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Effectiveness of Postpartum Gymnastics on The Decrease of Uterine Fundus Height in Post-Sectio Caesarea Patients

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ABSTRACT

The SC delivery rate in Indonesia is rapidly increasing, from 12.1% in 2013 to 17.6% in 2018. This triggers an increased risk of uterine subinvolution, a dangerous condition that caused maternal mortality in West Java to reach 2.82% in 2021. One way to prevent uterine subinvolution is by doing puerperal exercises. This study aims to provide an overview of nursing care for postoperative SC mothers with the application of postpartum exercises to prevent uterine subinvolution. The data collection technique used in this scientific paper is qualitative, with a case study approach on two nursing care documentation of postoperative SC mothers, where the author performs puerperal gymnastics and observes uterine involution. Changes in fundus uteri height with the application of puerperal gymnastics were measured using an observation sheet. The results of nursing care for three consecutive days with a duration of 15-30 minutes in 1 administration showed a decrease in the height of the fundus uteri with an average decrease of 1.8 cm. In this study, postpartum gymnastics can work effectively to help reduce the height of the fundus uteri.

1. INTRODUCTION

The birth rate of Sectio caesarea (SC) has recently increased. Based on World Health Organization (WHO) research data, the global SC percentage in 2021 is 21.1%, an increase from 18.6% in 2018 (Komarijah et al., 2023). According to the 2018 Riskesdas data, the number of deliveries in Indonesia using the SC method in Indonesia was 17.6%, an increase from 12.1% in 2013 (Ministry of Health, 2018). West Java Province has the highest percentage of SC deliveries in Indonesia, at 28.9%, up from 23.7% in 2018 (Dinas Kesehatan, 2019). The incidence of SC surgery in Banjar City, West Java, has increased in recent years. The increasing incidence of SC is one of the issues in increasing the risk of uterine subinvolution, which can cause postpartum hemorrhage (Shafinaz, 2023).

According to a study conducted at the Ourense University Hospital Complex in Spain in 2016, 0.18‰ incidence of uterine sub-involution and 6.12% of them were identified as the etiology of slow postpartum hemorrhage (Álvarez-Silvares et al., 2016). The incidence of uterine subinvolution causing postpartum hemorrhage in developed countries is around 5% of deliveries. In contrast, in developing countries, it can reach 28% of deliveries, which is a significant problem in maternal

mortality. The cause of uterine subinvolution and the occurrence of postpartum bleeding is 90% uterine atony, 7% is a birth canal tear, and the rest is due to placental retention and blood clotting disorders (Mazidah & Mulyaningsih, 2019). The cause of maternal death in West Java in 2021 due to uterine subinvolution was 2.82%. Of these, the causes of maternal death related to uterine subinvolution were 34 cases, consisting of 14 cases of bleeding, 10 cases of infection, and 10 cases of others (Revy Lestari, 2022). According to Banjar et al. Office 2022, as many as 6 cases of postpartum deaths have occurred in 2022, of which 2 cases were caused by bleeding, 3 cases of hypertensive disorders, and 1 case of heart and blood vessel disorders.

Bleeding caused by uterine subinvolution in post-SC patients occurs due to various kinds, including the presence of residual placental tissue that is still attached to the uterine wall, the occurrence of infection in the uterine lining (endometritis), the growth of benign tumors in the uterus (uterine myoma), complications in surgical wounds such as infection, bleeding, or decisiveness (opening of the surgical wound), other risk factors, such as age, parity, length of labor, and the health conditions of the mother and fetus during pregnancy and childbirth. One of the most frequent causes of uterine subinvolution is retained placental fragments and infection (Hermawan, 2019).

Other researchers have made various efforts to overcome uterine subinvolution, including by doing postpartum exercises. This is caused by an increase in calcium ions in the muscle cells that are bound to calmodulin. This bond causes consistent muscle and continuous uterine contractions (Rohmawati et al., 2019). Most postpartum women do not move immediately after giving birth, and they are worried that the movements they make will cause pain and bleeding. Postpartum women who do not do postpartum exercises have an unfavorable impact, such as the onset of bleeding or infection, and many postpartum women are afraid to move, so they use part of their time to sleep continuously (Mazidah & Mulyaningsih, 2019).

