Volume 6, No. 1 January, 2025
p ISSN 2723-6927-e ISSN 2723-4339

The Relationship Between Hemoglobin Levels and Early Mobilization on Surgical Wound Healing in Post Sectio Caesarea Patients at Metta Medika Padangsidimpuan Hospital

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Abstract

Postoperative wound healing is a critical factor in the recovery of post-sectio caesarean (C-section) patients, where hemoglobin (Hb) levels and early mobilization play essential roles. This study aims to analyze the relationship between hemoglobin levels and early mobilization on surgical wound healing in post-C-section patients. A quantitative approach was employed using a cross-sectional analytical observational method. The study was conducted at Metta Medika Padangsidimpuan Hospital with 33 patients, selected through purposive sampling. Data analysis was performed using the Chi-Square test to determine the relationship between Hb levels, early mobilization, and wound healing outcomes. The results revealed that patients with Hb levels ≥ 11 g/dl exhibited better wound healing than those with Hb levels < 11 g/dl ($p = 0.013$). Additionally, early and normal mobilization significantly improved wound healing compared to delayed mobilization ($p = 0.025$). These findings indicate that Hb levels and early mobilization have a significant impact on surgical wound healing in post-C-section patients. The study's implications suggest that maintaining optimal Hb levels and encouraging early mobilization should be integrated into postoperative care protocols to enhance patient recovery and reduce complications. Future research should explore the impact of nutritional interventions on Hb levels, the role of physical therapy in optimizing mobilization, and a broader patient population to validate these findings in diverse clinical settings.

Keywords: hemoglobin, early mobilization, wound healing, cesarean section, post-operative

Introduction

The wish of all women, to give birth smoothly and give birth to a healthy baby.(Leinweber et al., 2023) Childbirth is a process of leaving the fetus from the uterus when the gestational age is sufficient. (Lupu et al., 2023)There are two ways of delivery, namely normal delivery (through the vagina) where this delivery occurs spontaneously with the head as a presentation and followed by the release of the placenta and other membranes, this delivery process usually lasts for 18 hours if there are no problems or complications. And Sectio cesarean delivery (SC) is a surgical delivery process in which an incision is made in the mother's abdomen (laparatomy) and uterus to remove the baby.(ASIYANBOLA et al., 2022) Sectio caesarean section is performed if there is the right indication and is a procedure to save lives and help reduce maternal and infant mortality significantly.

There are several complicating factors in mothers and babies so that cesarean delivery must be carried out, such as large babies, gemeli (multiple pregnancies), babies who must be born prematurely, babies who are not in the correct position, wrapped in the umbilical cord, and abnormal heart rates during monitoring. (Milani et al., 2025)In addition to the baby's condition, the mother's condition can also be a trigger for caesarean delivery that does not allow vaginal delivery such as mothers with preeclampsia, diabetes mellitus, and several other complications. Some of the most common cases of cesarean section indications in most of the world are fetal emergency, pre-performed cesarean section, and malpresentation.(Milani et al., 2025)

