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Experience of Patients with Sectio Caesarean in Controlling Post Operative Nausea And Vomiting (PONV)

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Anti Amelia

antiamelia11@gmail.com**Abstract**

Background: Sectio Caesarea (SC) delivery is a surgical process to deliver a fetus through incisions in the abdominal wall and uterus. There are side effects of spinal anesthesia in SC, one of which is Post Operative Nausea and Vomiting (PONV). Patient factors, anesthesia, and surgery can give rise to PONV. PONV can be treated with pharmacological therapies such as antiemetics and non-pharmacological techniques such as relaxation. This study aims to find out how patients with Sectio Caesarea experience in controlling Post Operative Nausea and Vomiting (PONV).

Methods: This study uses a qualitative method with a phenomenological approach. Data were collected through in-depth interviews with participants who experienced SC and PONV.

Results: The data analysis resulted in five main themes: sources of information, lack of knowledge, surgical risks, complementary therapies and support systems. Sources of patient information about SC come from social media, the community, and experts. Many patients lack knowledge about SC because they do not seek out more information. The risks of surgery identified include the effects of the drug and side effects that cause discomfort. Complementary therapies used include deep breath relaxation techniques and aromatherapy with eucalyptus oil and citrus scent, as well as drinking warm water. The support system of medical personnel and families plays an important role in the management of PONV.

Conclusions: The conclusion of this study found that the patient's experience in controlling PONV involves various sources of information, limited knowledge, surgical risks, post-operative impacts, complementary therapy, and support from medical personnel and family.

Keywords: sectio caesarea, post operative nausea and vomiting, SC, PONV, qualitative**Introduction**

Childbirth is a natural process of a mother producing the results of conception of the fetus and placenta that are full-term (37-42 weeks). There are two methods of delivery: vaginal (natural) and Sectio Caesarea (SC) (Cunningham et al., 2022). SC delivery is a surgery to deliver a fetus through an incision in

the abdominal wall and uterus, performed when there are problems in vaginal delivery, such as placenta previa, abnormal presentation, dystocia, Cephalopelvic Disproportion (CPD), as well as other indications that endanger the mother and fetus (Fristika, 2023).

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In addition to medical indications, SC delivery is also carried out at the request of the patient, causing its prevalence to increase (Muntasir et al., 2023). World Health Organization (WHO) states that the rate of SC operations in the world ranges from 5-15% per 1,000 births. Data in 2019 shows that the number of SC actions was 85 million, in 2020 it was 68 million, and in 2021 it was 373 million actions (WHO, 2021).

Sectio Caesarea surgery mostly uses spinal anesthesia, which is a regional anesthesia technique with the injection of local anesthesia into the subarachnoid space of the lumbar (Oroh et al., 2022). In the United States, about 80% of Sectio Caesarean sections use spinal anesthesia (Triana, 2021). Although spinal anesthesia has advantages such as keeping the mother awake, reducing the risk of aspiration, and preventing neonatal depression, this technique can also cause side effects such as high spinal block, bradycardia, hypotension, apnea, post-lumbar headache, inadequate ventilation, and Post Operative Nausea and Vomiting (Nurjannah, 2020)

Post Operative Nausea and Vomiting (PONV) is a complication that often occurs after surgery and anesthesia, causing discomfort and dissatisfaction of the patient (NoorExperiment, 2023). PONV is associated with a variety of factors, such as patient factors (age, gender, motion sickness), anesthesia risk factors (opioid use, type of anesthesia), and surgical risk factors (procedure length, type of surgery, post-operative pain) (NoorExperiment, 2023). The impact of PONV can cause significant morbidities, such as aspiration, esophageal rupture, hematoma in the surgical wound, dehydration, electrolyte imbalance, disruption of the incision site, decreased patient satisfaction, prolonged recovery time, and longer hospitalization, resulting in economic losses for patients (Irawan, 2022). Therefore, health workers need to provide appropriate treatment through pharmacological and non-pharmacological therapies to prevent and manage PONV (Irawan, 2022).

