

Ida Mardalena*, Sutejo Sutejo, Eko Suryani

Department of Nursing, Poltekkes Kemenkes Yogyakarta, Indonesia

Corresponding Author: Ida Mardalena
Email: ida.madalena@gmail.com

Article Info

Online : <http://journal.umy.ac.id/index.php/ijnp>
ISSN : 2548 4249 (Print)
: 2548 592X (Online)
DOI : 10.18196/ijnp.v6i1.13353

Article History

Received : 10 December 2021
Revised : 06 June 2022
Accepted : 09 June 2022

Effectiveness of Nutrition Booklet to Improve Participation in The Management of Anemia in Cesarean Mothers

Abstract

Background: Severe postpartum anemia after cesarean is strongly associated with predelivery and postpartum Hb levels in maternal. The adverse effects of anemia impact health and economic development. WHO estimates that 12.8% of maternal deaths in Asia can be attributed to anemia.

Objective: This study aims to identify the effect of the anemia booklet on the perception, participation, and hemoglobin level of cesarean mothers in the management of anemia.

Method: This quasi-experiment with the pre-posttest without control groups design was conducted to measure the effectiveness of education using a nutrition booklet on the level of Haemoglobin and perception variable. 30 respondents were involved, and the data analysis was carried out using a Statistical test using paired t-test with a CI of 95%.

Result: The relationship between Hb before and after giving the booklet was revealed with a correlation coefficient of 0.333 and a significance of 0.84 (p -value > 0.05). Perceptions before and after understanding the booklet obtained p -value = 0.000 < 0.05 . Management before and after giving the booklet obtained p -value = 0.005 < 0.05 . The interviews found that after receiving information, mothers' perceptions improved regarding understanding anemia, recognizing signs and symptoms, preventing anemia, consuming protein, consuming drinks, and good nutrition for anemia management. After giving anemia management communication through booklets, there was an increase in the mother's participation in consuming snacks, drinking after mealtime, and improving personal and environmental hygiene.

Conclusion: Education through booklets affected maternal perceptions and management actions in preventing anemia but did not affect hemoglobin (Hb). It could also increase mothers' perception and participation in consuming snacks, drinking after mealtimes, and personal and environmental hygiene. Furthermore, nurses could use booklets as a medium of counseling.

Keywords: Anemia; Cesarean; Participatory; Booklet

INTRODUCTION

The World Health Organization states that more than 200 million women of reproductive age in SEAR (South-East Asia Region) were anemic, including 191

million non-pregnant women and 11.5 million pregnant women. Negative consequences of anemia on health and economic development include poor pregnancy outcomes, cognitive

impairment, and reduced labor capability. Among low- and middle-income countries, iron deficiency or anemia is among the top ten causes of years lost to disability, and it is the seventh greatest cause of lost years due to disability in women. Anemia in women and children is a public health issue affecting several Southeast Asian nations (Chaparro & Suchdev, 2019). Compared to normal vaginal delivery, obstetric interventions before and during labor, such as induction of labor and CS, increases the risk of post-partum sepsis. Acute blood loss during pregnancy causes postpartum anemia, which elevates the risk of postpartum sepsis approximately fourfold (Axelsson et al., 2017). Our sensitivity analyses showed that severe anemia in pregnant and postnatal women correlated strongly and independently to poor outcomes regardless of the source. Treatment and prevention of anemia in pregnancy should continue to be a global priority. (Daru et al., 2018). While nutritional anemia is widely considered the most prevalent, inflammation caused by infection and genetic causes such as hemoglobinopathy also contribute to the incidence of anemia. Only a few countries have managed to reduce the prevalence of anemia significantly. While evidence of informed recommendations for preventing anemia exists, many policy gaps and program barriers limit the effectiveness of anemia intervention programs in SEAR member countries. At the current rate of reduction, the 2nd Global Nutritional Target for 2025 is a 50% reduction in anemia in women of reproductive age, which is unlikely to be met (WHO, 2014). Postpartum anemia is associated with maternal and perinatal morbidity (Butwick et al., 2016). In this study, post-cesarean SSI was found to be common, and a contaminated wound, frequent vaginal examinations, rupture of membrane (>12 hours), prolonged labor (>12 hours), and anemia were all revealed to be significant predictors of SSIs (Gelaw, 2018).