According to the WHO, the number of Sectio Caesarean sections has increased in

developing countries.(Betran et al., 2021a) Therefore, the WHO sets the ideal percentage of cesarean section is between 5-15% in each country.(Betran et al., 2021b) From WHO data in the 2021 Global Survey on Maternal and Perinatal Health, 46.1% of all births were carried out through Sectio Caesarea (World Health Organization, 2019). Based on RISKESDAS data in 2021, the number of births with the cesarean section method in Indonesia is 17.6%.(Devy et al., 2024) The indication of cesarean delivery is caused by several complications with a percentage of 23.2%. Indications with transverse/breech fetal position 3.1%, bleeding 2.4%, eclampsia 0.2%, premature rupture of membranes 5.6%, long partus 4.3%, umbilical cord circumference 2.9%, placenta previa 0.7%, placenta laggard 0.8%, hypertension 2.7%, and others 4.6% (Ministry of Health of the Republic of Indonesia, 2021). Based on the report on the results of Basic Health Research (Rikesdas) in 2021, DKI Jakarta became the province with the highest number of births by the sectio cesarean method with a percentage of 31.1%, Bali 30.2%, and North Sumatra 23.9%.(Milani et al., 2025) The labor process has several complications related to childbirth. The most common complications were bleeding (21.1%), old partus (8.5%), wound infection (7.65%), vaginal tear (6.40%), malpresentation (2%), surgical injury (0.50%), and maternal death (0.50%). Based on these data, the highest incidence for vaginal delivery is the old partus, while for caesarean section, the occurrence of wound infection is the highest risk.(Novelia et al., 2021) Caesarean wounds can experience a deinscence or infection that is often called SSI. This incidence ranges from 0.21% to 24.6% in wound dehisness. According to WHO, the incidence of Surgical Wound Infections is mostly found in developing countries with an incidence of 11.8 incidents out of 100 surgical procedures. The prevalence of SSI in Indonesia is estimated to be around 2.3 – 18.3%.

There are several factors that affect the healing of sectio caesarea wounds so that they cause infection, including early mobilization, wound care, nutrition, and comorbidities in the form of anemia and diabetes mellitus.(Ulandari et al., 2022) Dehission can occur 5 to 8 days after surgery when wound healing is still in its early stages.

Based on several factors that can affect the speed of wound healing, the author is interested in researching whether hemoglobin levels and early mobilization can affect wound healing with the title "The Relationship between Hemoglobin Levels and Early Mobilization on Post Sectio Caesarea Wound Healing"

Literature searches for these articles are conducted through databases of scientific journals such as PubMed and Google Scholar, which provide access to a wide range of relevant research and publications in the medical field. The search was conducted using specific keywords and MeSH (Medical Subject Headings) terms related to vaginal birth after cesarean (VBAC), including terms such as "VBAC", "vaginal delivery after cesarean section", "risk of VBAC", and "trial of labor after cesarean (TOLAC)". The aim of this process is to identify and review the latest research and relevant clinical guidance on VBAC, so as to provide a comprehensive, evidence-based review to improve understanding and practice in the selection of delivery methods for women with a history of cesarean section. The purpose of this study is to determine the relationship between hemoglobin levels and early mobilization on surgical wound healing in post-sectio caesarea patients.(Milani et al., 2025)

Research Methods

In this study, quantitative research is used. Quantitative research is a research method

used to research a specific population or sample with the aim of testing the hypothesis set (Sugiyono, 2018). The research design uses observational analysis with a cross sectional approach which aims to determine the relationship between hemoglobin levels and early mobilization on the healing of Post Sectio Caesarea wounds

Population is a subject that has certain characteristics that have been determined by researchers (Sugiyono, 2018). The population in this study is all mothers who have undergone Sectio Caesarea delivery

The sample is part of a research population that is taken and will be studied (Sugiyono, 2018). The method of displaying the research sample in this study uses a type of non-probability sampling with a purposive sampling technique. Purposive sampling is a sampling technique that uses certain considerations based on criteria from the researcher to obtain the number of samples to be studied. Determining the sample in this study, the researcher used the Yamane formula taken from the book Sugiyono (2018)

Results and Discussion

This research was conducted at Rumah Metta Medika Padangsidimpuan in January 2024 and has received approval from the Health Research Ethics Commission (KEPK) of the Faculty of Medicine, Prima Indonesia University of Medan with the number: 081/KEPK/UNPRI/XI/2024 The design of this study is cross sectional with the purpose of the study is to determine the relationship between hemoglobin levels and early mobilization for surgical wound healing in post-cesarean section patients.

