well-designed clinical trials in this population [6].

Current evidence suggests that Pilates may have beneficial effects on physical function and bowel-related outcomes; however, its specific role in the management of postpartum constipation has not yet been clearly established. Most available studies have focused on abdominal muscle recovery, pelvic floor function, or constipation-related outcomes in non-postpartum populations. Therefore, investigating the effects of Pilates on constipation symptoms and constipation-related quality of life in postpartum women may provide valuable evidence for the development of effective non-pharmacological management strategies.

CHAPTER III

Subjects and Methods

This randomized controlled study will be carried out in 40 postpartum women at the outpatient clinics of El Senbellawein General Hospital to determine the potential therapeutic effect of Pilates exercises on postpartum constipation.

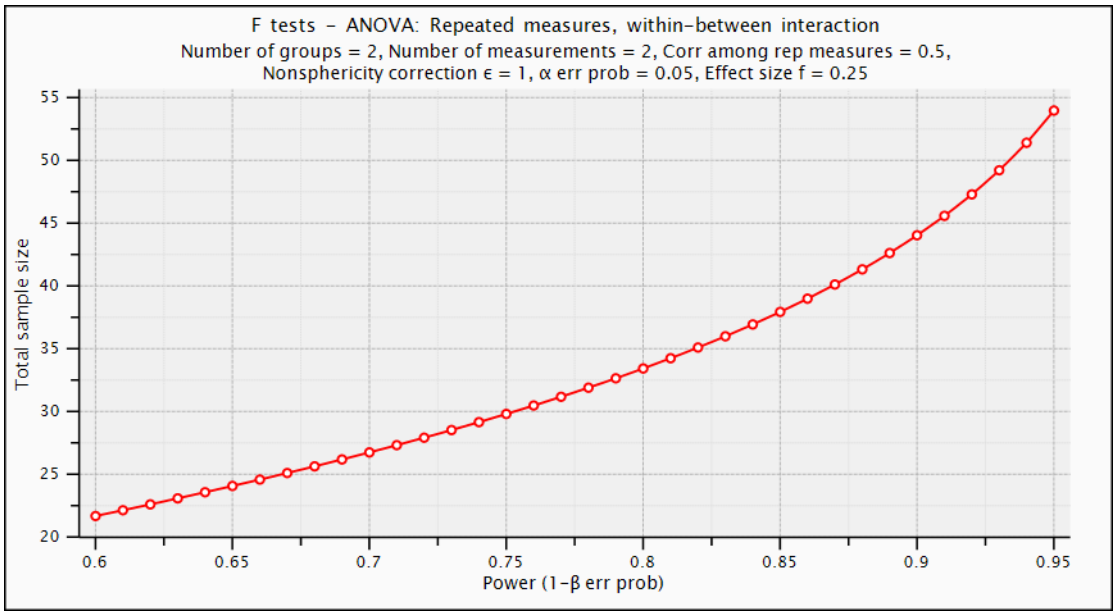
Ethical consideration

Official permission to conduct the study will be obtained from the Research Ethics Committee at Kafr Elsheikh University. The study will be conducted in accordance with the ethical standards outlined in the 1964 Declaration of Helsinki and its subsequent amendments, or with comparable ethical standards. Participation in the study will be voluntary. The study will include ethical considerations, explain the purpose and nature of the study, and state the possibility of withdrawal at any time. Written informed consent **(Appendix I)** will be obtained from all women in this study.

1-Subjects:

Sample size calculation:

The sample size was calculated a priori using G*Power software (version 3.1.9.7) for a Two-Way Mixed-Model ANOVA design (2 groups x 2 time points). Based on the primary outcome measure, the Patient Assessment of Constipation-Symptoms (PAC-SYM) total score, an effect size of $f = 0.25$ was selected. With a significance level of $\alpha = 0.05$ and a statistical power of 0.8, a minimum net sample size of 34 participants (17 per group) is required. To allow for a potential 15 % dropout rate during the 9-week study period, a total of 40 postpartum women will be recruited, divided equally into two groups (20 per group).



Forty women diagnosed with postpartum constipation will participate in this study. They will be selected from the outpatient clinics of El Senbellawein General Hospital. Their ages will range between 22 and 35 years, and their body mass index (BMI) will range from 30 to 32 kg/m². The selected participants will be women who have delivered vaginally only in the past 2–6 weeks.

Study Design and Randomization

This study will be conducted as a prospective randomized controlled trial, with participants randomly allocated to either the study group or the control group.

To avoid selection bias, participants will be randomly allocated using a simple randomization method by choosing one of two cards representing the two study groups.

The participants will be divided into two equal groups according to the following criteria:

Inclusion Criteria:

Participants will be included if they meet all of the following criteria:

- Postpartum women aged 22–35 years.
- Have a body Mass Index (BMI): 30–32 kg/m².
- women who have given birth vaginally.
- Are 2–6 weeks postpartum at the time of recruitment.
- Postpartum women complaining of constipation and meeting the Rome IV diagnostic criteria for functional constipation.

Exclusion Criteria:

The potential participants will be excluded in the following conditions:

- Women with hypertension.
- Women with cardiac diseases.
- Women with diabetes mellitus.
- History of inflammatory bowel disease, abnormalities, or anal fissure.
- History of bowel surgery other than appendectomy.
- Women with endocrine or gastrointestinal disorders.
- Women with neurological or muscular disorders.

Group (A) (study group): Twenty Egyptian women aged 22–35 years will receive a structured Pilates exercise program designed to address postpartum constipation, in addition to the standard postpartum care program. The Pilates program will target the core and pelvic floor muscles and will be conducted for 9 weeks, three sessions per week.

Group (B) (Control group): Twenty Egyptian women aged 22–35 years will receive the standard postpartum care program only throughout the 9-week intervention period.

All participants in both groups will undergo pre- and post-intervention assessment of bowel function, pelvic floor muscle strength, abdominal girth, and constipation-related quality of life.