Pharmacological therapy of PONV can be done by administering prophylactic antiemetics such as histamine receptor antagonists, muscarinics, dopamine, serotonin, neurokinins, cannabinoids, corticosteroids, and benzodiazepines. Non-pharmacological techniques in controlling PONV include deep breath relaxation, distraction, and mobilization (Virgiani, 2020). Research on the experience of SC patients in controlling PONV is still limited. Previous research discussed the effect of peppermint inhalation as a non-pharmacological therapy on the reduction of post-spinal anesthesia PONV (Khasanah,

2021). And the effect of non-pharmacological nursing interventions of ginger aromatherapy on nausea and vomiting in postoperative patients (Arisdiani et al., 2020).

Methods

This research has received approval from the Health Research Ethics Commission of Harapan Bangsa University with ethical license number No. B.LPPM-UHB/408/05/2024. This research is a qualitative study with a descriptive phenomenological approach conducted on June 12-22, 2024 at the Banjarnegara Islamic Hospital. The population consists of Sectio Caesarea (SC) patients who experience PONV (Postoperative Nausea and Vomiting). Data collection used purposive sampling techniques with 7 participants, through semi-structured interviews, voice recorders, field notes, and observations. Data analysis uses the Colaizzi method and thematic analysis to identify themes. At the end of the study, a follow-up was carried out with participants to clarify the theme to ensure the accuracy of the findings.

Results

This study involved 7 (seven) participants who were post-sectio caesarean section patients. The number of participants was in accordance with the saturation of the data obtained from the analysis of the answers given by the participants. The table of participant characteristics is as follows.

Table 1. Characteristics of Participant

Code	Initials	Gender	Age	PONV Frequency	Duration of PONV
P1	Ms. S	Female	31	+/- 3 times/days	+/- 5 min
P2	Ms. N	Female	35	+/- 3 times/days	+/- 5 min
P3	Ms. R	Female	37	+/- 3 times/days	+/- 5 min
P4	Ms. D	Female	21	3 times/days	+/- 3 min
P5	Ms. L	Female	32	2 times/days	+/- 5 min
P6	Ms. S	Female	36	+/- 3 times/days	+/- 5 min
P7	Ms. L	Female	25	+/- 3 times/days	+/- 10 min

Table 2. Characteristics of Triangulation

Code	Initials	Description
T1	Mrs. R	Mother Ny. S
T2	Mrs. M	Mother Ny. N
T3	Mr. S	Husband Ny. R
T4	Mrs. S	Mother Ny. D
T5	Mr. K	Husband Ny. L
T6	Mr T	Husband Ny. S
T7	Mrs. S	Mother Ny. L
T8	Mr. I	Anesthesiologist
T9	Mr. D	Anesthesiologist





In this study, 5 (five) themes were obtained related to the experience of patients with sectio caesarean section in controlling post operative nausea and vomiting (PONV). The five themes include: 1) Information Sources, 2) Lack of Knowledge, 3) Surgical Risks, 4) Complementary Therapies, 5) Support Systems.

Table 3. Theme 1

Code	Coding	Category	Theme
P1	Internet	Social Media and Society	Resources
P2	Internet and neighbors		
P3	Video hp		
P6	Friends, internet, and TV		
P7	Handphone		
P5	Hospital	expert	

Resources. On average, almost all participants at RSI Banjarnegara already understand the source of information on the Sectio Caesarea procedure, theoretically this is known from social media, the public, and experts. The following is the participant's statement:

"..... I found out on the internet. I actually don't know if I'm told either, the risk is that I know that I read it on the internet, that's how it (expression of thinking)" (P1, Mrs. S, 31th)

"I know the fault from the internet, I also heard from neighbors, " (P2, Mrs. N, 35th)

"If you know, you don't understand too much, because it's the first time you're born normally, sometimes you see a cesarean video, " (P3, Mrs. R, 37th)

"Yes, a cesarean section is a dissected delivery, right, you know it from friends, the internet continues from TV, that's how it (expression tries to explain his knowledge)" (P6, Mrs. S, 36th)

"..... know from technology maybe cellphones" (P7, Mrs. L, 25th)

"....., I knew it from the hospital, I didn't know before because I had just had a cesarean section." (P5, Mrs. L, 32th)

Table 4. Theme 2

Code	Coding	Category	Theme
P4	Do Not Know	Curiosities	Lack of Knowledge

Lack of knowledge, with the results of the participants not knowing about the Sectio Caesarea operation either from social media or from the hospital. According to the participant's statement with the code P4. The following is the participant's statement:

"I don't know yet, because this is my first child so I don't know at all, so I don't know anything.... (confused expression)" (P4, NY. D, 21th)