Sampling in this study uses a purposive sampling technique. The samples obtained amounted to 33 samples. The data taken in this study are secondary data, namely medical records which include Hb levels, wound healing in patients and primary data, namely questionnaire sheets which include mobilization in patients. The results of this study were analyzed using the Chi Square test, which is presented as follows:

Univariate Analysis

Hb Level Distribution

Table 1. Hb Level Distribution

Hb Rate	Number (n)	Percentage (%)
Hb >11 g/dl	21	63,6
Hb ≤11 g/dl	12	36,4
Total	**33**	**100**

Based on table 1, it is explained that there are 33 patients with post-sectio caesarean sections whose hemoglobin levels are checked at Metta Medika Padangsidimpuan Hospital. Of the 33 patients, Hb levels ≥ 11 g/dl amounted to 21 people (63.6%), and Hb levels < 11 g/dl amounted to 12 people (36.4%).

Distribution of Early Mobilization in Sectio Caesarean Surgery Patients

Table 2. Early Mobilization Distribution

Early Mobilization	Number (n)	Percentage (%)
Fast	9	27,4
Usual	20	63,2
Slow	4	9,4
Total	33	100

Based on the table above, it can be seen that there are 33 patients with post-sectio caesarean section who are observed to have a frequency of early mobilization at Metta Medika Padangsidimpuan Hospital. Of the 33 patients, as many as 4 patients (9.4%) had slow early mobilization, 20 patients (63.2%) had normal early mobilization, and 9 patients (27.4%) had rapid early mobilization.

Surgical Wound Healing Distribution

Table 3. Distribution of Surgical Wound Healing

Wound Healing Operation	Number (n)	Percentage (%)
Wet Wounds	1	10,1
Dry Wounds	32	89,9
Total	**33**	**100**

Based on the table above, it can be seen that there are 33 patients with post-sectio caesarean section who were observed in the healing process of their surgical wounds at Metta Medika Padangsidimpuan Hospital. Of the 33 patients, 32 patients (89.9%) had surgical wounds that healed well, 1 patient (10.1%) had surgical wounds that did not heal completely.

Bivariate Analysis

The Relationship of Hb to Surgical Wound Healing in Post-Cesarean Section Patients

Table 4. The Relationship of Hb Levels to Surgical Wound Healing in Post-Cesarean Section Patients

	Wound Healing Operation				Total		Value *P-value*
	Wet Wounds		Dry Wounds				
	n	%	n	%	n	%	
Power Hb >11 g/dl	0	0%	21	63,6%	21	63,6%	**0,013**
≤11 g/dl	1	1,6%	11	34,8%	12	36,4%	
Total	**1**		**32**		**33**	**100%**	

In table 4. of the chi-square test, the result of asymptotic significance (2-sided) was obtained which was 0.013 (p-value <0.05) which means that there is a significant relationship between Hb levels and surgical wound healing in post patients

sesarean section. With the results obtained for patients with Hb >11g/dl, the number of wet wounds was 0% compared to 63.6% dry wounds, while patients with Hb ≤11g/dl obtained wet wounds as much as 1.6% and wounds for dry wounds as much as 34.8%.

The Relationship of Mobilization to Healing Surgical Wounds in Post-Cesarean Section Patients

Table 5. Mobilization Relationship to Surgical Wound Healing in Post-Cesarean Section Patients

			Wound Healing Operation			Total		Value *P-value*
			Wet Wounds		Dry Wounds			
		n	%	n	%	n	%	
History Mobilist	**Fast**	0	0%	9	27,4%	9	27,4%	**0,025**
Early Breastfeeding	**Usual**	0	0%	20	63,2%	20	63,2%	
	Slow	1	3,2%	3	6,2%	4	9,4%	
	Total	**0**		**33**		**33**	**100%**	

In table 5 of the chi-square test, the result of asymptotic significance (2-sided) was obtained which was 0.025 (p-value <0.05) which means that there is a significant relationship between the history of early mobilization and the healing of surgical wounds in post-cesarean section patients. With the results obtained by patients with rapid mobilization the number of wet wounds was 0% compared to dry wounds of 27.4%, patients with normal mobilization obtained wet wounds of 0% compared to dry wounds of 63.2% and patients with slow mobilization with wet wounds of 3.2% compared to dry wounds of 6.2%.