2-Assessment

Measurement and assessment will be performed before the start of the intervention (at baseline) and after completion of the 9-week intervention for all participants in both groups, using the same standardized assessment procedures.

2.1- History Taking

All relevant information, including age, occupation, marital status, parity, mode of delivery, postpartum period, bowel habits, medical history, medication use, weight, height, and BMI, will be recorded on the participant data sheet **(Appendix II).**

2.2- Evaluative Procedures

A- Anthropometric Measurements

Body Weight and Height

Body weight and height will be measured for all participants using a calibrated weight-height scale. Each participant will be instructed to wear a thin layer of clothing and remove her shoes before measurement.

Body weight will be recorded in kilograms (kg), and height will be recorded in meters (m). Body Mass Index (BMI) will subsequently be calculated using the following equation:

$$\textbf{BMI (kg/m}^2\textbf{) = Weight (kg) / Height}^2\textbf{ (m}^2\textbf{)}$$ [33].

Abdominal Girth Measurement

Abdominal girth will be measured at the level of the umbilicus using a flexible non-stretchable measuring tape.

The participant will stand upright with her feet shoulder-width apart, arms relaxed by her sides, and abdomen relaxed. The measuring tape will be placed horizontally around the abdomen without compressing the skin. The participant will be instructed to breathe normally during the measurement.

Three consecutive measurements will be taken, and the mean value will be recorded for analysis.

Abdominal girth will be assessed at the baseline and after completion of the 9-week intervention using the same measurement procedures [34, 35].



Figure2. Measurement of abdominal girth at the level of the umbilicus.

B- Bowel Function Assessment

Bowel function will be assessed using the Arabic version of Bristol Stool Form Scale (BSFS), a seven-category visual scale used to classify stool form from Type 1 to Type 7. The BSFS provides a standardized method for assessing stool form and has been used to assess intestinal transit and bowel function [(36)].

Stool consistency will be assessed at baseline and after completion of the 9-week intervention using the same assessment procedure for all participants. The participant will be asked to identify the stool type that most closely represents her usual stool consistency according to the Arabic version of the BSFS (**Appendix III**).

C- Patient Assessment of Constipation–Symptoms (PAC-SYM)

Constipation-related symptoms will be assessed using the Patient Assessment of Constipation–Symptoms (PAC-SYM) questionnaire [(26)].

The PAC-SYM is a 12-item patient-reported questionnaire designed to assess the severity of constipation-related symptoms. It consists of three domains: abdominal symptoms (4 items), rectal symptoms (3 items), and stool symptoms (5 items). Each item is scored on a 5-point scale ranging from 0 to 4, where 0 = absent, 1 = mild, 2 = moderate, 3 = severe, and 4 = very severe [(26)].

For scoring, the score of each item will be recorded, and the overall PAC-SYM score will be calculated as the mean of all completed items by dividing the sum of the item scores by the number of completed items. The total score ranges from 0 to 4, with higher scores indicating greater severity of constipation-related symptoms. Domain scores will be calculated as the mean score of the items within each corresponding domain [(26)].

The PAC-SYM has demonstrated good validity and reliability. In the original psychometric validation study, the questionnaire showed high internal consistency (Cronbach's $\alpha = 0.89$) and good test–retest reliability (intraclass correlation coefficient [ICC] = 0.75). Concurrent validity was supported by significant correlations with patient-rated ($r = 0.68$) and investigator-rated ($r = 0.72$) constipation severity [26].

The questionnaire will be administered at baseline and after completion of the 9-week intervention. Changes in the total and domain PAC-SYM scores between pre- and post-intervention assessments will be used to evaluate changes in constipation-related symptom severity (**Appendix IV**)

D- Patient Assessment of Constipation Quality of Life (PAC-QOL)

Constipation-related quality of life will be assessed using the Patient Assessment of Constipation Quality of Life (PAC-QOL) questionnaire [27].

The PAC-QOL is a validated 28-item patient-reported questionnaire designed to assess the impact of constipation on quality of life. It evaluates the extent to which constipation affects the participant's physical well-being, psychosocial functioning, daily life, and satisfaction. It consists of four domains: physical discomfort (items 1–4), psychosocial discomfort (items 5–12), worries and concerns (items 13–23), and satisfaction (items 24–28) [27].

For scoring, each item is rated on a 5-point Likert scale ranging from 0 to 4. Items 18 and 25–28 are reverse-scored before calculating the scores. Domain scores will be calculated as the mean of the items within each respective domain, and the overall PAC-QOL score will be calculated as the mean of all 28 item scores. Both domain and overall scores range from 0 to 4, with higher scores indicating a greater negative impact of constipation and poorer constipation-related quality of life [27].

The PAC-QOL has demonstrated good validity and reliability in multinational validation studies. In the original validation study, the questionnaire showed good internal consistency, with Cronbach's alpha coefficients greater than 0.80 for the overall scale and its subscales. The questionnaire also demonstrated good reproducibility, with intraclass correlation coefficients (ICCs) greater than 0.70 for the overall scale and most subscales, except for the satisfaction subscale, which showed an ICC of 0.66. The validity of the PAC-QOL was supported by significant associations with abdominal pain and constipation severity. Furthermore, the questionnaire demonstrated responsiveness to improvements in constipation-related quality of life following treatment [27].

The questionnaire will be administered at baseline and after completion of the 9-week intervention. Changes in the PAC-QOL scores between pre- and post-intervention assessments will be used to evaluate changes in constipation-related quality of life (**Appendix V**).

E- Pelvic Floor Muscle Strength Assessment

Pelvic floor muscle strength will be assessed using a calibrated perineometer, which measures vaginal pressure generated during voluntary pelvic floor muscle contraction in cmH_2O. The participant will be positioned in crook lying, with the hips and knees comfortably flexed. Following standardized verbal instructions, she will be asked to perform a maximal voluntary contraction (MVC) of the pelvic floor muscles, followed by complete relaxation.