Table 5. Theme 3

Code	Coding	Category	Theme
P1	Drug Effect Information	Risk	
P2			
P3			
P4			
P5			
P6	Drug Effect Perception and Information	Side effects	Risks of surgery
P7			
P1			
P2			
P3			
P4	Duration and Frequency of Nausea, Vomiting, and Dizziness	Post Operative Impact	
P5			
P6			
P7			
P1			
P1	Abdominal pain, nausea and vomiting	Post Operative Impact	
P2	Anxiety, dizziness, and nausea		
P3	Anxious and Dizziness		
P4	Crowded		
P5	Split stomach, nausea and vomiting		
P6	Wounds, Nausea and Vomiting		
P7	Vomiting		

Risks of Surgery. Participants in the study showed a lack of prior understanding of the risks associated with medical procedures. However, after an explanation from health workers, they began to understand the risks. Participant statements include information regarding drug effects, perceptions, and drug information. Here are some of the participant statements representing the risk category:

"Because I know the effects of the drugs, I was told that the drugs are a little nauseous, I only know that it means the effects of the drugs (laugh a little)" (P1, Mrs. S, 31th)

"I don't know but I have been told that there will be such a risk, but the doctor said, I have been given medicine so that I am not too nauseous, but I feel a little nauseous, a bit claustrophobic in the operating room... (explaining and body language)" (P2, Mrs. N, 35th)

"...., the nurse kept saying yes, it was a little nausea, but I was given the medicine to my mother, that's it" (P7, Mrs. L, 25th)

Each participant in the study felt the side effects of the drugs they were taking, with varying variations. The side effects experienced include nausea and vomiting, with varying durations and frequencies. Here are the representatives of the statement:

"I don't know why that's it, maba, but I did feel a little nauseous yesterday, it didn't take about 5 minutes.... after surgery for his nausea 2-3 times but not until he vomited" (P1, Mrs. S, 31th)

"It's not too long, there are about 5 minutes like that, but it's not like a break 2-3 times...." (P2, Mrs. N, 35th)

"It's not too long, there are about 5 minutes like that, but it's not constantly like a pause, it's more like that... 2-3 times, forget that's the point... (trying to remember)" (P6, Mrs. S, 36th)

"It's not too long, there are about 10 minutes like that, but it's not like a long pause, it's more like that, it's more like that, 2-3 times, .." (P7, Mrs. L, 25th)





The post-operative impact on cesarean section patients varies such as nausea, vomiting, dizziness, pain, tightness and anxiety about the surgical wound. In accordance with the participant's statement. Here is the statement:

"..... The risk is yes, pain if you run out of medicine, nausea and nausea to vomit too" (P1, Mrs. S, 31th)
"..... The cesarean section was split in his abdomen, including being afraid because he heard that... dizziness and nausea" (P2, Mrs. N, 35th)
"..... It's terrible because you see it in the video, so it's scary... I continue to feel a bit dizzy and happy" (P3, Mrs. R, 37th)
"..... I was also given oxygen as well....." (P4, NY. D, 21 yrs)
"The cesarean section is split because the abdomen is later will be nauseous" (P5, Mrs. L, 32nd)
"..... I just understand a little because the wound must be painful..... if later it is nausea and vomiting too...." (P6, Mrs. S, 36th)
"..... I just understand a little because the wound must be painful.... Because the baby was too big, so he was told to have a cesarean section, it was also located in a Susan.... The risk is that later it will be nausea and vomiting...." (P7, Mrs. L, 25th)

Triangulated participants reported nausea, vomiting, pain, dizziness and tightness as varied postoperative effects. The following are excerpts from the interviews:

"... factors effecting postoperative nausea and vomiting include vasodilation, duration of surgery, and fasting time. Medical records and patient assessment are important, as well as premedication with ondansetron to prevent nausea and vomiting, and vasodrine to manage the drop blood pressure..." (T8, Mr. I, 26th)

Table 6. Theme 4

Code	Coding	Category	Theme
P1	Take a deep breath	Non-Invasive Procedures	Complementary
P2			
P4			
P5			
P3	Take a deep breath and sleep	Non-Pharmacological Therapy	
P6	Aromatherapy and warm drinks		
P7	Aromatherapy		