Comprehensive data on the prevalence of anemia and the proportion responsive to iron are based on nationally representative and published data. In the SEAR, the prevalence of anemia among pregnant women, 48.7% were anemic with severe anemia affecting 1.1%, while 41.5% of nonpregnant women had anemia, with 1.9% of women having severe anemia, affecting a total of 202.0 million anemic women childbearing age (WRA). Evidence suggests

that reducing the prevalence of anemia between 2012 and 2025 will be feasible if there is significant government commitment, as demonstrated by achievements in several countries. Decisive and effective action is needed to reduce iron deficiency and anemia in women of childbearing age (WHO, 2014). In the last ten years, the average prevalence of anemia in pregnant women in Indonesia was 42%, and the lowest prevalence of anemia in pregnant women was 40.2% achieved in 2008 and 2009. The incidence of anemia in pregnant women in Indonesia increased from 43.7% in 2018 to 44.2% in 2019 (The World Bank, 2022). Prolonging labor, preventing early rupture of membranes, appropriately managing patients with comorbidities like hypertension, strengthening anemia prophylaxis and treatment during antenatal care, and boosting awareness among rural inhabitants can all help to alleviate the problem (Bizuayew et al., 2021).

The 2016-2025 Decade of Action for Nutrition, endorsed by all Member States at the UN General Assembly, provided a unique opportunity to accelerate efforts to reduce anemia through reviewing and scaling up direct and indirect interventions to reduce anemia. Behavior change interventions can be carried out through communication, information, and education (IEC). The high prevalence of anemia in pregnant women in Indonesia requires management from various aspects, including the mother's communication and perception. This study aims to identify the effect of counseling communication through booklets on mothers' perceptions and participation in reducing the prevalence of anemia insectiocesarean mothers (SC).

METHOD

This research is a quasi-experiment with a pre-test-post-test design without a control group design. The research design in this study was an experiment using a nutrition booklet for cesarean mothers while being treated and then looked at the effect on Haemoglobin and perceptions. The research was conducted at PKU Muhammadiyah Hospital Yogyakarta and Kharisma Kulonprogo Hospital Yogyakarta. The study was conducted from May to November 2020. The population in this study was all pregnant women who were hospitalized, while the

sample was cesarean mothers who met the inclusion criteria. A minimal sample size was taken by formula from Lameshow. The sample size was sought by numerical analysis in pairs with 38 respondents. The sampling technique was carried out by accidental sampling, with inclusion criteria of 18 to 45 years of age, patients with a cesarean, and with ASA (American Society of Anesthesiologist) status I and II. The exclusion criteria in this study were patients with emergency surgery and Hemorrhage post-partum case. 28 respondents involved in the interview.

Data were collected using a questionnaire form and interview for perception, while hemoglobin levels were taken from secondary data for pre-surgery and laboratory examinations for post-surgery data. Data were processed using computers and analyzed using the dependent t-test with a confidence level of 95% ($\alpha = 0.05$). Data collection was carried out using research instruments consisting of the respondent's consent sheet, identity sheet, and patient response. Data were collected every day until the desired number of subjects was sufficient. A statistical test was conducted using paired t-test with a CI of 95%. Subject's perception data were taken through a questionnaire and confirmed by interview, while the data on the subjects' participation was obtained through in-depth interviews.

RESULT

Maternal Haemoglobin data in this research can be seen in Table 1 below.

(see table 1)

Table 1 shows the data obtained before surgery: the highest maternal Hb level is 17.2 g / dL, the lowest is 9 g / dL, and the average Hb is 11.8 g / dL. The data in table 1 also states that 21.1% of mothers are still anemic. After the Cesarean section surgery at the control time, the mother's Hb was examined with the highest Hb result at 13.9 g / dL, the lowest Hb at 8 g / dL, and the average maternal Hb at 11.2g / dL. Compared to pre and post-surgery, there was a decrease in the average delta of maternal Hb by 0.615 g / dL.