Three consecutive maximal voluntary contractions will be performed, with an adequate rest interval between trials to minimize muscle fatigue. The pressure generated during each contraction will be recorded in cmH_2O, and the mean value of the three MVCs will be used for statistical analysis. Previous studies have demonstrated good to high reliability of perineometer-based measurements for the assessment of pelvic floor muscle strength [37, 38].

Pelvic floor muscle strength will be assessed at baseline and after completion of the 9-week intervention using the same standardized measurement procedure for all participants (**Appendix VI**).

3. Evaluative Equipment

A- Weight-Height Scale

A calibrated weight-height scale will be used to measure body weight and height and to calculate BMI for each participant.



Figure 1: Weight-height scale.

B- Flexible Non- Stretchable Measuring Tape

A flexible non-stretchable measuring tape will be used to measure abdominal girth at the level of the umbilicus.



Figure 2: Flexible non- stretchable measuring tape.

C- Perineometer

A calibrated perineometer will be used to assess pelvic floor muscle strength by measuring the vaginal pressure generated during voluntary pelvic floor muscle contraction. The pressure will be recorded in cmH_2O**.**



Figure 3: Calibrated Perineometer with a Vaginal Prope.

4. Therapeutic Procedures

Patient Preparation

Prior to the intervention, each participant will receive a comprehensive explanation of the study procedures, including the assessment methods and treatment protocol. Participants will be instructed regarding the correct performance of the prescribed exercises and the importance of adherence to the standardized postpartum care program.

All participants will receive standardized advice regarding healthy postpartum lifestyle practices, including adequate dietary fiber intake, adequate fluid intake, and regular physical activity [14, 31].

A- Standard Postpartum Care Program

All participants in both groups will receive a standardized postpartum care program in the form of an information brochure, which will be explained by the researcher **(Appendix VII).**

The brochure will provide standardized advice regarding a healthy balanced diet, regular consumption of dietary fiber from fruits, vegetables, whole grains, legumes, nuts, and seeds, adequate fluid intake, regular meal patterns, and gradual return to low-impact physical activity such as walking. Participants will be encouraged to gradually achieve at least 150 minutes of moderate-intensity physical activity per week, as tolerated and according to their postpartum recovery and individual condition [14, 31].

These recommendations are consistent with the World Health Organization recommendations for postnatal care, including dietary advice, adequate fluid and dietary fiber intake, and regular physical activity to support postpartum recovery and bowel function [14, 31].

In addition, both groups will receive standardized medical treatment with Gastreg® (trimebutine) to promote gastrointestinal motility and regulate bowel

function, as prescribed by the physician. The same treatment regimen will be provided to participants in both groups [46].

The same standardized postpartum care program will be provided to both groups to ensure that the addition of the Pilates exercise program represents the principal difference between the study and control groups.

B- Pilates Exercise Program

Participants in the study group (Group A) will receive a structured Pilates exercise program designed to address postpartum constipation, in addition to the standard postpartum care program.

The program will focus on core muscle activation, pelvic floor muscle function, lumbopelvic control, and mobility, with the aim of supporting bowel function and reducing constipation-related symptoms [40, 41].

The Pilates intervention will be conducted for 9 weeks, three sessions per week, resulting in a total of 27 sessions. Each session will last approximately 40–45 minutes and will consist of three phases: [39, 40].

1. Warm-up.
2. Main exercise phase.
3. Cool-down.

Each participant will receive an educational session on Pilates principles, proper exercise performance, and coordination of breathing with movement before the training sessions begin.

The exercises will be performed under the supervision of the researcher [40]. The exercise program will be progressed gradually according to the participant's tolerance and ability to perform the exercises correctly [39].

Exercise Progression

The Pilates exercise program will be progressively adjusted throughout the 9-week intervention. During the initial phase, participants will be familiarized with the correct breathing pattern, pelvic floor activation, pelvic mobility, and basic Pilates movements [39, 42].

Progression will be achieved primarily by gradually increasing the number of repetitions and sets and, where appropriate, the duration of sustained positions. Progression will only be applied when the participant can perform the exercise using correct technique, controlled breathing, and without pain or excessive fatigue [39, 42].

No exercise will be performed to the point of pain. Participants will be instructed to maintain normal breathing throughout the exercises and to avoid breath holding or excessive straining [39].

Session Duration and Structure

Each Pilates session will last approximately 40–45 minutes, including:

- Warm-up: approximately 5–7 minutes.
- Main exercise phase: approximately 25–30 minutes.
- Cool-down: approximately 5–10 minutes.

Tolerance and Safety

Participants will be monitored throughout each session for exercise tolerance and any adverse symptoms. Exercise intensity, repetitions, or progression will be modified when necessary according to the participant's individual tolerance [39].

Participants will be instructed to report pain, dizziness, excessive fatigue, increased or unusual bleeding, or any other unusual symptoms. The exercise

session will be modified or discontinued when clinically indicated [14, 39].

Exercises will be performed within a comfortable range of motion, and participants will be instructed to avoid excessive straining and breath-holding.

The participant's perceived exertion will be monitored using the Modified Borg Rating of Perceived Exertion Scale during the exercise sessions. The scale ranges from 0 to 10 and will be used to monitor exercise tolerance and the participant's response to exercise and to guide the gradual progression of exercise intensity according to individual tolerance [43] **(Appendix VIII).**

Follow-up and Adherence

Attendance at each Pilates session will be documented using a participant attendance sheet.

Participants will be encouraged to complete all three scheduled sessions per week. Any missed session and the reason for absence will be documented. Participants who miss a scheduled session will be contacted to encourage continuation and maintain adherence to the intervention protocol [44].

Adherence to the Pilates intervention will be calculated as the percentage of completed sessions out of the total 27 scheduled sessions, as follows: [44]

Adherence (%) = (Number of completed sessions / 27) × 100

Participants who complete at least 80% of the scheduled Pilates sessions will be considered adherent to the intervention.