Complementary. this study to overcome nausea and vomiting, with varying experiences. Some participants who underwent invasive procedures were educated by medical personnel to perform deep breath relaxation techniques to control nausea and vomiting independently. Other participants applied non-pharmacological therapies, such as using essential oils of eucalyptus aroma, citrus, and drinking warm water to control these complaints. In invasive procedures are taught deep breath relaxation. Here is the statement:

"My experience, I do deep breaths taught by nurses who are told to take deep breaths, ... I feel that this way is easy to do, somewhat less nausea.... (try with hand movements take a deep breath)" (P1, Mrs. S, 31th)

".... with all I know I can take a deep breath just by doing that if for me" (P2, Mrs., N., 35th)
"There was a bad feeling, nausea was so good, until I vomited, so I was taught to take a deep breath like that, and then I did it by lying down" (P3, Mrs. R, 37th)
"....., when I was nauseous, I was told to take a deep breath so I could still control it" (P4, NY. D, 21th)
"..... I can control it by taking a deep breath" (P7, Mrs. L, 25th)

The statement was supported by triangulated participants who stated that participants controlled nausea and vomiting by doing deep breath relaxation. The following statement:

"More often we encourage patients to do deep breathing, ..." (T8, Mr. I, 26th)
"... We can do some steps doing therapeutic or maybe deep breathing ... " (T9, Mr. D, 38th)

Non-pharmacological therapy in controlling nausea and vomiting after SC surgery, some participants used aromatherapy from eucalyptus oil, citrus aroma and drinking warm water. Here is the statement:

"The feeling is normal, actually, because I feel nauseous, I just vomit, I can still control it with eucalyptus oil, drink warm tea." (P5, Mrs. L, 32th)
"....., the important thing is that there is an orange scent, so I started from being pregnant, until now if I am nauseous and vomiting, I must smell the smell of oranges, it is very important, it can be controlled So I can still neutralize so the important thing is that there are oranges....." (P6, Mrs. S, 36th)

Table 7. Theme 5

Code	Coding	Category	Theme
P1	The role and support of husbands, mothers, and families	The role and support of medical personnel and their families	Support System
P2			
P3			
P4			
P5			
P6	Nurse, self-control, and family roles		
P7			

Support System is very important for patients after section caesarean section. Support from the patient's husband, family, and people around him plays a key role in helping the recovery process. The presence and attention of the closest people provide comfort, enthusiasm, and a sense of security for patients during the recovery period. The researcher was inspired by the participants' statements to identify themes and categories related to the role and support of medical personnel and families as an influential and important support system for participants. The following is a statement from the representative of the participants:

"It must be my husband, because he is always there..... My mother also plays a role in helping me here..... It is very important to have the support of your husband or family ... Asking me what I want if I am nauseous he immediately feels worried, and knows my situation, so if I want to need it, it must be very helpful, that's it, that's more than enough" (P1, Mrs. S, 31th)





"When I was in the room because my husband was not allowed to enter, I controlled the mba myself, when I was discharged, I started to stop being nauseous, the nausea was resolved when I was still in the room after the surgery, so I controlled it myself.... If support is very important, MBA, then you want to ask for help from your husband or family who are here.... Because I was really nauseous inside, so the nurse there helped, who gave me how to breathe in my mother, I was also given nausea medicine like that, MBA, but if you have something in this room, they must be very helpful like that, MBA, that's enough (hehehe laughs a little)". (P7, Mrs. L, 25th)

Similar statements were also made by triangulation participants. The following is his statement.

"Because she had surgery after that, I saw that she was nauseous so I was worried about her, but when she wasn't nauseous, I saw that her face was redder and not as pale anymore, I felt really relieved, I was grateful for that (Stokes chest)" (T1, Mrs. R)

"Yes, the most important thing is to ask whether the nausea is too much or not, then see what vomiting nausea due to if there is a lot mucus, yes, we help prepare it to clean..." (T7, Mrs. S)

Discussion

The study found that patients obtained information about sectio caesarea (SC) surgery from various sources, such as social media, the public, and trusted experts (Sanders and Crozier, 2018). These results show the importance of a variety of information sources that patients use in their health-related decision-making process. Understanding how informal sources of information affect women's preparation for childbirth is essential (Sanders and Crozier, 2018). In the modern era, many people seek health information through the internet, which allows them to share their experiences with others they trust (Rezaee et al., 2022). Pregnant women generally seek information from a variety of sources, including family, friends, formal education in antenatal care, and discussions with health professionals and midwives (Grimes, Forster and Newton, 2014).

