



OVERVIEW OF COMORBIDITIES IN MOTHERS DELIVERING BY CAESAREAN SECTION

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ABSTRACT

Caesarean section (CS) is an obstetric procedure that is increasingly common in Indonesia and is often influenced by the presence of comorbidities in pregnant women. Understanding the factors that cause CS based on the Five P concept (Power, Passage, Passenger, Position, and Psyche) is important for improving the quality of maternity nursing care. To determine the characteristics of comorbidities in mothers giving birth with indications for CS at Hidayah Boyolali General Hospital based on the Five P concept. This study used a quantitative descriptive design with a retrospective approach. A sample of 118 mothers who gave birth by CS was taken using total sampling from medical records for the period July 2024–September 2025. Data was collected by recording the reasons why patients underwent CS, which can be viewed in the Hospital Management System. Data were analysed descriptively and quantitatively to display the frequency distribution of each causative factor. The most common concomitant factor was Power (43.2%), followed by Passage (27.1%), Psyche (12.7%), Passenger (11.1%), and Position (5.9%). Most mothers were aged 21–30 years and had full-term pregnancies (37–40 weeks). The Power factor was the dominant cause of CS, highlighting the importance of strengthening contraction monitoring, physical readiness, and psychological support. The application of a holistic approach in maternity nursing is expected to reduce the rate of medically unindicated CS.

Keywords: five P factors; maternal comorbidity; maternity nursing; sectio caesarea

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INTRODUCTION

Every mother hopes that her delivery will go smoothly and that her baby will be born safely. However, not all deliveries can proceed normally due to certain conditions that require surgery to save the mother and foetus. Vaginal delivery is often considered risky, so many mothers choose caesarean section (CS) as a safer alternative. Caesarean section (CS) is an obstetric surgical procedure involving an incision in the abdomen and uterus to deliver the foetus, performed when vaginal delivery is not possible or poses a high risk to the mother and foetus (Clyne, 2020). This procedure has become an essential intervention in modern obstetrics, but its increase is often associated with comorbidities, which refer to chronic or acute medical conditions that accompany pregnancy and affect the delivery process (Bajpai, Popa, Verma, Dumanski, & Shah, 2023). These comorbidities, such as hypertension, gestational diabetes mellitus, obesity, anaemia, infections, and cardiovascular disorders, not only increase the indications for C-section but also have the potential to cause post-operative complications, thus requiring a comprehensive approach to maternity nursing (Hermawan et al., 2024)

Globally, the World Health Organisation (WHO) has set the standard for caesarean sections in many countries at around 10-15% per birth. Based on WHO research data in 2021, caesarean sections continue to increase globally, currently accounting for more than 1 in 5 (21%) of all deliveries (World Health Organization, 2021). In Indonesia, the trend of increasing C-sections is significant; the 2018 Basic Health Survey (Riskesdas) from the Ministry of Health of the Republic

of Indonesia reported a rate of 15.8%, which increased to 20-30% in advanced health facilities based on the 2021 Indonesian Health Survey (SKI) (Kemenkes, 2023). The prevalence of caesarean sections (CS) in Central Java is 17.1% based on data from the 2018 Basic Health Research (Riskesdas) (Rahmawati, 2024).

In the context of maternity nursing, which emphasises holistic, preventive, and evidence-based care, understanding this picture of comorbidities can be integrated with the Five P's concept in maternity nursing. The Five P's refer to Power (uterine contraction strength), Passageway (birth canal or pelvis), Passenger (the foetus as the passenger), Position (foetal position), and Psyche (the mother's psychological aspects), first proposed by Friedman (1955) as a model of labour dynamics and adapted in nursing practice for comprehensive assessment (ICM, 2024). Specifically, disturbances in Power, such as placental vasoconstriction due to hypertension that reduces uterine perfusion and risks causing foetal hypoxia, require nursing interventions in the form of monitoring uterine contractions through electronic partography and vital signs periodically to prevent primary labour failure and indications for emergency caesarean section (Swier, 2021). In the Passageway, maternal obesity can cause narrowing of the birth canal due to the accumulation of adipose tissue in the pelvis, which increases the risk of shoulder dystocia in the foetus; nurses respond with antenatal mobility education, body mass index (BMI) monitoring, and deep vein thrombosis (DVT) prevention through intermittent compression and early mobilisation, in accordance with obstetric nursing protocols (Rostianingsih, 2022). For passengers, gestational diabetes carries a risk of triggering foetal macrosomia (birth weight >4 kg), which can cause foetal trauma such as clavicle fractures during caesarean section extraction; nurses play a role in evidence-based nutritional consultations, serial ultrasonography for foetal weight estimation, and multidisciplinary collaboration with nutritionists and obstetricians to reduce the risk of perinatal asphyxia (ICM, 2024). Position disorders, such as breech or transverse presentation exacerbated by infection or uterine myoma, have the potential to inhibit foetal descent and increase cord compression. Finally, the Psyche aspect, which involves the mother's emotional response and adaptation to pregnancy stress, is often disrupted by chronic comorbidities that trigger anxiety, depression, or adjustment disorders, risking to affect postnatal maternal-foetal bonding (Sulastrri, Diktina, & Rahayu, 2019).