Postpartum hemorrhage (PPH) can occur due to a lack of physical activity during the postpartum period. Physical activity can help contract the uterus so that the uterus can remove blood and tissue more effectively, reduce the risk of excessive bleeding, and improve circulation and muscle tone (WHO, 2013). In addition, physical activity is essential to prevent complications from SC. Physical activity plays a vital role in physiological function, maintaining independence, and accelerating recovery (Nurfitriani, 2019). A lack of physical activity in post-SC mothers results in increased body temperature, inhibiting the release of blood and placental remnants and causing disruption of uterine contractions and abnormal bleeding due to disrupted contractions (Ferni et al., 2021).

Doing physical activity, such as postpartum exercises, is very important to increase uterine involution and prevent complications related to postpartum hemorrhage (Kasim et al., 2023). Postpartum exercises are safe for postpartum mothers because they are specifically designed to promote uterine involution and help the recovery process after childbirth. This exercise is gentle so that mothers can follow it consistently every day. According to Riska Mandasari (2022), for mothers who undergo SC surgery, postpartum exercises can usually be started two days after giving birth or when the mother can get out of bed. The safety of postpartum exercises is also supported by research conducted by Lisnawaty Ernawati (2019), which shows that postpartum exercises have a significant effect on uterine involution and are effective for lowering the height of the fundus uteri.

2. METHODS

The design of this scientific paper is qualitative with a case study approach. The case was located in the Lotus Room 2 BLUD RSU Kota Banjar. The time for taking cases starts from the second day of client care after performing SC surgery until discharge and continues with home visits according to the remaining days. The postpartum exercise intervention was given three times in 3 days, for 15–30 minutes. After that, an evaluation was carried out on day three as a form of termination of the series of research activities. Data collection techniques include documentation and questionnaire studies, interviews with data sources from clients, families, or other nurses, observation and physical

examination, and the nursing process needed by Standard Operating Procedures (SOP). The data collection instrument used in this study is the maternity nursing care assessment format, which includes assessment, diagnosis, intervention, implementation, and nursing evaluation. Furthermore, Standard Operating Procedure (SOP) postpartum gymnastics, observation sheets, stationery, and metlin.

3. FINDINGS AND DISCUSSION

This research was conducted at BLUD RSU Kota Banjar, located in Jl. Public Hospital No. 05, Hegarsari, Pataruman Sub-district, Banjar City, West Java. BLUD RSU Kota Banjar is a type B hospital. Nursing care was implemented in the Teratai 2 class 3 room and continued with visits to the respondents' homes located in Cimenyan and Cisaga. The research conducted was the application of postpartum gymnastics interventions on two respondents after sectio caesarea (SC) surgery as much as once a day postpartum gymnastics intervention in 3 days. Both respondents were in class 3, with bed numbers Mrs. R in 3.4 and Mrs. R in 3.1. The first and second subjects were intervened with puerperal gymnastics on the second day of treatment from April 16, 2024, to April 18, 2024; on the second to the third day, the intervention was carried out at the hospital, then on the fourth day, it was carried out at the home of each respondent. The results obtained from this study are as follows:

a. Overview of Respondent Characteristics

Based on the results of research on 2 respondents of post sectio caesarea (SC) mothers on the decrease in fundus uteri height, there is a description of the characteristics of each respondent which can be seen in table 1. 1 :

Table 1. 2 Respondent Characteristics

Characteristics	Respondent 1 (Mrs. R)	Respondent 2 (Mrs. R)
Type of Labor	SC	SC
Age	23 years old	33 years old
Parity	Primiparous (P1A0)	Primiparous (P1A0)
Jobs	Housewife	HRD
Education	High School	S1
Body Mass Index (BMI)	40,0	24,4
Chief Complaint	The client's main complaint during the assessment was having heartburn in the stomach and feeling uncomfortable with the heartburn. Pain felt after the implementation of SC surgery felt sharp, like stabbing, felt in the back, and radiated to the pelvis with a pain scale of 5, arising intensely every time.	The client's main complaint during the assessment was having heartburn in the stomach and feeling uncomfortable with the heartburn. Pain felt after the implementation of SC surgery feels sharp, like stabbing, feels in the back, and radiates to the abdomen with a pain scale of 5, arising intensely every time.