(see table 2)

Data from table 2 shows respondents' perceptions about the definition of anemia that the pre-test

result was in a good category amounting to 84.21% and less good in the amount of 15.79%. The post-test result showed they were in a good category (100%). There was an increase in the understanding of mothers regarding the meaning of anemia. Respondents' perception of signs and symptoms of anemia based on the pre-test results can be seen in a good category at 55.26% and not a good category at 44.74%. Based on the post-test results, they were in a good category amounting to 100%. There was an increased understanding of mothers regarding the signs and symptoms of anemia. Respondents' perceptions about the causes of anemia based on the pre-test results revealed that it was in the good category of 42.11%, while 57.89% were not good. Based on the post-test results, all were in a good category, which amounted to 89.29%, while the remaining was less good at 10.71%. There was an increase in the understanding of mothers regarding the causes of anemia. Furthermore, Table 2 also obtained that respondents' perceptions about the impact of anemia based on the pre-test results can be seen in a good category are 42.11% and 57.89% unfavorable. Based on the post-test results, the good category was 89.29%, and the bad category was 10.71%. There is an increase in the understanding of mothers regarding the impact of anemia. Respondents' perceptions about anemia prevention based on the pre-test results can be seen in the good category of 78.95% and 21.05% unfavorable. Based on the results of the post-test, it can be seen that all of them are in a good category (100%). The data in Table 2 also shows the perception of respondents about the right type of nutrition based on the pre-test results. It can be seen that most of them were in a good category, namely 78.95%, and 21.05% were less good. Based on the results of the post-test, it can be seen that all of them were in a good category (100%).

(see table 3)

Data from table 3 shows that management of Fe tablet consumption in respondents based on the pre-test results was in the good category of 55.26%, while 44.74% were not good. Based on the post-test results, the good category was 96.43%, and 3.57% were in the 'not good' category. There is an increase in the consumption of Fe tablets. Based on the pre-test result, respondents' water consumption management was in a good category at 81.58%, and 18.42% were in the bad category. Based on the post-

test results, 89.29% were in a good category, and the bad category was 10.71%. It indicated there was an increase in drinking water consumption. Management of the consumption of snacks and food for respondents based on the pre-test results showed that most of them were in the good category of 97.37%. Based on the post-test results, they all were in a good category (100%), indicating an increase in the consumption of snacks outside of mealtimes. Furthermore, based on the pre-test results, management of side dishes consumption was in the good category at 65.79%, and 34.21% was not good. Based on the post-test result, 85.71% were in a good category, and 14.29% were not good, indicating an increase in protein consumption. The data in Table 3 also shows the management of complete menu consumption for respondents based on the pre-test results revealing that 78.95% were in a good category and 21.05% were not good. Based on the post-test results, 89.29% were in a good category, and 10.71% were in a bad category, indicating an increase in protein consumption. Based on the pre-test results of milk consumption management in respondents, it can be seen that 39.47% were in a good category, and 60.53% were in a bad category. Based on the post-test results, 53.57% were in a good category, and 46.43% were not good, indicating an increase in milk consumption. Based on the pre-test results, respondents' management of drinking water consumption after mealtime showed that 97.37% were in a good category, and 2.63% were in a bad category. Based on the results of the post-test, it can be seen that all of them were in a good category (100%). Table 3 shows that based on the post-test results, 53.57% were in a good category, and 46.43% were in a bad category, indicating an increase in drinking water consumption along with meal times. Management of health checks on respondents based on the pre-test results was in the good category of 84.21%, and 15.79% were in the bad category. There had been a decrease in carrying out health checks. Furthermore, based on the pre-test results, multivitamin consumption management in respondents was in a good category at 76.32%, and 23.68% were in a bad category. Based on the post-test result, 71.43% were in a good category, and 28.57% were in a bad category. Based on the pre-test results, the respondents' personal and environmental hygiene management was in a good

category at 97.37%, and 2.63% were in a bad category. Based on the post-test results, all were in a good category (100%), indicating an increase in personal hygiene and maternal environment.

