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Original Article

Effect of Finger Handheld Relaxation Techniques on Cesarean Section Pain, Physical Activity and Quality of Sleep among Puerperal Women

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ABSTRACT

Background: Finger-handheld relaxation is recognized as an effective method to reduce pain perception and improve sleep quality. **Aim**: The present study aimed to assess the effect of finger-handheld relaxation techniques on post-cesarean section pain and sleep quality among puerperal women. **Design**: A quasi-experimental design was utilized, including both study and control groups with pre- and post-assessment. **Sample**: The study included a purposive sample of 80 women. **Setting**: The research was carried out at the outpatient clinic of the Obstetrics and Gynecology Department and in the postnatal ward of Benha University Hospital. **Tools**: Data were collected using a structured interview questionnaire, the Short-Form McGill Pain Questionnaire, and the Physical Activity Limitation Questionnaire. **Results** After three hours of intervention, the study group exhibited a significant decrease in mean pain scores compared with the control group ($P \leq 0.05$). Similarly, after six hours, the study group reported significantly lower mean sleep quality scores than the control group ($P \leq 0.05$). **Conclusion**: Finger-handheld relaxation techniques significantly reduced pain intensity and physical activity limitation in the study group at both three and six hours following the intervention ($P \leq 0.05$, $P \leq 0.001$). In addition, sleep quality markedly improved among women in the study group compared with the control group ($P = 0.01$). **Recommendations**: Postnatal women should be encouraged to use finger-handheld relaxation as an easy and effective approach to alleviate pain intensity.

Keywords: Cesarean Section Pain, Finger-Handheld Relaxation, Puerperal Women, Quality of Sleep.

Introduction

Cesarean section (CS) is a life-saving surgical procedure performed when vaginal delivery poses risks to the mother or infant. Over the past decade, the rate of CS has increased substantially and is now one of the most common obstetric operations worldwide, in both developed and developing countries ***(Harini et al., 2020)***.

In Egypt, the prevalence of CS has reached alarming levels. According to the 2014 Egyptian Demographic Health Survey (EDHS), 51.8% of mothers reported undergoing cesarean delivery—nearly four times higher than the WHO's recommended threshold (2013). Similarly, findings from the 2015 Egypt Health Issues Survey indicated high CS rates, ranging between 34.8% and 56% across six governorates, with an overall prevalence of 43.8% ***(Wahdan et al., 2022).***

Post-cesarean pain is considered one of the major nursing challenges, as inadequate pain management not only results in unpleasant

maternal experiences but also hinders recovery. It interferes with essential daily activities such as mobility (sitting, standing, walking), eating, sleeping, and self-care, ultimately leading to fatigue and difficulty caring for the newborn ***(Sun & Pan, 2019)***.

Poor sleep quality is another common issue among post-cesarean mothers. More than 70% of women experience reduced deep sleep and frequent awakenings, contributing to poor rest and a lower quality of life (Karcioglu et al., 2018). Pain further limits physical function and delays recovery, making routine tasks such as sitting, walking, maintaining personal hygiene, and caring for the baby extremely difficult during the first two days post-surgery. These limitations affect family and social roles and prolong hospital stays ***(Booth et al., 2019)***.

On average, postoperative recovery takes about three days, during which pain is most intense in the first hours after anesthesia wears off. Although pharmacological interventions, such as analgesics, are commonly used for pain relief, their side effects and costs raise concerns. Non-pharmacological approaches, on the other hand, are safer, more economical, and help minimize dependence on medications ***(Aktas et al., 2020; Nori et al., 2023).***

The World Health Organization (2023) emphasizes that pain management is a critical component of quality care following childbirth, including cesarean delivery. Among non-pharmacological strategies, relaxation techniques are considered highly effective in reducing pain and improving sleep. Finger handheld relaxation is one such technique that promotes both physical and mental relaxation, enabling women to better control discomfort, anxiety, and sleep disturbances (***Knudsen et al., 2020; Rucka & Talarowska, 2022)***.

This technique involves holding individual fingers to stimulate energy pathways or meridians connected with specific organs and emotions. Such stimulation activates reflex responses in the brain, which subsequently influence physiological processes such as breathing, heart rate, blood pressure, muscle tension, and pain perception ***(Rosmala et al., 2020)***. It is a simple, accessible method that women can use in daily life to cope with stress, anxiety, pain, and sleep disturbances ***(Calisanie & Ratnasari, 2021)***.

Nurses working in postnatal units play a pivotal role in supporting maternal recovery by promoting non-pharmacological strategies that are safe, cost-effective, and free from adverse effects. Incorporating finger handheld relaxation into postpartum nursing care aligns with a woman-centered approach, aiming to improve comfort, reduce pain, and enhance recovery outcomes ***(Mwakawanga et al., 2022; Darmadi et al., 2020).***

Significance of the study

Pain and poor sleep quality are among the most prevalent challenges in the early postpartum period following cesarean section. Integrating finger handheld relaxation into routine post-cesarean care can reduce the need for pharmacological interventions while offering the additional advantage of being safe and free from side effects ***(Emara et al., 2022).***

More than 70% of post-cesarean mothers experience frequent awakenings and reduced deep sleep, limited physical activity due to presence of pain which negatively affect the quality of life ***(Bakr, et al, 2020).*** Given these concerns, both the World Health Organization and the Egyptian Ministry of Health recommend the use of non-pharmacological pain management strategies as cost-effective and resource-efficient alternatives that also improve maternal rest and well-being***(Department of statistics ,2024)*** Nurses play an essential role in managing postpartum pain. To provide holistic care, they need to be aware of both the benefits and drawbacks of pharmacological treatments and actively promote non-pharmacological interventions. Finger handheld relaxation represents a simple, safe, and low-cost method that can be easily taught and applied to improve maternal outcomes ***(Fadliyah et al., 2022).***

Accordingly, the present study was conducted to evaluate the effectiveness of finger handheld relaxation on post-cesarean pain, sleep quality, and physical activity limitations. The findings aim to contribute evidence-based nursing strategies that enhance maternal recovery and support mothers in resuming their roles in caring for their newborns, families, and themselves.