Discussion

Based on the results of the analysis of Hb levels on wound healing, it was found that patients with Hb levels of >11 g/dl were found to have dry wounds as many as 21 people (63.6%), while patients with Hb ≤11 g/dl had dry wounds as many as 11 people (34.8%). Red blood cells play an important role in hemostasis and thrombosis and can act as procoagulant and prothrombotic blood components. In patients with anemia, bleeding disorders occur where bleeding occurs longer and low hematocrit levels are found compared to patients who are not anemic.

This is related to the results of the research of Litvinov *et al*. who said that red blood cells form clots that contract as a barrier consisting of polyhedral red blood cells (polyhedrozytes) which play an important role in hemostasis and wound healing, and in addition to that red blood cells can also play a dual role, where red blood cells can help stop bleeding but at the same time can also contribute to thrombosis in a variety of ways. This is also in line with research conducted by Elghblawi *et al* where platelets play a role in the hemostasis process and minimize bleeding during surgery. This is also in line with the study of Alamin *et al*, which observed that patients

with anemia often experience longer inflammation. The presence of low hematocrit levels in patients will be associated with prolonged bleeding. In addition, an important role that is influential is the retraction of clots for hemostasis and wound healing, because it will make the clot a barrier consisting of dense polyhedrocytes so that it is difficult to penetrate.

Based on the results of the analysis of early mobilization for wound healing, it was found that patients who mobilized faster than the doctor's recommendation found dry wounds as many as 9 people (27.4%), patients with normal mobilization according to the doctor's recommendations got dry wounds as many as 20 people (63.2%), while patients who mobilized slower than the doctor's recommendation got dry wounds as many as 3 people (6.2%) and wet wounds as many as 1 person (3.2%). Early mobilization is a gradual return to the previous stage of mobilization to prevent complications and as an effort to reduce pain and improve blood circulation. Mobilization is the ability of individuals to move freely, easily, and in an orderly manner with the aim of meeting the needs of activities to maintain their health. Early mobilization is a supportive factor in accelerating postoperative recovery and can prevent postoperative complications. With early mobilization, vascularization becomes better so that it will affect the postoperative wound healing process because wounds require good blood circulation for cell growth or repair (Sumarah, 2019). Based on these data, it can be concluded that there is a relationship between early mobilization and the healing process of Sectio Caesarea wounds because by early mobilization, blood circulation becomes smooth, because smooth blood circulation can channel oxygen in the blood which helps repair tissues/wound healing processes.

Conclusion

The findings of this study indicate that hemoglobin (Hb) levels and early mobilization play a crucial role in the healing process of surgical wounds in post-cesarean section patients. Among the patients studied, 63.6% had Hb levels ≥11 g/dl, while 36.4% had Hb levels <11 g/dl. In terms of mobilization, 27.4% of patients exhibited fast mobilization, 63.2% had normal early mobilization, and 9.4% experienced slow mobilization. The analysis revealed a significant relationship between Hb levels and surgical wound healing, showing that patients with higher Hb levels had better wound healing outcomes. Additionally, the study confirmed a significant association between the timing of mobilization and surgical wound healing, where faster mobilization contributed to better recovery.

These findings emphasize the importance of maintaining optimal Hb levels and encouraging early mobilization as essential components of postoperative care protocols for C-section patients. Healthcare providers should prioritize preoperative Hb optimization and structured mobilization programs to enhance patient recovery and reduce complications. Future research should explore longitudinal studies on Hb management strategies, the impact of individualized mobilization programs, and the integration of nutritional interventions to improve Hb levels and wound healing outcomes. Additionally, investigating the role of physical therapy and its effectiveness in accelerating postoperative mobilization could further contribute to enhancing recovery strategies for post-cesarean section patients.

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