This threshold will be predefined as part of the study protocol **(Appendix IX).**

5- Pilates Exercise Program

The progression of the Pilates exercise program throughout the 9-week intervention period is presented in Table 1.

Table 1. Progression of the Pilates Exercise Program, modified from the Chinese Society of Perinatal Medicine and Ashrafinia et al [39, 40].

Training phase	Sets	Repetitions	Sustained contraction	Rest interval
Initial phase (Weeks 1–3)	1	6–10	5–10 sec	45–60 sec
Progression phase (Weeks 4–6)	2	8–10	10–15 sec	45–60 sec
Advanced phase (Weeks 7–9)	3	10–12	15–20 sec	30–60 sec

Sustained contraction duration will be applied only to exercises requiring an isometric contraction and will be adjusted according to the participant's ability and tolerance.

The prescribed repetition ranges, sets, and duration will be modified based on the recommendations of the Expert Consensus on Exercise for Pregnant and Postpartum Women (2026 Revision) [39], and the postpartum Pilates protocol reported by Ashrafinia et al. (2015) [40]. These parameters will be adapted according to the characteristics of postpartum women with constipation and to the objectives of the present study.

A- Warm-up Phase (5–7 minutes)

The warm-up will include diaphragmatic breathing combined with pelvic floor muscle activation, followed by gentle supine pelvic tilts and pelvic rocks. Exercises will initially be performed for 6–8 repetitions and gradually progressed according to the participant's tolerance [39, 40].

B- Main Exercise Phase (25–30 minutes)

The main phase will include the following Pilates exercises:

1. Supine Pelvic Tilts with Pilates Breathing
2. Pelvic Rock
3. Pelvic Clock
4. Bridging
5. Heel Slide
6. Side Kick – Front and Back
7. One Leg Circle
8. Single Straight Leg Stretch
9. Spine Stretch Forward
10. Stretching on the Ball for Muscle Relaxation

The exercises will be performed according to the progression presented in Table 2.

Range of movement, repetitions, and sets will be modified when necessary according to the participant's postpartum recovery and tolerance. Participants will be instructed to maintain controlled breathing and avoid breath holding or excessive straining [39].

C- Cool-down Phase (5–10 minutes)

The cool-down will consist of gentle stretching exercises performed using a stability ball. Each stretch will be maintained for approximately 20–30 seconds and repeated 2–3 times, according to the participant's tolerance.

Table 2. Description and Purpose of the Pilates Exercises, modified from Allam et al., Ashrafinia et al., and Culligan et al [15, 40, 45].

Exercise	Description	Purpose
Supine Pelvic Tilts with pilates Breathing [45].	The participant lies in supine position with the knees flexed. She performs a controlled posterior and anterior pelvic tilt while coordinating the movement with slow, controlled Pilates breathing.	To promote pelvic mobility, breathing control, and gentle activation of the deep abdominal and pelvic floor muscles.
Pelvic Rocks [45].	From crock lying, Gentle anterior and posterior pelvic movements are performed in a controlled manner while maintaining relaxed breathing.	To improve lumbopelvic mobility, pelvic control and body awareness.
Pelvic Clock [45].	The participant performs gentle, controlled pelvic movements in different directions as if moving the pelvis around the positions of a clock.	To improve pelvic mobility, motor control, and lumbopelvic coordination.
Bridging [45, 40].	From crook lying, the participant lifts the pelvis from the supporting surface while maintaining controlled breathing and pelvic alignment. The range of movement is adjusted according to individual tolerance.	To facilitate activation of the gluteal, abdominal, and pelvic floor muscles and improve lumbopelvic stability.
Heel Slide [45].	From crook lying, one heel is slowly slid forward and then returned to the starting position while maintaining pelvic alignment and controlled breathing.	To facilitate deep abdominal muscle activation and lumbopelvic control.
Side Kick – Front and Back [15, 40].	In side-lying position, the upper leg is moved forward and backward in a controlled manner while maintaining trunk and pelvic alignment.	To improve hip and pelvic stability and strengthen the hip musculature.
One Leg Circle [15, 40].	In supine, one leg is raised while the opposite leg remains supported. The elevated leg performs small, controlled circular movements within a comfortable range, followed by a return to the starting position.	To improve hip mobility and pelvic stabilization while maintaining controlled abdominal and trunk activity.

Exercise	Description	Purpose
Single Straight Leg Stretch [40].	From a supine position, one hip and knee are flexed toward the trunk while the opposite leg is extended in a controlled manner. The position is alternated slowly between the two legs while maintaining coordinated breathing.	To enhance abdominal control, lumbopelvic stability, and controlled lower-limb movement.
Spine Stretch Forward [40].	The participant sits upright with the legs comfortably separated and performs a gentle, controlled forward movement of the trunk while maintaining coordinated breathing, then returns to the upright position.	To promote spinal mobility, trunk control, and coordinated breathing with gentle movement of the abdominopelvic region.
Stretching on the Ball for Muscle Relaxation [15].	The participant lies supine and prone on the ball on each position for 30 seconds.	This was a part of cooling down.

Figure 4. Supine Pelvic Tilts with Pilates Breathing

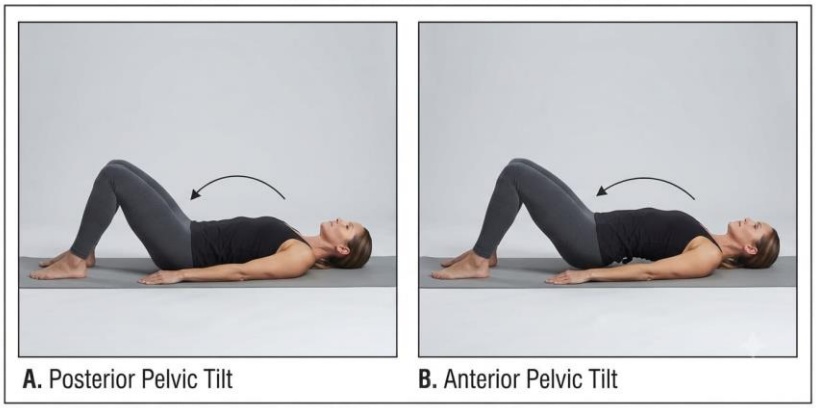


Figure 4: Supine Pelvic Tilts with pilates Breathing.