Aim of the Study

The aim of this study was to assess the effect of finger handheld relaxation techniques on cesarean section pain, physical activity limitation and quality of sleep among puerperal women.

The objective of the present study of quality of sleep was to: -

- Assess the level of cesarean section pain among puerperal women in study and control group before and after finger handheld relaxation technique.
- Assess the quality of sleep post-caesarean among puerperal women in study and control group before and after finger handheld relaxation technique.
- Assess the physical activities limitation affected by post C.S. pain among women in both groups.

Research hypotheses:

H1: Women who will receive finger handheld relaxation technique (independent variable) will show decreased post-cesarean incisional pain intensity (dependent variable) than who received the routine post cesarean section hospital therapy

H2: Women who will receive finger handheld relaxation technique will exhibit better scores in limitation of the physical activities than those who received the routine post cesarean section hospital therapy

H3: Women who will receive finger handheld relaxation technique will exhibit better quality of sleep scores than those who received the routine post cesarean section hospital therapy

Subjects and methods

Research design:

A quasi-experimental design with two groups (pre- and post-test) was employed in this study. As defined by ***Campbell and Stanley (1966),*** a quasi-

experimental design refers to a research approach that does not involve random assignment of participants.

Setting:

The study was conducted at the Obstetrics and Gynecology Department (pre operative and postpartum unit) of Benha University Hospital. This is a major hospital located in Benha city that serves women from Al-Qalubia Governorate and neighboring governorates. The department offers a wide range of maternal healthcare services including antenatal care, counseling, high-risk pregnancy management, delivery services (normal and cesearean section deliveries), postnatal care, family planning, and follow-up care.

Sampling:

A purposive non-probability sample of 80 women was recruited. According to the Benha University Hospital Statistical Center (2023), approximately 800 cesarean deliveries were performed by the end of that year. The study sample was selected during the period from August 1st, 2024 to March 31st, 2025 according to the following inclusion criteria: women undergoing cesarean section under regional anesthesia, at the day of operation, free from postpartum complications such as hemorrhage or puerperal sepsis, not receiving analgesics, with healthy hands (without burns, wounds, inflammation, or eczema), and fully conscious.

The sample was divided randomly into two equal groups. The **control group** included 40 women who received routine post-cesarean hospital care and were recruited during the first three months. The **study group** consisted of 40 women who received finger-handheld relaxation techniques in addition to routine hospital care.

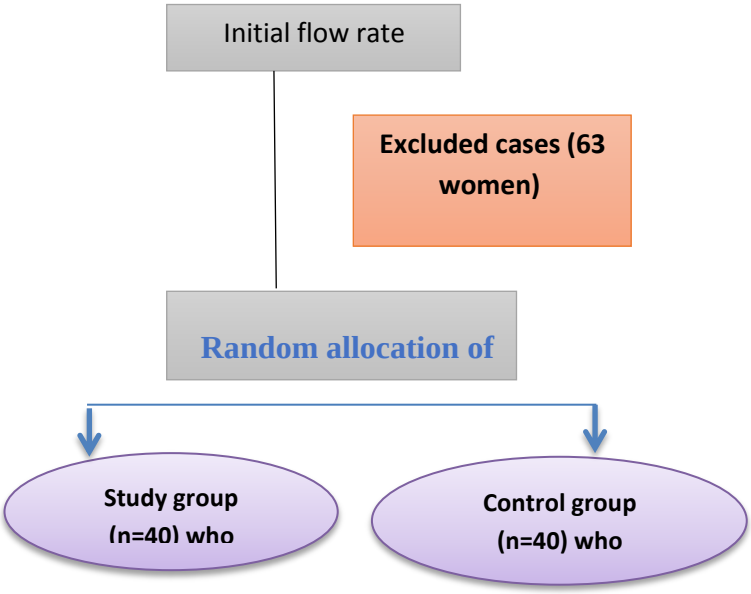

Fig.(1): Flowchart of the sample technique and participants in the study

Data collection tools:

Four main tools were used for data collection:

Tool I: A structured interviewing questionnaire: it consisted of two parts:

Part one: Personnel characteristics of the studied women. It included four items (age, educational level, occupation, residence).

Part two: Obstetrical history: It included six items (gestational age, number of pregnancies, number of abortion, type of cesarean section, type of incision.

Tool II: The short-form McGill Pain Questionnaire:

the Short-Form McGill Pain Questionnaire, originally adopted from ***Melzack (1987)***, to

evaluate both the quality and intensity of perceived pain. It is composed of three sections:

Part (1): Pain Rating Index (PRI) – Sensory and Affective Descriptors

This section includes 15 descriptors that assess two dimensions of pain: sensory (11 items) and affective (4 items). The sensory terms include throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting. The affective descriptors are tiring–exhausting, sickening, fearful, and punishing–cruel.

Each statement is rated on a 4-point scale:

- None = 0
- Mild = 1
- Moderate = 2
- Severe = 3

The overall score can range from 0 to 45, with pain intensity classified into four categories:

- No pain: 0–11
- Mild pain: 12–23
- Moderate pain: 24–35
- Severe pain: 36–45

Part (2): Visual analogue pain scale (VAS) to assess pain intensity:

It was a 10 points numerical scale, corresponding to the degree of pain. Where "0" indicates no pain, "1 - 3" indicates mild pain, "4 - 7" indicates moderate pain and "8 - 10" indicates severe pain. Women were asked to select from that 10 points numerical continuum the number that corresponds to her perceived pain intensity.

Part (3): Current Pain Intensity Scale (CPI):

was based on a scale of 0–5. Where "0" indicates no pain, "1" indicates mild pain, "2" indicates discomforting, "3" indicates distressing, "4" indicates horrible and "5" indicates excruciating.