Researchers assume that diverse sources of information are essential before making decisions regarding medical procedures, particularly SC surgery. This makes patients better understand the procedure to be carried out and are better prepared to face it. In addition to the internet, patients can also obtain information about SC surgery from related books, according to previous studies (Kamali et al., 2018). In general, professional sources of information (e.g. healthcare) are considered more trustworthy and useful than digital sources, although digital sources are also considered useful (Vogels-Broeke et al., 2022). This study reveals that many pregnant women have limited knowledge regarding cesarean

section (SC). The results showed that most respondents did not have adequate information about this procedure. Lack of knowledge is an important factor that affects the readiness of pregnant women to face SC surgery. These findings are in line with previous research conducted by Zadeh, Hedayati, and Ghazanfari (2016), which found that only about 30% of pregnant women have knowledge of SC surgery. This lack of understanding can lead to anxiety, uncertainty, and inappropriate decisions regarding the choice of delivery method (Prague, 2017). Pregnant women also stated that they received little information during gynecological examinations (Esposito et al., 2015).

The results of the interviews in this study were related to SC's operational knowledge based on the characteristics of the participants, such as SC's first experience, educational status, and occupation. It was found that most of the participants underwent SC surgery for the first time, had a high school education background, and most worked as housewives. These results are in line with research conducted by (M. Nabil Abaushadya et al., 2024). In addition, this study also explores the influence of age on women's knowledge and perception of SC surgery. It was found that older women tended to have more positive awareness and attitudes and better knowledge about SC surgery, compared to younger women (Prague, 2017). Overall, this study confirms that pregnant women's knowledge of SC surgery is still limited and factors such as experience, education, occupation, and age affect the level of knowledge of each patient.

The study revealed participants' experiences after sectio caesarean section (SC), where they experienced various risks and side effects such as nausea, vomiting, abdominal pain, shortness of breath, dizziness, and anxiety. Risks of SC surgery include complications from the effects of anesthesia, surgical trauma, and emotional reactions to the procedure, which can be affected by the participant's age, health status, and medical history (Al-kareem et al., 2021). The high incidence of Post Operative Nausea and Vomiting (PONV) in SC patients shows a significant negative impact on patients and the healthcare system (Hailu, Mekonen and Shiferaw, 2022). The complex mechanism of PONV occurrence involves various reflex pathways and receptors in the brain (Denholm and Gallagher, 2024).

In addition, postoperative pain and other side effects such as chills, anxiety, and shortness of breath were also found in the participants. Persistent abdominal pain after SC is a common complication that requires proper





management (Liu et al., 2020). Postoperative anxiety and shortness of breath are often exacerbated by the physiological and psychological effects of the procedure (Denholm and Gallagher, 2024); Albzea et al. 2023; Fitzgerald et al. 2020). Shivering during and after regional anesthesia occurs as a result of thermoregulatory responses to hypothermia and other thermoregulatory changes (Reddy and Chiruvella, 2011). Proper management and monitoring are necessary to prevent serious complications such as more bleeding than normal childbirth (Seligman. K 2020; Kayembe and Kapuku 2024).

The study found that participants had different experiences in controlling nausea and vomiting after cesarean section. Effective complementary therapies include deep breath relaxation techniques and aromatherapy. The deep breath relaxation technique, which involves breathing from the lower abdomen, is taught by nurses and has been shown to be effective in reducing nausea and vomiting (Mustafa Abdallah Elpeshni et al., 2023). Aromatherapy using essential oils such as eucalyptus and citrus has also been shown to be effective. Eucalyptus oil contains the compound eucalyptol which has anti-inflammatory and muscle relaxant properties, which helps relieve nausea (HULYA ELMALI SIMSEK, 2022). Meanwhile, citrus oil provides a calming effect and helps improve the quality of life of patients after surgery (Yağmur Şancı, PhD et al. 2023; Weixia Zhong, et al., 2021). Overall, complementary therapies such as deep breath relaxation and aromatherapy can be an effective first step to addressing nausea and vomiting in post-cesarean section patients. If symptoms cannot be controlled properly, pharmacological therapy with antiemetic drugs may be necessary. Aromatherapy has been shown to help control nausea symptoms through the olfactory system affecting the limbic system and hypothalamus in the brain, which plays a role in controlling emotions and nausea (Whitley, 2019).