In this study, there were only 28 respondents who could be followed up starting from pre-surgery to post-surgery, going home, and returning to the hospital. The normality test was conducted using Shapiro Wilk, with the result in Table 4 below:

(see table 4)

The data in Table 4 also shows that the average Hb value at pre-test was 11.86 gr / dL, and the average Hb at post-test was 11.35 gr / dL, where there was a decrease in the average Hb level of the mother after giving birth with SC of 0.51gr / dL. Based on the results of the correlation test between pre-test and post-test Hb and according to the provision of booklets with a correlation coefficient value of 0.333 with a significance of 0.84 (> 0.05), it can be concluded that there was no relationship between the provision of booklets and the Hb levels of post-cesarean mothers.

The results of the Wilcoxon test found that one mother experienced a decrease in perceptions of anemia and its management. 26 mothers experienced an increase in perception, and one person had the same perception before understanding the nutrition booklet for preventing anemia in post-SC mothers. Hypothesis test results obtained $p < 0.000$ smaller than 0.05, so it can be concluded that the nutrition booklet affected maternal perceptions. The mother took management variables or actions to prevent and treat anemia before statistical analysis was tested for normality of data using Shapiro Wilk.

Statistical analysis showed that five mothers experienced a decrease in their implementation actions after being given a booklet, 17 mothers experienced an increase in management, and 6 mothers did not experience a change both before and after the booklet intervention. The results of statistical tests obtained a p -value = 0.005 < 0.05 , so it can be concluded that there is an effect of providing nutrition booklets on maternal management measures to prevent anemia. In this

study, the results showed an increase in maternal perceptions about anemia after providing communication through booklet media by 31.6%, which was an effect of booklet media with an increase in maternal perceptions of anemia (p-value <0.05).

DISCUSSION

In women who have an elective cesarean section, either anemia or low iron stores were identified as independent risk factors for postpartum depression or impaired postpartum functional capacity (Chandrasekaran et al., 2018). Compared to before and after surgery, there was a decrease in the average delta of maternal Hb by 0.615 g / dL. Cesarean surgery is an operation incurring a moderate risk of bleeding, and rates are rising globally (Ferguson & Dennis, 2018). Women with a low preoperative Hb concentration and fetuses with macrosomia may be targeted for screening and hemoglobin optimization before and during cesarean surgery (Sivahikyako et al., 2021). There are no practical guidelines for the identification and therapy of anemia and iron deficiency in the postoperative phase, although there are various guidelines for the management of anemia in surgical patients. The researchers created a set of best-practice and evidence-based recommendations to guide patient care regarding anemia and iron shortage in the postoperative phase. Physiological factors of maternal age during pregnancy will affect the physical readiness of the mother and susceptibility to anemia. Age factors less than 20 years and more than 35 years can increase the incidence of anemia in pregnant women (Amini et al., 2018). There was an increase in maternal understanding regarding the prevention of anemia and understanding of mothers regarding the types of food for post-SC treatment. To avoid cesarean section during birth, several women tended to perform potentially harmful practices to give birth to a small newborn, such as avoiding nutritious food and eating less during pregnancy (Nisha et al., 2019). As a result, strategies should be implemented to encourage comprehensive health education and promotion initiatives among pregnant and postpartum women (Mremi et al., 2022).

In metropolitan Chinese women, postpartum anemia is widespread. Preventing postpartum anemia will require a combination of measures, including controlling prenatal anemia and correcting

poor eating habits (Zhao et al., 2019). There is an increase in drinking water consumption after meals. Prevention of anemia was perceived to result from an improved diet, avoidance of exposure to heat and improved sanitation to avoid diseases. The gap between local understanding of anemia and health and nutrition behaviors is required to lower the disease's prevalence. Effective interventions may be designed in collaboration with and for communities, building on existing knowledge while addressing any remaining gaps or misunderstandings (Awuah et al., 2021). Iron-deficiency anemia can be treated with oral or intravenous formulations (Bollag et al., 2021).