Figure 5. Pelvic Rock

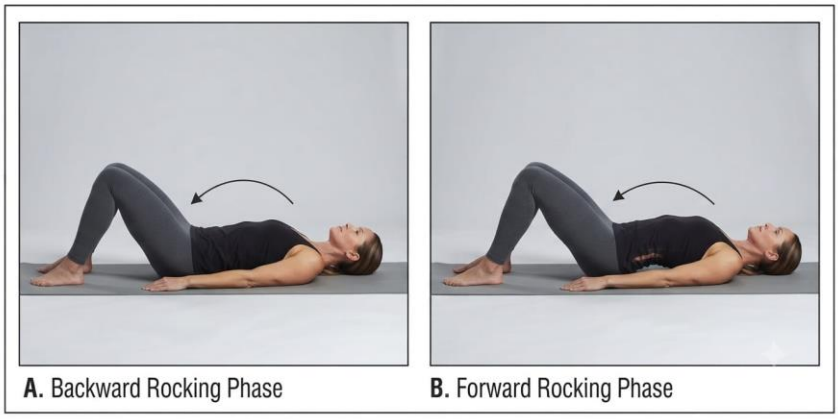


Figure 5: Pelvic Rock.

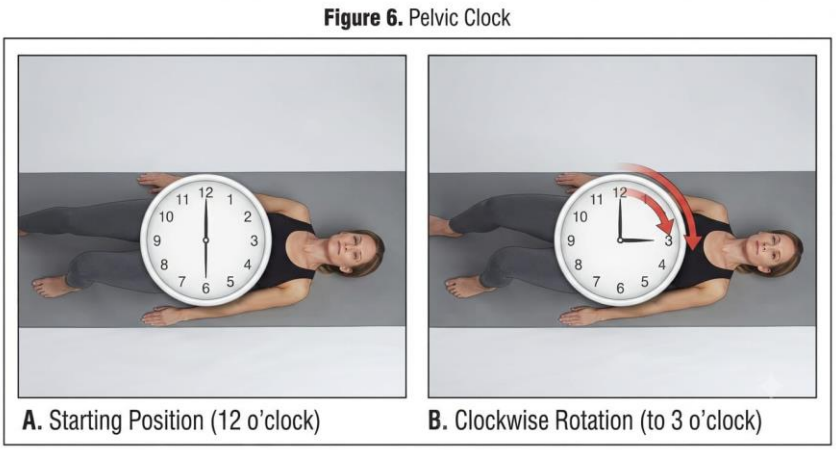


Figure 6: Pelvic Clock.

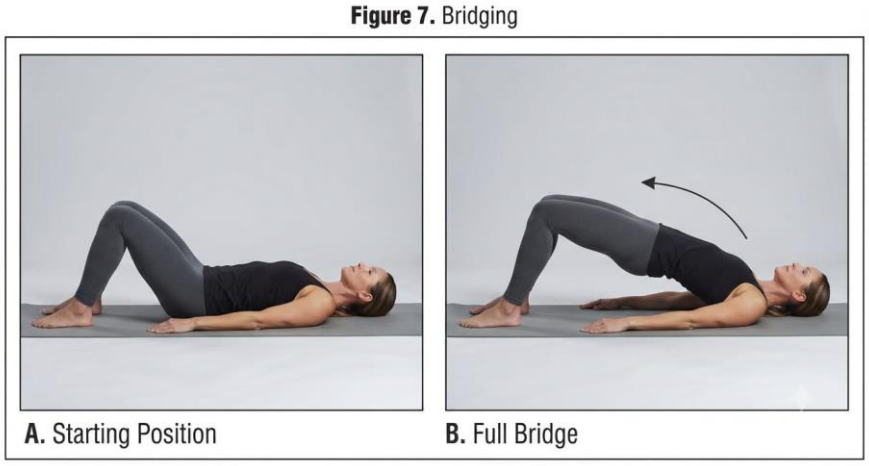


Figure 7: Bridging.

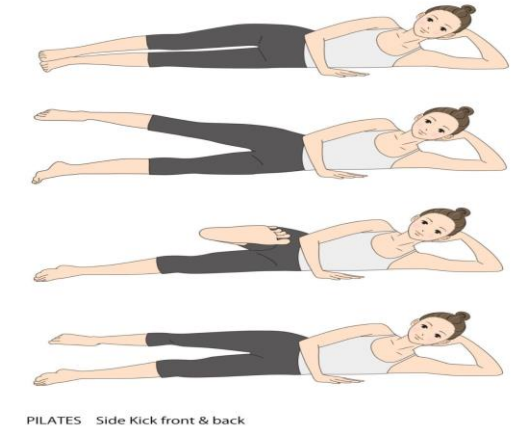


Figure 8: Side Kick – Front and Back.



Figure 9: One Leg Circle.



Figure 10: Single Straight Leg Stretch.