b. Overview of Decreased Uterine Fundus Height

Table 1. 3 Overview of TFU changes before and after the implementation of puerperal gymnastics

No.	Time Post partum	Respondent 1		Time	Respondent 2		Difference
		Before	After		Before	After	
1	24 hours	13.5 cm	13.5 cm	24 hours	12.5 cm	12.5 cm	The difference in TFU reduction between the first respondent, Mrs. R, and the second 24 hours afterthe implementation of puerperal gymnastics is significant..
2	48 hours	11.7 cm	11.7 cm	48 hours	11 cm	11 cm	
3	72 hours	9.7 cm	9.7 cm	72 hours	9.2 cm	9.2 cm	
Average		11.6 cm			10.9 cm		
Description		On the first day of postpartum exercise, both respondents' uteruses were located in the midline of the abdomen, two fingers below the center. The uterus was palpated hard (muscular contractions), but the bladder was not palpable. The release of lochea in the two respondents was different. In the first respondent, Mrs. R, the amount of lochea that came out was ± 65 ml, while in the second respondent, Mrs. R, it was ± 90 ml. On the second day of postpartum exercise, both respondents' uteruses were in the midline of the abdomen, three fingers below the center. The uterus was palpated hard (strong contractions), while the bladder was not palpable. The lochea output of the two respondents was different. In the first respondent, Mrs. R, the amount of lochea that came out was ± 55 ml, while in the second respondent, Mrs. R, it was ± 85 ml. On the third day of implementing postpartum gymnastics, both respondents' uterus was in the midline of the abdomen, four fingers below the center. The uterus was palpated hard (muscular contractions), but the bladder was not palpable. The release of lochea in the two respondents was different. Mrs. R, as much as ± 30 ml was released in the first respondent, while in the second respondent, Mrs. R, ± 45 ml was released.					

The change in fundus uteri height was only seen 24 hours after the postpartum exercise. In addition, both respondents reported a change in the amount of lochea every day, both of which are evident in Table 1.2.

Based on the results of the application of puerperal gymnastics for the two patients, it can be concluded that there is a decrease in the height of the fundus uteri after giving the intervention of puerperal gymnastics to the two post-SC patients. This discussion aims to interpret the data from the application and then compare it with the theoretical concepts from previous research.

At the time of the study, data were obtained that the characteristics of respondents in this study consisted of two mothers after sectio caesarea (SC) surgery with some significant differences. The first respondent is 23 years old, and the second respondent is 33 years old; both are primiparous (mothers who have just given birth to one child). Regarding education, the first respondent has a high school educational background, while the second respondent has a bachelor's degree. The respondents' occupations differed; the first respondent was a housewife, and the second respondent worked as an

HRD. The first respondent's Body Mass Index (BMI) was classified as obese (40.0), while the second respondent had an ideal BMI (24.4). Conformity with theory suggests that age, education, and nutritional status are essential post-SC recovery. The theory of uterine involution states that the physical and psychological condition of the mother can affect the effectiveness of recovery, which is in line with the findings that individual characteristics can affect post-SC recovery outcomes. The complaints felt by both respondents can also be referred to as after pain. After, pain can occur due to the breastfeeding process. This is in line with the research of Fadhillah (2021), where pain or after pain can also occur when mothers breastfeed or pump breast milk because breast milk production causes the release of oxytocin, which stimulates the uterus to contract and helps the uterine involution process.