Previous research supports the relevance of this analysis. A study by Misrina (2024) at Avicena Hospital in Bireuen, Of the 329 caesarean section (CS) cases in January–April 2024, the most common cause was a history of previous CS (37.68%), followed by cephalopelvic disproportion/CPD (14.58%) and premature rupture of membranes (13.06%). Based on the 5P analysis, the Passenger factor included umbilical cord entanglement (5.1%), transverse lie (6.35%), and breech presentation (3.6%), indicating foetal positional abnormalities. Passage factors such as CPD and narrow pelvis (0.3%) became mechanical obstacles to the birth canal, while Power factors such as uterine dysfunction (0.3%) indicated weak contractions. In terms of Psyche, many mothers with a history of CS chose repeat surgery due to anxiety about normal delivery. Placental and maternal factors included pre-eclampsia (2.7%), placenta praevia (1.5%), asthma (0.9%), and non-communicable diseases (3.03%), which increased the risk of complications (Misrina & Lestari, 2024). Another study by Sugihartini et al (2025) states that 41 respondents (58.6%) had indications for CS, such as premature rupture of membranes, maternal hypertension, placenta praevia, placental abruption, foetal malposition, and pre-eclampsia (Sugihartini, Kulsum, & Kusumastuti, 2025).

Thus, the picture of comorbidities in mothers giving birth by CS at Hidayah Boyolali General Hospital not only reveals local epidemiological patterns but also highlights the crucial role of maternity nursing in integrating the Five P concept for complication prevention and quality of care improvement. This study is expected to contribute to more targeted intervention strategies, reduce maternal-foetal morbidity, and support the achievement of Sustainable Development Goals (SDGs) related to reproductive health in Indonesia. The objective of this study was to describe the types of comorbidities and factors causing CS based on the 5P concept in maternity nursing, which includes

Passenger, Passage, Power, Psyche, and Placenta.

METHOD

This study used a quantitative descriptive design with a retrospective approach, reviewing medical records of mothers who underwent caesarean section (CS) at Hidayah General Hospital in Boyolali. The population in this study consisted of all mothers who underwent CS at Hidayah General Hospital in Boyolali during the period July 2024 – September 2025, totalling 119 cases. The sampling technique used total sampling. The inclusion criteria included mothers with complete medical records that listed the main diagnosis and indications for CS. The exclusion criteria were incomplete medical records or those that did not list any accompanying diagnoses. The research instrument was a secondary data observation sheet, which was compiled based on the 5P categories.

The Five P factors that influence the labor process include the Passenger, which refers to fetal conditions such as fetal position, presentation, and overall well-being. The Passage involves factors related to the birth canal, including a narrow pelvis, cephalopelvic disproportion (CPD), or abnormalities of the reproductive structures. The Power factor concerns the strength and effectiveness of uterine contractions, such as uterine dysfunction or prolonged labor. The Psyche includes the mother's psychological state and obstetric history, including previous cesarean section and anxiety related to normal delivery. Lastly, the Placenta encompasses maternal conditions and comorbidities such as pre-eclampsia, asthma, diabetes, placenta praevia, and premature rupture of membranes, all of which can impact the safety and progress of labor.

Data collection techniques were carried out through medical record searches in the medical records room of Hidayah Boyolali General Hospital with official permission from the hospital. Data were recorded on observation sheets and grouped according to the 5P categories. Data analysis was performed using descriptive quantitative methods, namely calculating the frequency and percentage of each 5P category and the types of comorbidities accompanying mothers giving birth with indications for CS. The results were presented in the form of distribution tables and narratives to illustrate the proportion of causative factors and the health conditions of mothers giving birth.

RESULT

Respondent Characteristics

Tabel 1.
Respondent Characteristics

Childbirth Factors	f	%
Age		
< 21 years	8	6.8
21 – 30 years	67	56.8
> 30 years	43	36.4
Gestational age		
< 37 weeks	16	13.6
37 – 40 weeks	96	81.3
> 40 weeks	6	5.1
Number of children		
First	40	33.9
Second	44	37.3
Third	23	21.2
Fourth	6	5.1
Fifth	3	2.5

The respondent characteristics show that most participants were between 21–30 years old (56.8%), followed by those over 30 years (36.4%). The majority had a gestational age of 37–40 weeks (81.3%), indicating that most were at term. Regarding parity, the largest group consisted of mothers with two children (37.3%), followed by first-time mothers (33.9%). Smaller proportions had three

or more children. Overall, the data suggest that most respondents were women of reproductive age with term pregnancies and low to moderate parity.