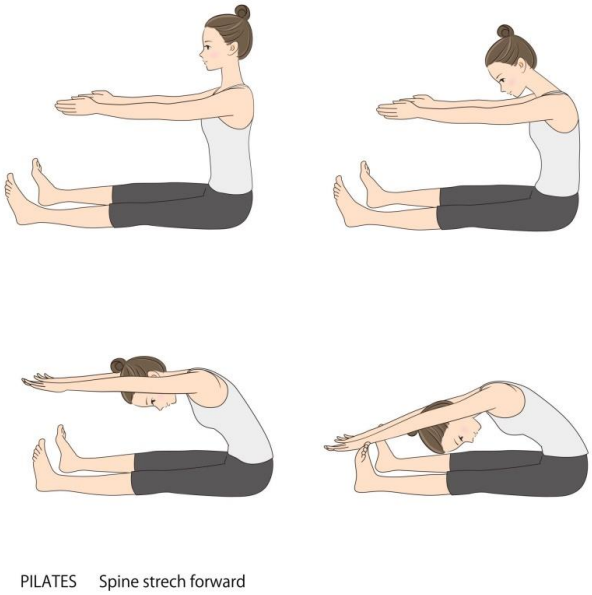


Figure 11: Spine Stretch Forward.

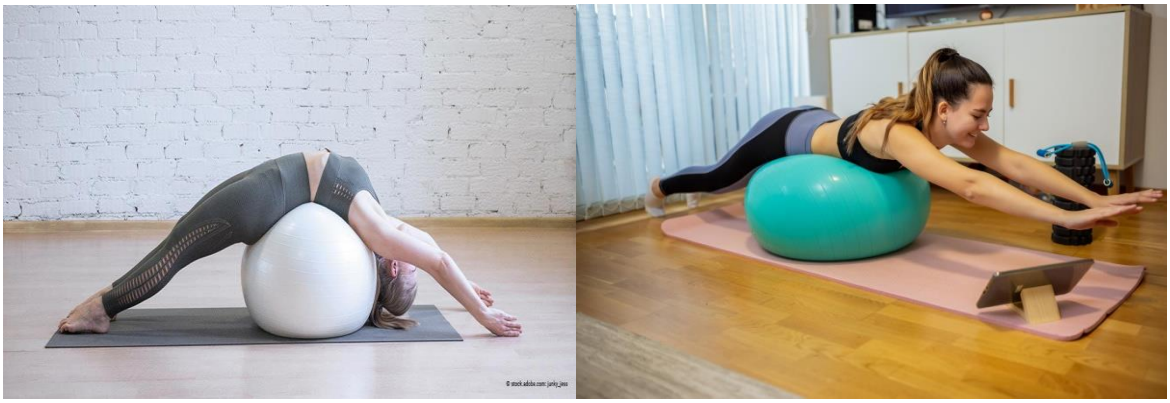


Figure 12: Stretching on the Ball for Muscle Relaxation.

Group A – Study Group

Participants in Group A will receive a structured Pilates exercise program described above, in addition to the standard postpartum care program.

Pre- and post-intervention assessments will be performed to evaluate changes in bowel function, constipation symptoms, constipation-related quality of life, pelvic floor muscle strength, and abdominal girth.

Group B – Control Group

Participants in Group B will receive the standardized postpartum care program only throughout the 9-week intervention period.

Pre- and post-intervention assessments will be performed using the same assessment procedures applied to Group A.

6- Statistical Analysis

- The normality of data distribution will be checked using Shapiro-Wilk test. Levene's test will be conducted to assess the homogeneity of variances between groups.

- Descriptive statistics will be reported as means and standard deviations (SD) for normally distributed continuous variables, and as medians and interquartile ranges (IQR) for non-normally distributed or ordinal variables. Categorical demographic data will be expressed as frequencies and percentages.
- Between-group comparisons for baseline clinical and demographic variables will be performed using the independent-samples t-test (for parametric data) or the Mann-Whitney U test (for non-parametric data). Categorical variables will be compared using the Chi-square test or Fisher's exact test.

  To evaluate the treatment effects across time and between groups, a Two-Way Mixed-Model Analysis of Variance (ANOVA) will be conducted. The primary outcome focus will be the Group × Time interaction effect. If a significant interaction is detected, post-hoc pairwise comparisons with Bonferroni adjustment will be performed. For non-parametric repeated measures, the Wilcoxon signed-rank test (within-group) and Mann-Whitney U test (between-group) will be used.
- All statistical analyses will be performed using the Statistical Package for Social Sciences (SPSS) version 27 for Windows.
- For all analyses, a p-value < 0.05 will be considered statistically significant.

CHAPTER IV

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Full text – PMC

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APPENDICES

Appendix I

Informed Consent Form

I freely voluntarily agree to participate in this research study under the supervision of researcher: **Rania Hassan Hassan Ibrahim,** a description of the study procedure has been explained to me and understands that I may withdraw my consent and discontinue participation in this research study at any time without prejudice to me.

- Participant name……..……
- Signature……...……
- Date……/……../…….

إقرار أقر أنا الموقع أدناه./.....بأننى وافقت بإرادتى على المشاركة فى هذا البرنامج البحثى تحت إشراف وتوجيه الباحث/ رانيا حسن حسن ابراهيم ، وقد تم وصف وشرح طريقة التقييم والعلاج المستخدمة فى هذه الدراسة وتعهدت أن ألتزم بها بدقة مع العلم أنه يحق لى أن أنسحب بطفلي من المشاركة فى هذه الدراسة البحثية فى أى وقت أشاء دون أى مسئولية.

- اســـــم المـشـارك ……..
- الـــتـــوقـــيـــع……..……
- الـــتـــاريـــخ……/……../……

Appendix II

أولًا: البيانات الشخصية والتاريخ المرضي

البيان	بيانات المشاركة
كود المشاركة / التاريخ	_____ :الكود التاريخ: ____ / ____ / 2026
الاسم بالكامل	_____
السن / الوظيفة	السن: _____ سنة الوظيفة : _____
الحالة الاجتماعية	☐ متزوجة ☐ عزباء _____ :أخرى
عدد مرات الإنجاب	_____ طفل
تاريخ آخر ولادة	2026 / ____ / ____
نوع الولادة	☐ قيصرية ☐ طبيعية
التاريخ المرضي للدورة الشهرية	☐ انقطاع الطمث ☐ غير منتظمة ☐ منتظمة
الأمراض الطبية	☐ يوجد ☐ لا يوجد التفاصيل : _____
استخدام الأدوية	☐ نعم ☐ لا اسم الدواء : _____

ثانيًا: القياسات الجسمية

القياس	النتيجة
الوزن	_____ كجم ___
الطول	_____ سم ___
مؤشر كتلة الجسم (BMI)	_____ كجم/م² ___

Appendix III الملحق الثالث

Bowel Function Assessment Sheet

Based on the Bristol Stool Form Scale (BSFS) developed by Lewis and Heaton (36).