Pre-eclampsia, prenatal hypertension, gestational diabetes mellitus, and antepartum hemorrhage were all more common in obese women. However, anemia was more common in underweight women (Agrawal et al., 2016). During therapy, the hospital should provide information and evaluate high protein intake, particularly in post-SC patients, so they can use it until they return home (Darmawati et al., 2019). At dr. Zainoel Abidin Banda Aceh, there is a substantial relationship between food patterns and anemia in postpartum mothers (Fitri et al., 2020). The research results showed a significant relationship between gestational age, iron tablet supplementation, and consumption (protein, fat, vitamin C, and iron) on anemia status in pregnant women¹⁰. According to WHO, a low Body Mass Index and short stature are found in many low-income countries that cause poor fetal development, an increased risk of complications in pregnancy, and an increased need for complicated delivery. Maternal anemia is associated with low birth weight (LBW) and an increased risk of maternal death. Each year an estimated 13 million children are born with stunted intrauterine growth, and about 20 million are with low birth weight. A child born with LBW has a greater risk of morbidity and mortality and is also more likely to develop non-communicable diseases, such as diabetes and hypertension, later in life (WHO, 2015). Compared to individuals who did not take folic acid, those who did were 3.4 times less likely to develop anemia (Odds Ratio of 3.408), and complications in the immediate puerperium (Odds Ratio of 3.397) were linked to anemia in puerperal women. (Obando, 2021).

According to the current study's findings, although the pregnant women obtained iron treatment

during their pregnancy according to the MCH center's protocol, their hemoglobin levels remained low due to various causes (i.e., knowledge, practices and nutritional factors) (Latef et al., 2019). The results of the Paired sample Test showed the p-value = 0.063, indicating it was > 0.05. It can be concluded that there was no association between communication using the booklet and the hemoglobin level in the mother. The research with 40 respondents of postpartum mothers as the sample found that the factors that had a meaningful relationship with the incidence of postpartum anemia included pregnancy anemia, age, parity, type of delivery, and baby's birth weight. The factors which were more at risk included anemia during pregnancy, type of delivery, and baby birth weight (Azra & Rosha, 2015). Severe postpartum anemia was strongly associated with a pre-delivery Hb level between 10 and 10.9 g/dL and a pre-delivery Hb level of less than 10 g/dL (Butwick et al, 2016). Bleeding that occurs during childbirth and postpartum can potentially cause post-partum anemia. Research showed that women who gave birth with SC were susceptible to postpartum anemia as postpartum hemorrhage was greater in SC delivery than vaginal delivery (Sunuwar et al., 2020). Other studies have shown that SC caused postpartum anemia with a percentage of 58.2% and vaginal delivery with a percentage of 37.2% (Garrido et al., 2017)

During pregnancy, hypervolemia and hemodilution stimulate fluctuations in the physiology of hemoglobin concentration, and then there is a decrease in hemodilution in hemoglobin during labor and postpartum. Thus, in women who do not experience iron deficiency, single pregnancies, the amount of blood loss during childbirth of ≤ 300 ml, do not experience a deficiency in hemoglobin levels, and it even tends to increase. Hemodynamic adaptations can influence this situation before and after delivery. It causes an increase in hemoglobin levels, compensating for blood loss during labor and tending to lower hemoglobin levels. Hypervolemia during pregnancy will result in a loss of 30% of blood volume during delivery and will slightly change the hematocrit rate in the postpartum period. After delivery, hypervolemia is reduced through increased diuresis with a weight loss of ± 3 kg in the first postpartum week. The risks of complications

that can occur in cesarean delivery include infection, pain in the incision area, the risk of thrombosis, bleeding, and lactation disorders. Complications that can occur in the cesarean section include complications from anesthesia (10% of all maternal mortality). Complications that occur during cesarean action, more than 11% caused, among others, include bladder injury, uterine injury, blood vessel injury, intestinal injury, and can also occur to the fetus, amniotic fluid embolism. Postoperative complications can include infections of the uterus/endometritis, urinary tract, intestines, and cesarean incisions and thromboembolic events (Butwick e al,2016).

In this case, the interviews with respondents found that after receiving information through nutrition booklets, mothers' perceptions improved in terms of understanding anemia, recognizing signs and symptoms of anemia, preventing anemia, consuming protein, types of drinks, and good nutrition for anemia management. After giving anemia management communication through booklets, there was an increase in the mother's participation in consuming snacks, drinking after mealtime, and improving personal and environmental hygiene. Women of childbearing age should be provided with nutritional education regarding food sources of iron, especially before pregnancy, and taught how food choices could either enhance or interfere with iron absorption. Information regarding the side effects of the blood-supplemented tablet was still considered insufficient (Sumarna et al., 2016).