Tool III: Physical Activities Limitation Questionnaire (PALQ):

This tool was adapted from ***Ismail and Elgzar (2018)*** to evaluate the degree of physical activity limitation following cesarean section. It consisted of **7 items** covering basic daily activities, including: sitting in bed, standing up, walking, performing personal hygiene, breastfeeding, eating, and using the toilet.

Each activity was rated on a 4-point scale:

- 0 = easily performed
- 1 = performed with difficulty
- 2 = performed with assistance
- 3 = cannot be performed

The total score ranged from 0 to 21, with higher scores indicating greater limitations. Classification of limitation levels was as follows:

- **No limitation:** 0–5
- **Mild limitation:** 6–11
- **Moderate limitation:** 12–17
- **Severe limitation:** 18–21

Tool IV: The Groningen Sleep Quality Scale: (GSQS)

It was adapted from ***(Meijman et al., 1988)*** to assess the overall quality of sleep. The scale contains fifteen "yes or no" questions to evaluate the sleep quality after 24 hours post cesarean section operation.

Scoring system:

The participants received a score of "1" for each "yes" response and "0" for each "no" response, with a total possible score ranging from 0 to 15. Higher scores reflected greater severity of sleep disturbances. The overall sleep quality was categorized as follows:

- Normal sleep: score of 0.
- Mild disturbance: scores from 1–5.
- Moderate disturbance: scores from 6–10.
- Severe disturbance: scores from 11–15.

Validity

To check the content validity, the data collection tools were presented to a panel of three nursing specialists in the field of obstetrics and gynecology. Modifications and changes were made such as additions, rewording and omission of some questions.

Reliability

The reliability of the tools was tested using Cronbach's alpha coefficient test, which revealed that the tools have consistent properties.

Administrative design

For conduction of the study, the official written authorization letter was obtained from the Dean of faculty of nursing to the Director of the Obstetrics and Gynecology Department at Benha University Hospital with the purpose and aim of the study.

Tool	Cronbach's alpha value
Tool II: Short-form McGill Pain Questionnaire	
• **Pain Rating Index**	0.93
• **Visual analogue pain scale**	0.94
• **Current Pain Intensity Scale**	0.89
Tool III: Physical Activities Limitation Questionnaire	0.86
Tool IV: The Groningen Sleep Quality Scale	0.91

Ethical considerations:

Ethical approval for conducting this study was granted by the Research Ethics Committee, Faculty of Nursing, Benha University REC-OSN-P42. Prior to data collection, written informed consent was secured from all participating women after a clear explanation of the study's purpose. Participants were assured that the collected data would be used solely for research purposes, that confidentiality and privacy would be strictly maintained, and that they had the right to withdraw from the study at any time without any consequences

2.5. Pilot Study:

It was carried out on ten percent of the total sample (8 women). The purpose was to assess the ease, clarity, suitability, and feasibility of the tools that were developed. Based on the findings from the pilot study, certain questions were rephrased, and the pilot sample was removed from the main study.

2.6. Field work:

To achieve the aim of the study, the research process was carried out in three main stages: interviewing and assessment, implementation, and evaluation. The entire process extended over a period of one year, from August 2024 to March 2025. The researchers attended the study setting twice weekly (on Saturdays and Mondays) from 9:00 a.m. and 9:00 p.m. Data collection for the control group was completed first, followed by data collection for the study group. The procedure included the following sequential steps:

A-Interviewing and assessment phase:

On the day of the cesarean operation, all eligible women were approached by the researchers. Each participant in both the study and control groups was interviewed individually in a pre-operative room, where the aim of the study was explained and informed consent was obtained. Three hours after the operation, the researchers conducted the assessment. Data regarding personal characteristics and obstetric history were collected using Tool I (Structured Interviewing Questionnaire). Pain intensity was measured through the Short-Form McGill Pain Questionnaire (Tool II), which included the pain rating index, visual analogue scale, and current pain intensity scale. Additionally, the Physical Activities Limitation Questionnaire (Tool III) was administered to assess physical activity restrictions. Each interview lasted approximately 20 minutes per participant.

B-Implementation phase:

Control group: Women in the control group received only routine hospital care, which included pre-operative, intra operative and added to that post operative care as monitoring vital signs, observing vaginal bleeding, administering intravenous fluids, and providing antibiotics, without any additional intervention.

Study group: In addition to the routine hospital care, women in the study group received the finger-handheld relaxation technique during pre-operative and performed during post operative care. This method, also referred to as the *finger hold*, is designed to help relieve postoperative pain. The technique is based on the concept that each finger is associated with energy pathways (meridians) that influence different bodily functions and emotions. The procedure involves gently holding each finger individually, starting from the thumb and progressing to the little finger, for about three minutes each. By grasping the finger and applying warmth to the fingertip meridian points while practicing deep breathing, physical and emotional tension can be reduced ***(Handoyo, 2021).***

During the intervention, women were asked to lie in bed, close their eyes, and practice deep breathing. Prior to starting, the researchers washed their hands and cleaned the participants' hands with a wet towel. Any unpleasant sensations related to cesarean section delivery were noted both before and after the relaxation technique. The procedure was carried out step by step, as illustrated in Figure (1).

Figure (1): finger handheld relaxation techniques

a. Hold thumbs for 3 minutes

b. Hold index finger for 3 minutes

c. Do this for all fingers. Can be started from the right or left hand.

d. Inhale gently and then exhale slowly and regularly. When you inhale, breathe in a feeling of harmony, peace, comfort and hope for healing.

e. When exhaling, exhale slowly while releasing the feelings and problems that are roiling in the mind and imagine that the disturbing things are leaving our body.

f. Now imagine things that make you comfortable and bring feelings of peace. So, the mind only focuses on good things.