Comorbidities in pregnant women with Caesarean section based on the factors of Power, Passage, Passenger, Position, and Psyche

Classification of comorbidities in pregnant women with Caesarean section based on five factors affecting childbirth, namely Power (strength), Passage (birth canal), Passenger (foetus), Position (mother's position), and Psyche (mother's psychological state).

Tabel 2.

Classification of comorbidities in pregnant women with Caesarean section based on the five factors affecting childbirth

Childbirth Factor	f	%
Power	51	43.2
Passage	32	27.1
Passenger	13	11.1
Position	7	5.9
Psyche	15	12.7

Table 2, The classification of comorbidities among pregnant women undergoing Caesarean section based on the Five P childbirth factors shows that Power factors—such as ineffective uterine contractions—were the most common, accounting for 43.2% of cases. This was followed by Passage factors (27.1%), including issues with the birth canal. Psyche factors contributed to 12.7%, while Passenger factors, related to fetal conditions, accounted for 11.1%. Position factors were the least common at 5.9%. Overall, Power and Passage factors represented the majority of comorbidities influencing the decision for Caesarean section.

DISCUSSION

Respondent Characteristics

Childbirth is a complex physiological process involving various physical, psychological, and social factors that influence each other (World Health Organization, 2022). In the context of maternity nursing, the success of the childbirth process is not only determined by the mother's ability to give birth, but also by the presence of medical conditions that can directly or indirectly affect the course of childbirth (Sari & Ratnasari, 2021). One of the most common obstetric interventions performed on mothers with complications is caesarean section (CS). According to the World Health Organization (World Health Organization, 2021), the rate of caesarean section births continues to increase globally, with a prevalence of around 21% of all births, and is estimated to increase to 29% by 2030. In Indonesia alone, the prevalence of SC deliveries reaches approximately 17.6%, with considerable variation between regions (Kemenkes, 2023)

The mother's age is one of the factors that greatly influences the success of childbirth and is often the basis for clinical considerations in determining the indications for caesarean section. The ideal reproductive age for pregnancy is between 20 and 35 years, because in this age range the reproductive organs are mature, the pelvic capacity is optimal, and the risk of obstetric complications is relatively low (Purborini & Rumaropen, 2023). However, the results of this study indicate that caesarean sections are still frequently performed in the ideal age group, suggesting that factors complicating childbirth are not solely determined by biological age but also by underlying medical or obstetric conditions, such as failed induction, pre-eclampsia, or cephalopelvic disproportion (CPD) (Karla & Wisnuwardani, 2025).

Several previous studies reinforce this finding at RSI NU Demak, showing that 60% of mothers who underwent caesarean sections were aged 20–35 years (Sugihartini et al., 2025). Similarly, a study by Norbaiti et al. (2024) mentioned that 211 respondents were aged 20–35 years (59.9%). This is because the body of a mother who is too young to be pregnant is not ready for pregnancy,

childbirth, postpartum, and baby care. Mothers over 35 years of age are also at risk of experiencing problems during pregnancy, such as birth defects and complications (Norbaiti et al., 2024).

In terms of gestational age, this study shows that the majority of mothers who underwent caesarean section were at 37–40 weeks of gestation (81.3%), while 13.6% were <37 weeks (preterm) and 5.1% were >40 weeks (postterm). Full-term pregnancy should be the ideal period for spontaneous delivery, but in reality, many surgical procedures are performed during this phase. This may be due to late pregnancy complications such as premature rupture of membranes for more than 24 hours, failure to progress in labour, or pregnancy-induced hypertension, which are more common towards the end of pregnancy (Misrina & Lestari, 2024). At Banyuwangi District Hospital, 1,280 individuals (62.2%) underwent CS at term, with the most common indications being failed induction and foetal distress (Aningsih & Amalia, 2025). These findings are consistent with the results of a study at Hidayah Boyolali General Hospital, which showed that the timing of a C-section is not solely determined by foetal immaturity (as in preterm cases), but also by the failure of the physiological labour process during full-term pregnancy.

Meanwhile, CS in preterm pregnancies (13.6%) is usually related to efforts to save the mother and foetus due to severe complications such as severe pre-eclampsia, placental abruption, or intrauterine growth restriction (IUGR). Conversely, in post-term cases (5.1%), the increased risk of intrauterine foetal death and decreased placental function may prompt the decision to perform a C-section earlier (Graham, Stephens, & Heazell, 2021). In the context of nursing care, this highlights the importance of early detection of changes in foetal status and maternal condition in the final trimester in order to prevent higher-risk emergency surgery.