CONCLUSION

There was an increase in the mother's perception of anemia which was in the good category, from 64.83 to 96.43. Management of anemia in mothers increased from an average of 77.37% to 86.07%. Besides, there was a significant effect of providing nutrition booklets on increasing maternal perceptions about anemia with a p-value = 0.000. Furthermore, there was a significant effect of providing nutrition booklets on improving the management of anemia prevention in mothers with a p-value = 0.005. However, there was no communication influence through the provision of booklets on the hemoglobin level of post-cesarean mothers, with a p-value = 0.063. Communication

through the booklet nutrition could increase mothers' perception and participation in consuming snacks, drinking after mealtimes, and personal and environmental hygiene.

REFERENCES

- Agrawal, S., Singh, A. (2016). Obesity or Underweight-What is Worse in Pregnancy? *J Obstet Gynaecol India*. 66(6):448-452. <https://doi.org/10.1007/s13224-015-0735-4>
- Amini, A., Pamungkas, C. E., & Harahap, A. P. (2018). Usia Ibu Dan Paritas Sebagai Faktor Risiko Yang Mempengaruhi Kejadian Anemia Pada Ibu Hamil di Wilayah Kerja Puskesmas Ampenan. *Midwifery Journal*, 3(2). <https://doi.org/10.31764/mj.v3i2.506>
- Azra, P. A., & Rosha, B. C. (2015). *Factors Associated with Anemia Status of Pregnant Women in the Working Area of Air Cold Health Center, Koto Tengah District, Padang City*. <https://media.neliti.com/media/publications/107658-ID-faktor-faktor-yang-berhubungan-dengan-st.pdf>
- Awuah, R. B., Colecraft, E. K., Wilson, M. L., Adjorlolo L. K., Lambrecht, N. J., Nyantakyi-Frimpong, H., Jones, A. D. (2021). Perceptions and beliefs about anemia: A qualitative study in three agro-ecological regions of Ghana. *Matern Child Nutr*, 17(4): e13181. <https://doi.org/10.1111/mcn.13181>
- Axelsson, D., Blomberg, M. (2017). Maternal obesity, obstetric interventions and postpartum anemia increase the risk of postpartum sepsis: a population-based cohort study based on Swedish medical health registers. *Infect Dis (Lond)*, 49(10):765-771. <https://doi.org/10.1080/23744235.2017.1341055>
- Bizuayew, H., Abebe, H., Mullu, G., Bewuket, L., Tsega, D., & Alemye, T. (2021). Post-cesarean section surgical site infection and associated factors in East Gojjam zone primary hospitals, Amhara region, North West Ethiopia, 2020. *PLoS One*, 16(12):e0261951. <https://doi.org/10.1371/journal.pone.0261951>
- Bollag, L., Lim, G., Sultan, Pervez., Habib, A, S., Landau, R., Zakowski, M., Tiouririne, M., Bhamhani, S., & Carvalho, B. (2021). Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean, *Anesthesia & Analgesia*. 132(5);1362-1377 <https://doi.org/10.1213/ANE.0000000000005257>
- Butwick, A. J., Walsh, E. M., Kuzniewicz, M., Li, S. X., & Escobar, G. J. (2016). Patterns and predictors of severe postpartum anemia after Cesarean section. *Transfusion*, 57(1), 36–44. <https://doi.org/10.1111/trf.13815>
- Chandrasekaran, N., De Souza, L. R., Urquia, M. L., Young, B., Mcleod, A., Windrim, R., & Berger, H. (2018). Is anemia an independent risk factor for postpartum depression in women who have a cesarean section? - A prospective observational study. *BMC Pregnancy Childbirth*. 18(1):400. <https://doi.org/10.1186/s12884-018-2032-6>
- Chaparro, C. M., & Suchdev, P. S. (2019). Anemia epidemiology, pathophysiology, and etiology in low- and middle-income countries. *Annals of the New York Academy of Sciences*, 1450(1), 15–31. <https://doi.org/10.1111/nyas.14092>
- Darmawati., Husna, C., Fitri, A., & Munira, D (2019). The Effectiveness Of High Protein Nutrient To The Post Sectio Caesarea Healing Process. *Jurnal Medika Veterinaria*, 13 (2), 192-199. <https://doi.org/10.21157/j.med.vet.v13i2.14090>
- Daru, J., Zamora, J., Fernandez-Felix, Borja M. et al.(2018). Risk of maternal mortality in women with severe anemia during pregnancy and postpartum: a multilevel analysis.*The Lancet Global Health*, 6(5), 548-554. [https://doi.org/10.1016/S2214-109X\(18\)30078-0](https://doi.org/10.1016/S2214-109X(18)30078-0)
- Fitri, A., Darmawati., Kiftia, M., Rizkia, M., & Syahbandi. (2020). The Relationship between Diet and Iron Deficiency Anemia in Post Partum Mothers in Dr. Zainoel Abidin Banda Aceh in 2019. *JIKO (Jurnal Ilmiah Keperawatan Orthopedi)*, 4(2), 47-53. <https://doi.org/10.46749/jiko.v4i2.40>
- Ferguson, M. T., & Dennis, A. T. (2018). Defining peri-operative anemia in pregnant women - challenging the status quo. *Anaesthesia*, 74(2), 237–245. <https://doi.org/10.1111/anae.14468>
- Garrido, C. M., León, J., & Vidal, A. R. (2017). Maternal anemia after delivery: prevalence and risk factors. *J Obstet Gynaecol*, 38(1), 55–59. <https://doi.org/10.1080/01443615.2017.1328669>
- Gelaw, M, W., Abdella, A. (2018). Prevalence Of Surgical Site Infection And Associated Factors Among Mothers After Cesarean Delivery In Zewditu Memorial Hospital. *Ethiopian Journal of Reproductive Health*, 10 (4): 21-32