C-Evaluation phase:

The women in the study and control groups were assessed and rated on their "self-reported" pain levels using the short-form McGill Pain Questionnaire (Tool II-posttest) and were assessed regarding limitation of physical activity using Physical Activities Limitation Questionnaire (Tool III-posttest), 3 hours and 6 hours after the intervention. In addition, after 24 hours the quality of sleep was assessed using the Groningen Sleep Quality Scale (Tool IV). The researchers evaluated both groups at 24 hours through Phone calls.

2.7. Statistical Design:

The collected data was coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS), version 24. Descriptive statistics, including mean, standard deviation, frequencies, and percentages, were utilized to summarize the data. Inferential statistics were conducted using independent t-tests and Chi-square tests. A p-value

of > 0.05 was considered non-significant, a p-value of < 0.05 indicated statistical significance, while a p-value of ≤ 0.001 was regarded as highly statistically significant.

2.8. Strengths of the study

- The novel study topic is among the few that applied the finger handheld relaxation technique as a simple, non-pharmacological method to reduce pain and improve sleep among post-cesarean women.
- Random allocation: Participants were randomly assigned into study and control groups, which minimized selection bias.

Results:

As presented in Table 1, the majority of participants in both groups were aged 25 to <30 years, accounting for 77.5% in the study group and 82.5% in the control group. The mean age was 24.30 ± 4.16 years for the study group and 24.67 ± 3.74 years for the control group. With respect to education, 47.5% of the study group and 60.0% of the control group had a diploma-level education. Regarding occupation, most participants were housewives (85.0% in the study group and 75.0% in the control group). Concerning residence, 65.0% of the study group and 57.5% of the control group lived in rural areas. No statistically significant differences were found between the two groups in relation to their personal characteristics (p > 0.05).

Table 2 illustrates that the obstetrical characteristics of both groups were comparable. The mean gestational age was 38.65 ± 1.07 weeks in the study group and 38.77 ± 0.91 weeks in the control group. A history of two previous pregnancies was reported by 42.5% of women in the study group compared to 57.5% in the control group. Most participants had no history of abortion (87.5% in the study group and 92.5% in the control group). Planned cesarean section was more common among the study group (92.5%) than the control group (85.0%). General anesthesia was the predominant method used (87.5% and 95.0% in the study and control groups, respectively). All participants underwent a transverse lower segment cesarean section (LSCS). No statistically significant differences were observed between the two groups regarding these characteristics.

Table 3 shows that there was no statistically significant difference in the total mean pain scores between the study and control groups during the pre-intervention phase (47.57 ± 11.05 and 46.62 ± 12.07, respectively; p > 0.05). However, at three- and six-hours post-intervention, the study group demonstrated lower mean pain scores (36.75 ± 10.97 and 30.77 ± 10.85, respectively) compared with the control group (44.02 ± 12.11 and 40.52 ± 12.06, respectively).

Table 4 demonstrates that there were no statistically significant differences between the study and control groups in all domains of the Pain Questionnaire (subjective pain, visual pain score, and pain intensity) before the intervention (p > 0.05). In contrast, at both

three- and six-hours post-intervention, the study group showed statistically significant

improvements compared with the control group ($p \leq 0.0$

As shown in Table 5, no statistically significant differences were found between the study and control groups regarding physical activity limitation before the intervention (15.32 ± 4.05 vs. 15.30 ± 3.59; $p > 0.05$). In contrast, at three- and six-hours post-intervention, the study group recorded significantly lower mean scores of physical activity limitation compared with the control group (10.15 ± 6.15 vs. 13.45 ± 3.69 and 5.25 ± 4.42 vs. 8.97 ± 5.19, respectively; $p \leq 0.05$).

Figure 2. Shows that before intervention, 50.0% of the study group and 52.2% of the control group reported severe limitation. While 7.5% of the study group versus 37.5% in the control group at 6 hours post-intervention reported sever limitation.

Table 6. Illustrates the mean of sleep quality scores among the studied groups. At 24 hours post-cesarean section, the mean sleep quality score was (6.70 ± 6.97) in the study group compared to the control group (10.32 ± 6.32), The difference was statistically significant ($P = 0.01$*).

Figure 3 displays the distribution of total sleep quality levels among the study and control groups at 24 hours post-cesarean section. In the study group, 42.5% of women experienced mild sleep disturbance, and 27.5% experienced severe sleep disturbance. While in the control group, only 22.5% of women reported mild sleep disturbance and (52.5%) experienced severe sleep disturbance.

-Validated tools: Standardized and reliable tools were used to measure pain intensity and sleep quality, ensuring credibility of the results.

- Contribution to maternal health: The study adds evidence supporting non-invasive methods to enhance recovery, reduce pain, and improve overall maternal well-being in the immediate puerperal period.

2.9 limitations of the study:

-The study was conducted on a relatively small number of participants in a single hospital, which may limit the generalizability of the findings to other settings or larger populations.

- Limited Egyptian and international research is available on this specific topic, which restricted the comparison of the present findings with a wider body of evidence.

Table (1): Distribution of the studied women according to personal characteristics (n=80).

Groups / Variables	Study group n=40		Control group n=40		X^2	P-value
	No	%	No	%		
Age (years)						
< 25 year	3	7.5	1	2.5	1.06	0.58 ns
25 < 30 years	31	77.5	33	82.5		
>30 years	6	15.0	6	15.0		
Mean ± SD	24.30±4.16		24.67±3.74		t=0.423	0.673 ns
Educational level						
Primary education	10	25.0	8	20.0	1.27	0.57 ns
Secondary education	19	47.5	24	60.0		
University education	11	27.5	8	20.0		
Occupation						
Working	6	15.0	10	25.0	1.25	0.40 ns
Housewife	34	85.0	30	75.0		
Residence						
Rural	26	65.0	23	57.5	0.47	0.49 ns
Urban	14	35.0	17	42.5		

Chi-square test (x2); t= independent t test; ns no statistically significant difference (p > 0.05)

Table (2): Distribution of the studied groups according to the obstetrical history (n=80).