استمارة تقييم وظيفة الأمعاء

كود المشاركة: _____

التاريخ: _____

نوع التقييم: **التقييم الأساسي** ☐ **بعد انتهاء التدخل** ☐

مقياس بريستول لشكل البراز(BSFS)

التعليمات: يرجى تحديد نوع البراز الذي يعبّر بشكل أكثر دقة عن قوام البراز المعتاد لديكِ.

مقياس بريستول للبراز		
 النوع ١	كتل صلبة منفصلة	إمساك شديد
 النوع ٢	كتل تشبه السُجق	إمساك طفيف
 النوع ٣	شكلها سُجقي مع تشققاتٍ على السطح	طبيعي
 النوع ٤	ملساء، مثل ثعبان أو سُجق طري	طبيعي
 النوع ٥	كتل مستديرة لزجة طرية ذات حواف واضحة	نقص في الألياف
 النوع ٦	طرية مع حواف غير منتظمة	إسهال طفيف
 النوع ٧	سائلة دون وجود أي قطع صلبة	إسهال شديد

نوع البراز وفقًا لمقياس بريستول: ☐ **7** ☐ **6** ☐ **5** ☐ **4** ☐ **3** ☐ **2** ☐ **1**

ملاحظات:

Appendix IV

PAC-SYM Questionnaire

Based on Frank et al [26].

Item No.	Symptom Domain	Description	Score (0–4)
1	Abdominal	Abdominal discomfort	0–4
2	Abdominal	Abdominal pain	0–4
3	Abdominal	Abdominal bloating	0–4
4	Abdominal	Stomach cramps	0–4
5	Rectal	Painful bowel movements	0–4
6	Rectal	Burning sensation in rectum	0–4
7	Rectal	Rectal bleeding/irritation	0–4
8	Stool	Incomplete bowel movement	0–4
9	Stool	Hard stools	0–4
10	Stool	Straining during bowel movement	0–4
11	Stool	Feeling of blockage	0–4
12	Stool	Small stool size	0–4

Scoring System:

Score	Severity
0	Absent
1	Mild
2	Moderate
3	Severe
4	Very Severe

Appendix V

PAC-QOL Questionnaire

Based on Marquis et al [27].

Item No.	Subscale	Description	Score (0–4)
1–11	Worries&Concerns	Anxiety and concerns about bowel habits	0–4
12–19	Physical Discomfort	Abdominal pain and physical symptoms	0–4
20–27	Psychosocial Discomfort	Social and emotional impact	0–4
28	Satisfaction	Satisfaction with bowel habits/treatment	0–4

Scoring System:

Score	Interpretation
0	No impairment
1	Mild impairment
2	Moderate impairment
3	Severe impairment
4	Very severe impairment

Appendix VI

Pelvic Floor Assessment

Pre intervention		Post intervention	
Pelvic Floor Muscle Strength	**Abdominal Girth**	**Pelvic Floor Muscle Strength**	**Abdominal Girth**

(Appendix VII)

Standardized Postpartum Care Brochure

Based on the World Health Organization (WHO) recommendations [14] .

Postpartum Care Advice

This brochure provides general health advice to support recovery and promote healthy bowel function during the postpartum period.

Healthy Balanced Diet

1. Eat a variety of foods from different food groups every day.
2. Include vegetables, fruits, whole grains, legumes, and other nutritious foods in your daily meals.
3. Try to maintain regular meal times.
4. Limit excessive intake of highly processed foods and foods with low nutritional value.

Adequate Dietary Fiber

1. Include fiber-rich foods regularly in your daily diet.
2. Good sources of dietary fiber include:
3. Fresh fruits and vegetables.
4. Whole-grain bread and cereals.
5. Oats.
6. Legumes such as lentils, beans, and chickpeas.
7. Nuts and seeds.
8. Increase fiber intake gradually, particularly if your usual intake is low.

Adequate Fluid Intake

1. Drink sufficient fluids throughout the day according to your individual needs and medical condition.
2. Water should be the main source of hydration.
3. Adequate fluid intake is particularly important when increasing dietary fiber intake, unless your healthcare provider has advised you to restrict fluids.

Regular Physical Activity

1. Gradually return to regular physical activity according to your postpartum condition and healthcare provider's advice.
2. Walking is an appropriate form of gentle physical activity for many postpartum women.
3. Brisk walking for approximately 30–45 minutes, three times per week, may be performed according to individual condition and tolerance.
4. Begin gradually and stop the activity if pain, dizziness, unusual shortness of breath, bleeding, or other concerning symptoms occur.

Participant Code: _____

Date: ____ / ____ / 2026

Researcher: _____

الملحق السابع

بروشور إرشادات الرعاية القياسية بعد الولادة

استنادًا إلى توصيات منظمة الصحة العالمية (WHO) [14].

إرشادات الرعاية بعد الولادة

يقدم هذا البروشور مجموعة من الإرشادات الصحية العامة التي تساعد على التعافي بعد الولادة وتعزيز وظيفة الأمعاء الصحية خلال فترة ما بعد الولادة.

١ .الغذاء الصحي المتوازن

- احرصي على تناول مجموعة متنوعة من الأطعمة من مختلف المجموعات الغذائية يوميًا.
- احرصي على تناول الخضروات والفواكه والحبوب الكاملة والبقوليات وغيرها من الأطعمة الغنية بالعناصر الغذائية.
- حاولي الحفاظ على مواعيد منتظمة للوجبات.
- قللي من الإفراط في تناول الأطعمة المصنعة بدرجة كبيرة والأطعمة منخفضة القيمة الغذائية.