- Latef, A, A, A, E., Ghonemy, G, E., Ghany, R, M, A, E., & Ibrahim, M. (2019). Factors Influencing Iron Treatment among Anemic Pregnant Women. *Saudi Journal of Nursing and Health Care*, 2(10): 347-352. <https://doi.org/10.36348/SJNHC.2019.v02i10.003>
- Mremi, A., Rwenyagila, D., Mlay, J. (2022) Prevalence of post-partum anemia and associated factors among women attending public primary health care facilities: An institutional-based cross-sectional study. *PLoS ONE*, 17(2): e0263501. <https://doi.org/10.1371/journal.pone.0263501>
- Nisha, M. K., Raynes-Greenow, C., Rahman, A., & Alam, A. (2019). Perceptions and practices related to birth weight in rural Bangladesh: Implications for neonatal health programs in low- and middle-income settings. *PLoS One*, 14(12). <https://doi.org/10.1371/journal.pone.0221691>
- Obando, F. L. L., Moran, R., Medrano, K. (2021). Factors associated with anemia in post-cesarean with and without COVID-19 at the Hospital Nacional Alberto Sabogal Sologuren. *Anales de la Facultad de Medicina*, 82(4), <https://doi.org/10.15381/anales.v82i4.21077>
- Sivahikyako, S .A., Owaraganise, A., Tibaijuka, L., Agaba, D. C., Kayondo, M., Ngonzi, J., Mugisha, J., & Kanyesigye, H. (2021). Prevalence and factors associated with severe anemia post-cesarean section at a tertiary Hospital in Southwestern Uganda. *BMC Pregnancy Childbirth* 21, 674 (2021). <https://doi.org/10.1186/s12884-021-04157-x>
- Sumarna., Nursanti, I., & Mawarti, R. (2016). Description of Anemia Incidence in Postpartum Mothers at PanembahanSenopati Hospital, Bantul. Essay.
- Sunuwar, D. R., Singh, D. R., Chaudhary, N. K., Pradhan, P., Rai, P., & Tiwari, K. (2020). Prevalence and factors associated with anemia among women of reproductive age in seven South and Southeast Asian countries: Evidence from nationally representative surveys. *PloS one*, 15(8), e0236449. <https://doi.org/10.1371/journal.pone.0236449>
- The World Bank. 2022. Prevalence of anemia among pregnant women (%) – Indonesia. <https://data.worldbank.org/indicator/SH.PR.G.ANEM?locations=ID> Accessed: 18 February 2022
- WHO. 2014. Global Nutrition Targets 2025: Anaemia Policy Brief. Geneva: WHO <https://www.who.int/publications/i/item/WHO-NMH-NHD-14.4>
- WHO. (2015). Comprehensive Promotion and Prevention Program to Improve Health and Nutrition Status among Adolescence, Maternal, and Young Child Plans. Translation Indriastuti, Yustina A., Achadi, Endang L., and Latief, Dini. Promotive and Preventive Comprehensive Plan.
- Zhao, A., Zhang, J., Wu, W., Wang, P., & Zhang, Y. (2019). Postpartum anemia is a neglected public health issue in China: a cross-sectional study. *Asia Pac J Clin Nutr*, 28(4):793-799. [https://doi.org/10.6133/apjcn.201912_28\(4\).0016](https://doi.org/10.6133/apjcn.201912_28(4).0016)