Obstetrical history	Study group n=40		Control group n=40		X^2	P value
	No	%	No	%		
Gestational age (Weeks)						
37 38 39 40	8 8 14 10	20.0 20.0 35.0 25.0	4 10 17 9	10.0 25.0 42.5 22.5	1.89	0.59 ns
Mean +SD	38.65 ± 1.07		38.77 ±0.91		t=0.559	0.578 ns
Number of pregnancies						
One Two Three and more	10 17 13	25.0 42.5 32.5	6 23 11	15.0 57.5 27.5	2.06	0.35 ns
Number of abortions						
Non One Two	35 4 1	87.5 10.0 2.5	37 3 0	92.5 7.5 0.0	1.19	0.54 ns
Type of cesarean section						
Planned cesarean section Emergency cesarean section	37 3	92.5 7.5	34 6	85.0 15.0	1.12	0.28 ns
Type of anesthesia						
General Regional	35 5	87.5 12.5	38 2	95.0 5.0	1.40	0.23 ns
Type of incision						
Transverse LSCS.	40	100.0	40	100.0	—	—

Chi-square test (x2); t= independent t test; ns no statistically significant difference (p > 0.05)

Table (3): Comparison of the mean scores of pain in both groups before the intervention, immediately,3hours after the intervention and six hours after the intervention (n=80).

Total Score of Pain	Range of Possible Scores	Study group n=40	Control group n=40	Independent t-test	P value
		Mean ±SD	Mean ±SD		
Pain Rating Index					
Before-intervention	0-45	36.12 ± 7.83	35.75±8.62	0.203	0.839 ns
3 hours after intervention		28.45±7.29	33.45±8.38	2.846	0.006*
6 hours after intervention		24.30±7.38	30.52±8.32	3.238	0.001**
Visual analogue pain scale					
Before-intervention	0-10	7.45 ± 2.18	7.05±2.48	0.766	0.446 ns
3 hours after intervention		5.37 ± 2.43	6.77±2.76	2.401	0.01*
6 hours after intervention		3.87 ± 2.36	6.45±2.78	4.459	0.000**
Current Pain Intensity Scale					
Before-intervention	0-5	4.00 ± 1.10	3.82±1.12	0.699	0.487 ns
3 hours after intervention		2.92 ± 1.42	3.80±1.09	3.089	0.003*
6 hours after intervention		2.60 ± 1.39	3.55±1.10	3.376	0.001**
Total score					
Before-intervention	0-60	47.57 ± 11.05	46.62 ± 12.07	0.367	0.715 ns
3 hours after intervention		36.75 ± 10.97	44.02 ± 12.11	2.815	0.006*
6 hours after intervention		30.77 ± 10.85	40.52 ± 12.06	3.800	0.000**

ns no statistical significant difference (p > 0.05);

**A high statistical significant difference (P ≤ 0.001)

Table (4): Distribution of the studied groups according to the total score of pain before the intervention, three and six hours after the intervention (n=80).

Short-form McGill Pain Questionnaire	Before intervention				3 hours after intervention				6 hours after intervention			
	Study group n=40		Control group n=40		Study group n=40		Control group n=40		Study group n=40		Control group n=40	
	No	%	No	%	No	%	No	%	No	%	No	%
Pain Rating Index												
No pain (0 - 11)	0	0.0	0	0.0	0	0.0	0	0.0	1	2.5	0	0.0
Mild pain (12 - 23)	3	7.5	5	12.5	9	22.5	6	15.0	15	37.5	8	20.0
Moderate pain (24 - 35)	8	20.0	7	17.5	18	45.0	9	22.5	17	42.5	12	30.0
Sever pain (36 - 45)	29	72.5	28	70.0	13	32.5	25	62.5	7	17.5	20	50.0
X^2 / P value	0.58 (0.74)				7.38 (0.02*)				11.25 (0.01*)			
Visual analogue pain scale												
No pain = 0	0	0.0	0	0.0	0	0.0	0	0.0	2	5.0	0	0.0
Mild pain (1 - 3)	2	5.0	4	10.0	10	25.0	7	17.5	17	42.5	10	25.0
Moderate pain (4 - 7)	10	25.0	11	27.5	18	45.0	10	25.0	16	40.0	11	27.5
Severe pain (8 - 10)	28	70.0	25	62.5	12	30.0	23	57.5	5	12.5	19	47.5
X^2 / P value	0.88 (0.64)				6.27 (0.04*)				12.9 (0.005*)			
Current Pain Intensity Scale												
No pain=0	0	0.0	0	0.0	1	2.5	0	0.0	3	7.5	0	0.0
Mild pain=1	1	2.5	0	0.0	6	15.0	0	0.0	6	15.0	0	0.0
Discomforting=2	4	10.0	7	17.5	9	22.5	6	15.0	9	22.5	9	22.5
Distressing =3	6	15.0	8	20.0	11	27.5	10	25.0	12	30.0	10	25.0
Horrible =4	12	30.0	10	25.0	5	12.5	10	25.0	6	15.0	11	27.5
Excruciating =5	17	42.5	15	37.5	8	20.0	14	35.0	4	10.0	10	25.0
X^2 / P value	2.41 (0.66)				10.9 (0.05*)				13.2 (0.02*)			

* A statistical significant difference (P ≤ 0.05);

Table (5): Comparison of the mean scores' limitation of physical activities in both groups before the intervention, three and six hours after the intervention (n=80).