٢ .الحصول على كمية كافية من الألياف الغذائية

- احرصي على إدخال الأطعمة الغنية بالألياف ضمن نظامك الغذائي اليومي بانتظام.
- من أهم مصادر الألياف الغذائية:
- الفواكه والخضروات الطازجة.
- الخبز والحبوب الكاملة.
- الشوفان.
- البقوليات مثل العدس والفاصوليا والحمص.
- المكسرات والبذور.
- زيدي كمية الألياف تدريجيًا، خاصةً إذا كان استهلاكك المعتاد من الألياف منخفضًا.

٣ .الحصول على كمية كافية من السوائل

- احرصي على تناول كمية كافية من السوائل على مدار اليوم وفقًا لاحتياجاتك وحالتك الصحية.
- يُفضل أن يكون الماء هو المصدر الرئيسي للسوائل.
- الحصول على كمية كافية من السوائل مهم بشكل خاص عند زيادة تناول الألياف الغذائية، ما لم يوصِ الطبيب بتقييد السوائل.

٤ .ممارسة النشاط البدني بانتظام

- عودي تدريجيًا إلى ممارسة النشاط البدني المنتظم وفقًا لحالتك بعد الولادة وتعليمات مقدم الرعاية الصحية.
- يُعد المشي أحد أشكال النشاط البدني الخفيف المناسبة للعديد من السيدات بعد الولادة.
- يمكن ممارسة المشي السريع لمدة 45–30دقيقة، ثلاث مرات أسبوعيًا، وفقًا للحالة الصحية والقدرة على التحمل.
- ابدئي تدريجيًا، وأوقفي النشاط في حالة حدوث ألم أو دوخة أو ضيق تنفس غير معتاد أو نزيف أو أي أعراض مقلقة أخرى.

كود المشاركة : _____

التاريخ :___ / _____/ 2026

الباحثة : _____

Appendix VIII

الملحق الثامن
مقياس بورج المعدل (Modified Borg Scale)

Based on Hareendran et al. (2012) [28].

التعليمات:
يرجى اختيار الرقم الذي يعبّر بشكل أفضل عن شدة المجهود الذي تشعرين به أثناء جلسة التمرين.

وصف شدة المجهود	الدرجة
لا يوجد مجهود على الإطلاق	**0**
مجهود خفيف جدًا جدًا (يكاد لا يُلاحظ)	**0.5**
مجهود خفيف جدًا	**1**
مجهود خفيف	**2**
مجهود متوسط	**3**
مجهود شديد إلى حد ما	**4**
مجهود شديد	**5**
—	**6**
مجهود شديد جدًا	**7**
—	**8**
مجهود شديد جدًا جدًا (يكاد يصل إلى الحد الأقصى(	**9**
أقصى مجهود	**10**

Appendix IX

الملحق التاسع

استمارة متابعة حضور جلسات البيلاتس

Participant Attendance Sheet Based on Giovanazzi et al [43].

كود المشاركة :_____

تاريخ بدء البرنامج : 2026 / ____ / ____

تاريخ انتهاء البرنامج :2026 / ____ / ____

عدد الجلسات المقررة : 27 جلسة

مدة البرنامج : 3 جلسات اسبوعيا لمدة 9 أسابيع

جدول متابعة الحضور

رقم الجلسة	التاريخ	حضور	غياب	سبب الغياب إن وُجد	ملاحظات
1	2026 / ____ / ____	☐	☐	_____	_____
2	2026 / ____ / ____	☐	☐	_____	_____
3	2026 / ____ / ____	☐	☐	_____	_____
4	2026 / ____ / ____	☐	☐	_____	_____
5	2026 / ____ / ____	☐	☐	_____	_____
6	2026 / ____ / ____	☐	☐	_____	_____
7	2026 / ____ / ____	☐	☐	_____	_____
8	2026 / ____ / ____	☐	☐	_____	_____
9	2026 / ____ / ____	☐	☐	_____	_____
10	2026 / ____ / ____	☐	☐	_____	_____
11	2026 / ____ / ____	☐	☐	_____	_____
12	2026 / ____ / ____	☐	☐	_____	_____
13	2026 / ____ / ____	☐	☐	_____	_____
14	2026 / ____ / ____	☐	☐	_____	_____
15	2026 / ____ / ____	☐	☐	_____	_____
16	2026 / ____ / ____	☐	☐	_____	_____
17	2026 / ____ / ____	☐	☐	_____	_____

رقم الجلسة	التاريخ	حضور	غياب	سبب الغياب إن وُجد	ملاحظات
18	2026 / ____ / ____	☐	☐	_____	_____
19	2026 / ____ / ____	☐	☐	_____	_____
20	2026 / ____ / ____	☐	☐	_____	_____
21	2026 / ____ / ____	☐	☐	_____	_____
22	2026 / ____ / ____	☐	☐	_____	_____
23	2026 / ____ / ____	☐	☐	_____	_____
24	2026 / ____ / ____	☐	☐	_____	_____
25	2026 / ____ / ____	☐	☐	_____	_____
26	2026 / ____ / ____	☐	☐	_____	_____
27	2026 / ____ / ____	☐	☐	_____	_____

ملخص الالتزام بالجلسات

إجمالي عدد الجلسات المقررة :27 جلسة

إجمالي عدد الجلسات التي تم حضورها : ____ جلسة

إجمالي عدد الجلسات التي لم يتم حضورها :_____ جلسة

نسبة الالتزام بالحضور:

(عدد الجلسات التي تم حضورها ÷ 27) × 100 = _____

حالة الالتزام:

☐ملتزمة بالبروتوكول (≤80%)

☐غير ملتزمة بالبروتوكول (<80%)

توقيع الباحثة: _____

التاريخ: 2026 / ____ / ____