Table 1. Maternal Haemoglobin (Hb) Levels Before and After Surgery (n = 38)

Category	n	%	Min (g/dL)	Max (g/dL)	Mean (g/dL)
Anemia before surgery	8	21.1	9	17.2	11.8
No anemia before surgery	30	78.9			
Anemia after surgery	15	39.5	8	13.9	11.12
No anemia after surgery	23	60.5			

Table 2. Respondent's Perceptions of Anemia

Respondent Perception	Pre-test (n=38)				Post-test (n=28)			
	Good		Not Good		Good		Not Good	
	n	%	n	%	n	%	n	%
Definition of Anemia	32	84.21	6	15.79	28	100.00	0	0.00
Sign and Symptom of Anemia	21	55.26	17	44.74	28	100.00	0	0.00
Causes of Anemia	16	42.11	22	57.89	25	89.29	3	10.71
Impact of Anemia	16	42.11	22	57.89	25	89.29	3	10.71
Anemia Prevention	30	78.95	8	21.05	28	100.00	0	0.00
Protein Consumption	32	84.21	6	15.79	28	100.00	0	0.00
Good Drinks	9	23.68	29	76.32	28	100.00	0	0.00
Fluid Requirement	29	76.32	9	23.68	25	89.29	3	10.71
Good Nutrition	30	78.95	8	21.05	28	100.00	0	0.00
Protein Source	25	65.79	13	34.21	27	96.43	1	3.57
Types of Food for Healing	31	81.58	7	18.42	27	96.43	1	3.57
Average		64,83		35,17		96,43		3,57

Table 3. Management of anemia that has been done by respondents

Management	Pre SC (n=38)		Post SC (n=28)		Pre SC (n=38)		Post SC (n=28)	
	Good		Not Good		Good		Not Good	
	n	%	n	%	n	%	n	%
Fe Tablet Consumption	21	55.26	17	44.74	27	96.43	1	3.57
Type of Drink	31	81.58	7	18.42	25	89.29	3	10.71
Snack Consumption	37	97.37	1	2.63	28	100,00	0	0,00
Total consumption of protein	25	65,79	13	34,21	24	85.71	4	14.29
Full Menu Consumption	30	78.95	8	21.05	25	89.29	3	10.71
Milk Consumption	15	39.47	23	60.53	15	53.57	13	46.43
Drink After Meal Time	37	97.37	1	2.63	28	100.00	0	0.00
Health Examination	32	84.21	6	15.79	21	75.00	7	25.00
Multivitamin Consumption	29	76.32	9	23.68	20	71.43	8	28.57
Personal and environmental hygiene	37	97.37	1	2.63	28	100.00	0	0.00
Percentage average		77.37		22,63		86,07		13,93

Table 4. Hemoglobin Correlation Test Results with Pair T-Test

	Mean	Std. Deviation	Sig.
HbPre	11.8607	1.19174	0.84
HbPost	11.3571	1.18616	