Physical activities	Range of Possible Scores	Study group n=40	Control group n=40	Independent t-test	P value
		Mean ±SD	Mean ±SD		
Sitting in bed					
Before-intervention	0-3	2.10 ± 0.59	2.12±0.60	0.187	0.85 ns
3 hours after intervention		1.32±0.85	1.70±0.60	2.254	0.02*
6 hours after intervention		0.87±0.72	1.27±0.67	2.551	0.01*
Standing up					
Before-intervention	0-3	2.20 ± 0.64	2.07±0.61	0.884	0.37 ns
3 hours after intervention		1.50 ± 1.10	1.95±0.59	2.259	0.02*
6 hours after intervention		0.70±0.72	1.25±0.80	3.206	0.002*
Walking					
Before-intervention	0-3	2.15 ± 0.62	2.20±0.68	0.341	0.73 ns
3 hours after intervention		1.40 ± 0.98	1.85±0.66	2.403	0.01*
6 hours after intervention		0.72±0.84	1.25±0.80	2.836	0.006*
Performing personal hygiene					
Before-intervention	0-3	2.20 ± 0.68	2.22±0.61	0.171	0.86 ns
3 hours after intervention		1.52 ± 0.98	1.92 ± 0.61	2.175	0.03*
6 hours after intervention		0.80±0.79	1.37±0.95	2.937	0.004*
Breastfeeding					
Before-intervention	0-3	2.25 ± 0.63	2.30±0.64	0.350	0.72 ns
3 hours after intervention		1.65 ±1.00	2.05±0.74	2.023	0.04*
6 hours after intervention		0.85±0.80	1.32±0.94	2.425	0.01*
Using a toilet					
Before-intervention	0-3	2.17 ± 0.59	2.22±0.61	0.368	0.71 ns
3 hours after intervention		1.42 ±1.00	2.00±0.67	2.988	0.004*
6 hours after intervention		0.65±0.73	1.22±0.91	3.088	0.003*
Eating					
Before-intervention	0-3	2.25 ± 0.54	2.15±0.62	0.766	0.44 ns
3 hours after intervention		1.32 ±1.07	1.97±0.73	3.166	0.002*
6 hours after intervention		0.65±0.73	1.27±1.08	3.014	0.003*
Total score					
Before-intervention	0-21	15.32 ± 4.05	15.30±3.59	0.029	0.97 ns
3 hours after intervention		10.15 ±6.15	13.45±3.69	2.909	0.005*
6 hours after intervention		5.25 ±4.42	8.97±5.19	3.452	0.002*

X2 = Chi square test ;ns no statistical significant difference ns no statistically significant difference ($p > 0.05$) ns no statistically significant difference ($p > 0.05$); statistically significant difference ($P \leq 0.05$)

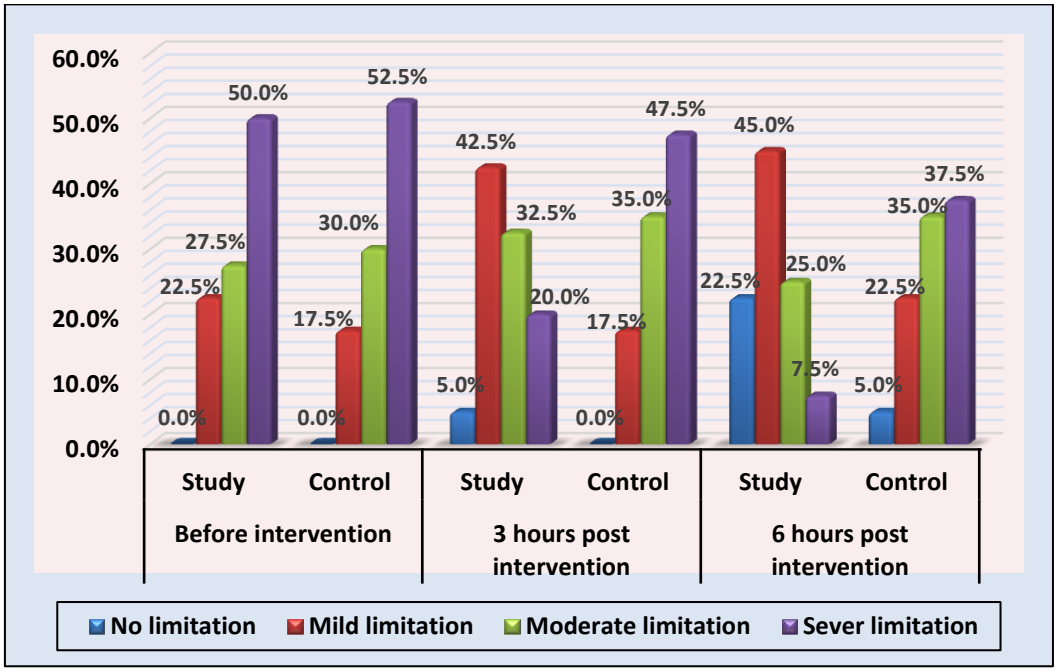

Figure (2): Distribution of studied women' total physical activities limitation in the study and control groups before the intervention, three and six hours after the intervention (n=80).

Table (6): Distribution of the studied groups according to sleep quality at 24 hours post cesarean section (n=80).

Groningen Sleep Quality items	24 hours post cesarean section					
	Study group n=40		Control group n=40		X^2	P-value
	Yes		Yes			
	No	%	No	%		
I didn't sleep deeply last night.	24	60.0	33	82.5	4.94	0.02*
I feel like I slept poorly last night.	22	55.0	31	77.5	4.52	0.03*
It took me over half an hour to fall asleep last night.	19	47.5	29	72.5	5.20	0.02*
I woke up several times last night.	17	42.5	30	75.0	8.71	0.003*
I felt tired after waking up this morning	19	47.5	30	75.0	6.37	0.01*
I feel like I didn't get enough sleep last night.	17	42.5	28	70.0	6.14	0.01*
I woke up in the middle of the night.	19	47.5	28	70.0	4.17	0.04*
I didn't feel comfortable after waking up this morning.	16	40.0	26	65.0	5.01	0.02*
I feel like I only had two hours of sleep last night.	14	35.0	23	57.5	4.07	0.04*
I didn't sleep for the blink of an eye last night	16	40.0	25	62.5	4.05	0.04*
I found it hard to sleep last night.	19	47.5	29	72.5	5.20	0.02*
After I woke up last night, I had trouble sleeping again	17	42.5	29	72.5	7.36	0.007*
I flipped and turned all last night.	18	45.0	28	70.0	5.11	0.02*
I didn't sleep more than 5 hours last night	17	42.5	26	65.0	4.07	0.04*
I woke up earlier than usual in the morning	13	32.5	23	57.5	5.05	0.02*
Mean ±SD	6.70 ± 6.97		10.32 ± 6.32		t= 2.43	0.01*

*X2 = Chi square test t= independent t test A statistically significant difference (P ≤ 0.05).