Based on a comprehensive analysis, this study found that the support system (support system) plays an important role for pregnant women in dealing with nausea and vomiting during pregnancy (Ababneh et al., 2024). Each participant had a different support system, such as support from husband, mother, family, children, caregivers, and themselves (Mabetha et al., 2022). The form of support provided can be in the form of feelings of worry, sympathy, care, readiness, and direct implementation when pregnant women are or will experience nausea and vomiting (Mabetha, et al. 2022). Furthermore, research shows that the most

important sources of support for pregnant women are people from nearby social networks, such as couples, family, friends, midwives, and doctors (Skurzak et al., 2015). Support from the partner fully mediates the relationship between the pregnant woman's concerns and her psychological well-being, especially in the dimensions of environmental mastery and life purpose (Ilska and Przybyła-Basista, 2017). In the context of this study, support from the husband provides a very important role for pregnant women in going through the incidence of nausea and vomiting, while family support, especially the mother of the pregnant woman, is also very important when alternating with the husband (Ababneh et al., 2024).

Conclusion

In this study, the experiences of patients with cesarean section in controlling post-operative nausea and vomiting (PONV) at Banjarnegara Islamic Hospital were discussed in 5 (five) main themes based on the results of interviews, including: information sources such as social media, the public, and experts who help find out information related to SC surgery; lack of knowledge such as ignorance of information about SC operations; surgical risks such as drug effects and drug side effects that have a duration and frequency of effects, so that patients feel uncomfortable; post-operative impacts in the form of nausea, vomiting, wound pain, dizziness, and tightness; as well as complementary therapies such as deep breath relaxation, aromatherapy (eucalyptus oil and citrus aroma), and drinking warm water, with each participant having different experiences in controlling nausea and vomiting, and the support of medical personnel and family is very important for patients.

Limitations

In the interview, this study faced limitations because most of the participants were still weak so it was difficult to give in-depth answers. Many participants looked confused about conveying their opinions and experiences. Although researchers tried to repeat the question, they could only answer it casually. Researchers were unable to force participants to give more detailed answers because they considered their frail health.

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Author's contributions





Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data: IY, SS, HSM, AM, TH; Involved in drafting the manuscript or revising it critically for important intellectual content: IY, SS, HSM; Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content: IY, SS, HSM, AM, TH; Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: IY, SS, AM. All authors read and approved the final manuscript.

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Availability of data and materials

The data that support the findings of this study are available from the corresponding author, [IY], upon reasonable request

Declarations

Ethics approval and consent to participate
Not applicable

Competing Interest

The authors declare no competing interest

References

- Ababneh, A.M.T. et al. (2024) 'The Lived Experience of Family Support Among Women During and After Childbirth in Jordan: A Phenomenological Study', SAGE Open Nursing, 10. Available at: <https://doi.org/10.1177/23779608241240137>.
- Al-kareem, M.A. et al. (2021) 'Indications and Common Complications of Caesarean Section : An Overview Study', Eurasian Medical Research Periodical, 3(January), pp. 40–44.
- Arisdiani, T. and Asyofi, A. (2020) 'Effect of Non-pharmacological Nursing Intervention of Ginger Aromatherapy on Nausea and Vomiting in Postoperative Patients', Journal of Chemical Information and Modeling, 53(9), pp. 1689–1699.
- Cunningham, F.G. et al. (2022) Cunningham F. Obesity. In: Fried A, Editor. Williams obstetrics, 24th ed. New York: McGraw-

Hill Education; 2014:961-70, Williams Obstetrics, 26e. Available at: <http://accessmedicine.mhmedical.com/content.aspx?aid=1190762794>.