Bleeding caused by uterine subinvolution in post-SC respondents occurs due to various kinds, including the remaining placental tissue that is still attached to the uterine wall, the occurrence of infection in the uterine lining (endometritis), complications in surgical wounds such as infection, bleeding, or dehiscence (opening of the surgical wound), other risk factors, such as age, parity, type of delivery, and the health conditions of the mother and fetus during pregnancy and childbirth. (Hermawan, 2019). Based on the theory that primiparous respondents who give birth with SC are at risk of bleeding and in both respondents it is by existing theory, the results of research (Ximenes et al., 2021) The results of research (Ximenes et al., 2021) show that nursing care for post-SC respondents who are the main nursing problem is the nursing problem of bleeding risk because if it is not handled, it can endanger the respondent's condition. Postpartum bleeding that is not handled correctly can result in shock and decreased consciousness due to the large amount of blood that comes out. This causes impaired blood circulation throughout the body and can cause severe hypovolemia. When this happens, the mother is Notana & Sulistyaningsih (2023).

Postpartum exercises are essential in stimulating uterine muscle contractions through mechanisms involving action potentials and changes in cell membrane permeability. According to research by Gustiani & Kartini (2023), muscle cells produce energy converted into movement by the contractile proteins actin and myosin when gymnastics is performed. Mechanical stretching during gymnastics increases the permeability of calcium (Ca^{2+}) channels, which causes calcium ions to enter the cell, triggering the contraction of the uterine muscles. This process also increases cytosolic calcium, contributing to the biochemical reactions that activate muscle contraction. Postpartum exercises not only impact uterine contractions but also increase blood flow and cardiac output and accelerate uterine involution, reducing the uterus's size after delivery. Effective uterine contractions reduce the size of the uterus until it cannot be palpated above the pubic symphysis. The primary mechanism of uterine contraction involves changes in electrical activity and ion distribution inside and outside the cells. Gap junctions in the myometrium serve as intercellular communication channels, which increase during labor but quickly disappear afterward. Increased intracellular calcium triggers muscle contraction, where the interaction between actin and myosin is regulated by calcium and calmodulin. Activation of myosin through phosphorylation enhances this interaction, which in turn accelerates the process of uterine involution.

Research conducted by Rohmawati et al. (2019) regarding the application of puerperal gymnastics to reduce the height of the fundus uterus gave significant results. The study found a significant effect between puerperal gymnastics and uterine involution. The average height of the fundus uteri on the first day was 13.18 cm. After doing puerperal gymnastics for two days, the average height of the fundus uteri on the third day was 10.27 cm, with an average decrease in the height of the fundus uteri by 2.91 cm. This shows a significant effect of puerperal exercises on uterine involution. These results indicate that puerperal exercises can reduce the height of the uterine fundus by binding actin and myosin vang so that uterine contractions occur, which can reduce the height of the uterine fundus. After the implementation of puerperal gymnastics, a response to a decrease in the height of the fundus uteri was obtained in both respondents.

The response to the decrease in fundus uteri (TFU) height showed that after the implementation of postpartum exercises, there was a significant difference in the decrease in TFU in the two respondents observed. The decrease in TFU was only seen after 24 hours of postpartum exercise, and there was no immediate decrease after the exercise was performed. This is due to several factors, including the process of uterine involution, recovery of the muscles around the abdomen, and hormonal changes that require time to work effectively. The average TFU reduction in both respondents was 1.8 cm per day. The first respondent experienced a faster decline than the second respondent because the first respondent had started breastfeeding earlier. Breastfeeding can accelerate TFU reduction because the baby's suction on the nipple stimulates the release of prolactin and oxytocin hormones, which help the uterine involution process. The second respondent experienced a slower decline in TFU because she was not nursed with her baby and only pumped breast milk. The TFU decrease in the second respondent was recorded from 12.5 cm to 11 cm on the second day and from 11 cm to 9.2 cm on the third day after postpartum exercises. This study shows that postpartum exercises can contribute to uterine involution, which can be measured through changes in the height of the fundus uteri.

4. CONCLUSION

A comparative analysis of the study's results and the theoretical framework showed that postpartum gymnastics effectively reduced the fundus uteri's height in both post-SC patients. This finding may support the use of puerperal exercises as a complementary intervention in preventing uterine sub-involution in post-SC patients.

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