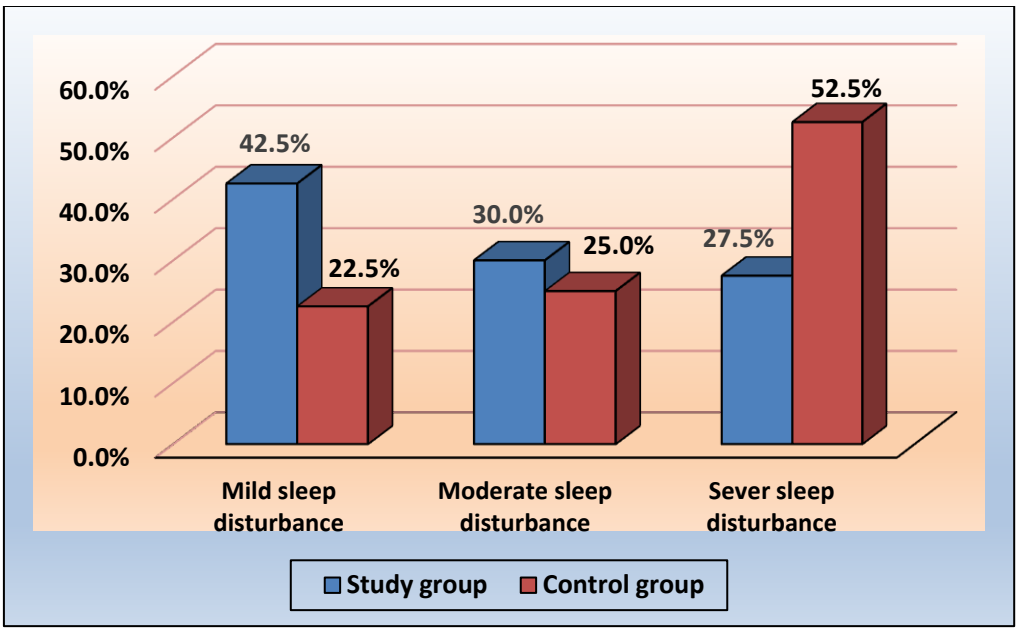

Figure (3): Distribution of studied women' total sleep quality in both study and control groups at 24 hours post cesarean section (n=80).

Discussion

Following cesarean section, puerperal women will typically experience severe pain in the first two hours as the anesthetic effects wear off and causing different physical activity limitations and disturbances in sleep quality lasts extensively till the following three days until the promoting recovery. The finger handheld relaxation technique is a non-pharmacological method to control pain. When compared to the usage of pharmaceutical management, non-pharmacological management is more cost effective and has no negative side effects &influences a person's internal response to pain and stress (**Lee, Woo, Chae, Kim, & Shin, 2023).**

Our fingers are connected to various organs and emotions by energy meridians and channels. When you grasp something, the reflection points on your hand stimulate an automatic reflex. The stimulus will empty the brain of a shock or electrical charge. The wave is quickly processed by the brain and sent to the nerves in the damaged body organs, obstructing the energy flow to disappear **(Nave, Deane, Miller, & Clark, 2022)**

Based on these important issues the current study was aimed to evaluate the effect of finger handheld relaxation techniques on cesarean section pain and quality of sleep among puerperal women. This aim was significantly achieved through the present study findings.

In the light of the above, the present research was conducted on 80 puerperal women post cesarean section by utilizing A quasi experimental design (two groups, pre-posttest design).

The current research results were Clarified that more than three quarters of both study and control groups were in age group (25- <30 years) this is anticipated because it is the normal age of childbearing, had a diploma education, and were

housewives living in rural areas. These characteristics align with typical reproductive profiles observed in similar Egyptian and Middle Eastern populations, supporting the generalizability of the findings to such contexts.

As regards obstetric history, the mean gestational age at delivery was 38.65 ± 1.07weeks and 38.77 ±0.91weeks of the study and control group respectively. Additionally, the most of women in both study and control group respectively planned for cesarean section and were anesthetized by general anesthetic. Also, there were no statistically significant differences in the two groups' regarding obstetrical history.

Concerning degree of pain, the current study demonstrates that there was no statistically significant difference between the study and control groups regarding all forms of Pain questionnaire (subjective pain rating ,visual analogue scale and intensity of pain) before intervention ($p > 0.05$). Meanwhile, a statistically significant improvement was observed in the study group compared with the control group three and six hours after intervention ($P \leq 0.05$). the present findings comparable to those reported by (**Tyas, 2020),** in a study titled "The Effect of Finger Relaxation Technique on Post-Operative Pain Level Reduction in Patients with cesarean section" and revealed a significant decrease in pain levels among mothers practicing finger-hold relaxation, with a highly significant difference ($p = 0.001$). similarly, ***(Yulyana et al., 2020***) who studied The Impact of Finger Relaxation Methods in Mitigating Post-Operative Sectio Caesarea Pain were highlighted that Prior to intervention, the intervention group's mean pain scale was 6.44. Following the intervention, the intervention group's mean pain score was 3.39. In the intervention group, there was a statistically significant difference in pain reduction from before and after the intervention.