- Denholm, L. and Gallagher, G. (2024) 'Physiology and pharmacology of nausea and vomiting', Anaesthesia & Intensive Care Medicine [Preprint]. Available at: <https://doi.org/10.1016/J.MPAIC.2024.06.019>.
- Esposito, G. et al. (2015) 'Women's knowledge, attitudes and behavior about maternal risk factors in pregnancy', PLoS ONE, 10(12), pp. 1–12. Available at: <https://doi.org/10.1371/journal.pone.0145873>.
- Fristika, Y.O. (2023) 'Analysis of factors related to the act of giving birth of Sectio Caesarea (SC) at Bhayangkara Hospital (Moh. Hasan) Palembang in 2022', Journal of Public Health Innovation, 3(02), pp. 107–114. Available at: <https://doi.org/10.34305/jphi.v3i02.732>.
- Grimes, H.A., Forster, D.A. and Newton, M.S. (2014) 'Sources of information used by women during pregnancy to meet their information needs', Midwifery, 30(1), pp. e26–e33. Available at: <https://doi.org/10.1016/j.midw.2013.10.007>.
- Hailu, S., Mekonen, S. and Shiferaw, A. (2022) 'Prevention and management of postoperative nausea and vomiting after cesarean section: A systematic literature review', Annals of Medicine and Surgery, 75. Available at: <https://doi.org/10.1016/j.amsu.2022.103433>.
- Hülya Elmali Şimşek, Ş.E.A. (2022) 'The effect of aromatherapy and Su Jok interventions on post-cesarean pain', Complementary Therapies in Clinical Practice, 49. Available at: <https://doi.org/10.1642>.
- Iliska, M. and Przybyla-Basista, H. (2017) 'Partner support as a mediator of the relationship between prenatal concerns and psychological well-being in pregnant women', Health Psychology Report, 5(4), pp. 285–295. Available at: <https://doi.org/10.5114/hpr.2017.68235>.
- Irawan, R., Sukmaningtyas, W. and Safitri, M. (2022) 'Overview of the Incidence of





- Post Operative Nausea and Vomiting (PONV) After the Administration of Ondansetron 8mg in Postoperative Eye Patients with General Anesthesia at Cicendo Eye Hospital Bandung', pp. 159–164.
- Kamali, S. et al. (2018) 'Health information needs of pregnant women: information sources, motives and barriers', *Health Information and Libraries Journal*, 35(1), pp. 24–37. Available at: <https://doi.org/10.1111/hir.12200>.
- Kayembe, A.T. and Kapuku, S.M. (2024) 'Postoperative maternal complications of caesarean section: a cross-sectional study at the Provincial General Hospital of Kananga in the Democratic Republic of Congo', *Pan African Medical Journal*, 47. Available at: <https://doi.org/10.11604/pamj.2024.47.23.40458>.
- Ministry of Health of the Republic of Indonesia (2018) 'Riskesdas Report 2018 Ministry of Health of the Republic of Indonesia', *National Riskesdas Report 2018*, pp. 154–165. Available at: [http://www.yankes.kemkes.go.id/asset/s/downloads/PMK No. 57 of 2013 concerning PTRM.pdf](http://www.yankes.kemkes.go.id/asset/s/downloads/PMK_No_57_of_2013_concerning_PTRM.pdf).
- Khasanah, R.N., Yuda, H.T. and Nugroho, F.A. (2021) 'Effect of Peppermint Inhalation as a Non-Pharmacological Therapy on the Reduction of Post-Spinal Anesthesia PONV at PKU Muhammadiyah Gombong Hospital', *The 13th University Research Colloquium 2021*, pp. 59–65. Available at: <http://repository.urecol.org/index.php/proceeding/article/view/1252/1219>.
- Liu, T.T. et al. (2020) 'Chronic pain after caesarean delivery: An Australian cohort', *Anaesthesia and Intensive Care*, 41(4), pp. 496–500. Available at: <https://doi.org/10.1177/0310057x1304100410>.
- M. Nabil Aboushady, R. et al. (2024) 'Knowledge and Beliefs of Pregnant Women Towards the effect of Cesarean Section Delivery on Women's Health', *Egyptian Journal of Health Care*, 15(2), pp. 311–324. Available at: <https://doi.org/10.21608/ejhc.2024.353612>.
- Mabetha, K. et al. (2022) 'Social Support during pregnancy: A phenomenological exploration of young women's experiences of support networks on pregnancy care and wellbeing in Soweto, South Africa', *medRxiv*, 2(Cd), p. 2022.04.03.22273162.
- Moustafa Abdallah Elpasiony, N. et al. (2023) 'Postoperative Nausea, Vomiting, and Retching in Orthopedic Patients: The Influence of Deep Breathing Exercise', *Egyptian Journal of Health Care*, 14(1), pp. 144–154. Available at: <https://doi.org/10.21608/ejhc.2023.279724>.
- Muntasir, E., Handayani, R.N. and Wahyuningrum, E. (2023) 'Analysis of Factors Affecting the Incidence of Postoperative Nausea and Vomiting (Ponv) in Sectio Caesarean Bypass Patients with Spinal Anesthesia at Tgk Chik Ditiro Sigli Hospital, Pidie Regency, Aceh Province', *Journal of Health*, 12(00007), pp. 1–19. Available at: <https://doi.org/10.35960/vm.v16i2.920>.
- Naraya, I.G.A. (2022) 'Anseitas in Preoperative Sectio Caesarean Patients', pp. 1–7.
- Nurjanah, Siti Nunung (2020) *Postpartum Midwifery Care, Complemented by Postpartum Obstetric Care, Post-Sectio Caesarean Midwifery Care*. Available at: http://opac.umtas.ac.id/index.php?p=s-how_detail&id=8560.
- Nurprayogi, H.R. and Chasanah, N. (2023) 'The Relationship between Patients' Anxiety Levels and the Incidence of Postoperative Nausea and Vomiting', *Journal of Nursing and Midwifery*, 15(1), pp. 15–28.
- Oroh, A., Yudono, D.T. and Siwi, A.S. (2022) 'Effect of Leg Elevation on Blood Pressure in Sectio Caesarean Patients with Spinal Anesthesia in the Operating Room Installation of Tk.II Robert Wolter Mongisidi Hospital Manado', *Journal of Research Innovation*, Vol.3 No.7(7), p. 6858.
- Prah, J.K. (2017) 'Knowledge, Attitude and Perceptions of Pregnant Women towards Caesarean Section among Antenatal Clinic Attendants in Cape Coast, Ghana', *Texila International Journal of Public Health*, 5(1), pp. 58–