Besides that, ***(Ibrahim, etal., 2022)*** who reported guided relaxation techniques significantly reduced pain perception among post-cesarean women as, this non-invasive and low-cost method may reduce dependence on pharmacological agents, which often carry undesirable side effects, especially in breastfeeding women._And ***(Kiptiah ,etal 2024)*** presented in a study titled "The Effect of Finger Hold Relaxation Technique on Pain Intensity in Post-Caesarean Section Surgery" demonstrated that the finger-hold relaxation technique is an alternative for reducing pain non-pharmacologically in post-cesarean section surgical patients and Midwives can teach finger-hold relaxation techniques post-cesarean section patients and the benefits

From the researchers' point of view, the significant decrease in the study group at 3- and 6-hours post-intervention suggested that finger handheld relaxation is an effective method for managing acute postoperative pain. The mechanism behind this effect could be attributed to distraction, muscle relaxation, and the stimulation of parasympathetic nervous system activity, all of which are known to modulate pain perception. And this section supported the first research hypothesis "Women who will receive finger handheld relaxation technique will show decreased post-cesarean incisional pain intensity than who

received the routine post cesarean section hospital therapy"

As regard to the physical activity limitation, the foregoing study highlighted that there was no statistically significant difference in the total mean score of physical activity limitation between study and control groups at pre intervention phase (p >0.05) which indicate that at the beginning of the study, both groups had similar levels of physical activity limitation indicating similar baseline levels of limitation. However, three and six hours after intervention, the mean score of the total physical activity limitation in the study group was lower than the scores in the control group ($P \leq 0.05$, $P \leq 0.001$). These findings are consistent with prior studies indicating that non-pharmacological interventions can enhance early postpartum recovery by reducing discomfort and encouraging movement as ***(Ali et al., 2021; Hassan & El-Sayed, 2020)*** which presented " Improved physical activity is crucial in preventing postoperative complications such as deep vein thrombosis, enhancing maternal confidence, and promoting early mother–infant bonding|.

Moreover the present findings reinforce the conclusion of (***Kamau,etal , 2024).*** that non-drug interventions—such as finger handheld relaxation or mind-body techniques are effective strategies to reduce physical activity limitation in the immediate postpartum period. They also highlight the critical role of nursing and postnatal care in facilitating early recovery, minimizing discomfort, and supporting maternal reintegration into daily life. The researchers opinions for such findings of the study based on before intervention, more than half of the study group and the control group reported severe limitation, while after practiced the finger handheld relaxation ,the percentage dropped to minority in the study group versus about two fifths in the control group at 6 hours post-intervention so significantly improved physical limitations of the study group. Also, this part achieved the second research hypothesis which stated that" Women who will receive finger handheld relaxation technique will exhibit better scores in limitation of the physical activities than who received the routine post cesarean section hospital therapy".

the findings of the present study demonstrated a significant improvement in sleep quality among women in the study group compared with the control group 24 hours post-cesarean section as The mean sleep quality score was markedly lower in the study group (6.70 ± 6.97) than in the control group (10.32 ± 6.32), with a statistically significant difference ($P = 0.01$). Moreover, a higher percentage of women in the study group (42.5%) experienced only mild sleep disturbances compared to 22.5% in the control group, whereas severe sleep disturbances were more prevalent in the control group (52.5%) than in the study group (27.5%). These results indicate that the applied intervention was effective in promoting better sleep quality during the early postpartum period following cesarean delivery.

The current findings are supported by previous studies. For example, ***(Tyas 2020)*** who highlighted that finger relaxation techniques not only reduced postoperative pain but also contributed to improved rest and overall immediate

puerperal women comfort, which are key determinants of sleep quality. Similarly, **(*Liu et al. 2021)*** reported that non-pharmacological relaxation interventions significantly improved sleep quality among postnatal women by reducing anxiety, stress, and discomfort. In addition, ***(Shen et al. 2021)***, in a systematic review, emphasized that complementary approaches such as breathing exercises and relaxation techniques enhanced maternal sleep patterns during the early postpartum phase. More recently, **(*Elnosary,etal., 2024*)** demonstrated that performing finger hand held relaxation technique post-cesarean not only alleviated pain but also contributed to better maternal rest and, indirectly enhancing sleep quality.

The present results slightly dissimilar with ***(Ramlakhan and Browning 2020),*** in a systematic review study, concluded that non-pharmacological interventions for postpartum sleep disturbance, including relaxation techniques, showed mixed effectiveness, and in some cases. The researchers found these discrepancies may be attributed to differences in study design, participants' characteristics, cultural background, and the multifactorial nature of postpartum sleep disturbances. Therefore, while finger hand-held relaxation appears promising, further large-scale randomized controlled trials are warranted to validate its consistent effectiveness across diverse populations. And these notable improvements in present study regarding the quality of sleep scores post intervention might be a positive effect of finger handheld relaxation mechanisms such as reduced pain, improved relaxation, lower anxiety levels, and alternatively good sleep quality. Finally, the above results achieved the third research hypothesis which stated, "Women who will receive finger handheld relaxation technique will exhibit better quality of sleep scores than those who received the routine post cesarean section hospital therapy".

5. Conclusion

Based on the present findings ,it is concluded that there were statistical statistically significant reduction in pain intensity scores , physical activity limitation of the study group in the three and six hours post-intervention compared to the control group ($P \leq 0.05$, $P \leq 0.001$) ,also the Sleep quality also improved significantly, as evidenced by lower mean sleep quality score in the study group compared to the control group with a statistically significant difference ($P = 0.01$). These results markedly achieve the current study aim and hypotheses.

6. Recommendations

-Empowering postnatal women to practice finger-handheld relaxation for reducing pain intensity scores, physical limitations and sleep quality after cesarean section.

- Integration of finger-handheld relaxation as non-pharmacological intervention for reducing post-cesarean pain in routine nursing care.

Further research

- An educational perspective, incorporating finger-handheld relaxation, into nursing curriculum will enhance the holistic approach of maternity care after cesarean section.

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