65. Available at:
<https://doi.org/10.21522/tijph.2013.05.01.art007>.
- Reddy, V. and Chiruvella, S. (2011) 'Clonidine versus tramadol for post spinal shivering during caesarean section: A randomized double blind clinical study', *Journal of Obstetric Anaesthesia and Critical Care*, 1(1), p. 26. Available at: <https://doi.org/10.4103/2249-4472.84252>.
- Rezaee, R. et al. (2022) 'Healthy lifestyle during pregnancy: Uncovering the role of online health information seeking experience', *PLoS ONE*, 17(8 August), pp. 1–13. Available at: <https://doi.org/10.1371/journal.pone.0271989>.
- Sanders, R.A. and Crozier, K. (2018) 'How do informal information sources influence women's decision-making for birth? A meta-synthesis of qualitative studies', *BMC Pregnancy and Childbirth*, 18(1), pp. 1–26. Available at: <https://doi.org/10.1186/s12884-017-1648-2>.
- Skurzak, A. et al. (2015) 'Social support for pregnant women', *Polish Journal of Public Health*, 125(3), pp. 169–172. Available at: <https://doi.org/10.1515/pjph-2015-0048>.
- Triana, A. (2021) 'Is There an Effect of Finger Grip Relaxation Technique on Anxiety in Preoperative Sectio Caesarean Surgery Patients with Spinal Anesthesia Technique', pp. 1–9.
- Virgiani, B.N. (2020) 'Overview of Distraction, Relaxation and Mobilization Therapy in Overcoming Post Operative Nausea and Vomiting (PONV) in Post Operative Patients at Indramayu Hospital', 11(02), pp. 17–23. Available at: <https://doi.org/10.38040/js.v11i02.34>.
- Vogels-Broeke, M. et al. (2022) 'Sources of information used by women during pregnancy and the perceived quality', *BMC Pregnancy and Childbirth*, 22(1), pp. 1–13. Available at: <https://doi.org/10.1186/s12884-022-04422-7>.
- Whitley, M. (2019) 'The Use of Aromatherapy for the Treatment of Post-Operative Nausea Vomiting'.
- WHO (2021) *Monitoring Health For The SDGs*, World Health Organization, World Health Organization. Switzerland. Available at: <https://www.who.int/news/item/16-06-2021-caesarean-section-rates-continue-to-rise-amid-growing-inequalities-in-access>.
- Yağmur Şancı, PhD, R. et al. (2023) 'Effect of peppermint-lemon aromatherapy on nausea-vomiting and quality of life in pediatric patients with leukemia: A randomized controlled trial', *Journal of Pediatric Nursing*, 72. Available at: <https://doi.org/https://doi.org/10.1016/j.pedn.2023.07.001>.

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