The third influential factor is parity, which is the number of live births the mother has experienced. The results of the study show that mothers with a second child are the largest group undergoing caesarean section (37.3%), followed by primiparous mothers (33.9%), and multiparous mothers with three or more children (28.8% in total). Parity is closely related to the physiological readiness of the uterus and the response of uterine contractions to the delivery process (Hermawan et al., 2024). Primiparous mothers have twice the risk of prolonged labour or failure to progress compared to multiparous mothers, because cervical elasticity and uterine contraction coordination are not yet optimal (Firdhauzy, Sulistyowati, Khasanah, & Ginarsih, 2024). This explains the high rate of C-sections in the first and second child mother groups in this study.

The study (Norbaiti et al., 2024) also reported that among 1,352 mothers who gave birth, 52.8% or 186 mothers with caesarean section cases were multiparous women (first and second child), with the most common indications being failed induction and cephalopelvic disproportion. Meanwhile, in multiparous women (≥ 3 children), although the risk of CS decreases, there is an increase in other complications such as placenta praevia and uterine atony, which can also be indications for surgical intervention (Patterson, Byun, & Hines, 2024). Therefore, parity is an important indicator in determining obstetric risk, both for the likelihood of successful vaginal delivery and for the potential complications in mothers with a history of previous CS.

Overall, the results of this study confirm that maternal age, gestational age, and parity are the main determinants in clinical decision-making for caesarean section. Although most respondents were in the ideal age and gestational age groups, obstetric complications remained the dominant reason for performing CS. For maternity nursing practice, this is an important basis for improving structured antenatal monitoring, reproductive health education, and psychological support at every stage of pregnancy so that the risk of complications and surgical intervention can be minimised.

Comorbidities in pregnant women with caesarean section based on the Power, Passage, Passenger, Position, and Psyche factors

Discussion Physiological childbirth is influenced by five main components known as the Five Ps: Power (strength), Passenger (foetus), Passage (birth canal), Position (mother's position), and Psyche (mother's psychological state) (World Health Organization, 2022). An imbalance or disruption in any of these factors can lead to labour complications, resulting in the decision to perform a caesarean section. Based on the results of a study at Hidayah General Hospital in Boyolali, the most common cause was Power (43.2%), followed by Passage (27.1%), Psyche (12.7%), Passenger (11.1%), and Position (5.9%).

The power factor was the dominant cause of caesarean section in this study, accounting for 51 cases (43.2%). Power includes the strength of uterine contractions and the mother's ability to push effectively during labour. Impaired power can take the form of uterine inertia, maternal fatigue, or failed induction of labour, which causes labour to stall (Swier, 2021). Inadequate uterine contractions are the primary cause of dystocia and significantly contribute to the high rate of caesarean sections (Gynecologists, 2024). This aligns with the study by Misrina and Lestari (2024) at Avicenna Bireuen Hospital, which found that 37 caesarean sections were performed due to premature rupture of membranes and failed induction. Other contributing factors such as anaemia and hypertension can also worsen uterine contractions due to reduced oxygen supply to the uterine muscles, causing the mother to tire quickly (Amiroh, Lubis, & Dhilon, 2023). From a maternity nursing perspective, nurses play a crucial role in helping maintain contraction strength through monitoring vital signs, providing emotional support, and educating on breathing techniques and effective positions during labour (Bajpai et al., 2023). Early detection of signs of fatigue, dehydration, or ineffective contractions can prevent further complications and reduce the need for surgery (Gynecologists, 2024).

Passage factors were found in 32 cases (27.1%) and were associated with abnormalities or obstructions in the birth canal or intrauterine environment. Conditions such as placenta praevia, placental calcification, high myopia (as a contraindication to pushing), or cephalopelvic disproportion (CPD) fall into this category because they impede the progress of labour (Azzahra et al., 2023). According to the WHO (2022), approximately 25–30% of global SC indications are caused by passage disorders, whether due to pelvic abnormalities, abnormal placental position, or other mechanical factors (World Health Organization, 2022). Research by Syahroni et al. (2024) at Sundari General Hospital in 2024 also reported that placenta praevia is associated with indications for caesarean section with a significance value of 0.001 (Damanik & Zuiatna, 2024). From a nursing perspective, identification of passage factors is carried out during the antenatal period through pelvic examinations (pelvimetry), monitoring of placental position using ultrasound, and evaluation of foetal growth. Maternity nurses play a role in providing education about danger signs such as antepartum haemorrhage and preparing mothers physically and psychologically for surgery when the medical indications are clear (Dutta, 2021).

Passenger factors include foetal conditions, such as size, position, presentation, and well-being during labour. In this study, passenger factors contributed to 13 cases (11.1%) of all caesarean section procedures. Conditions such as cephalopelvic disproportion (CPD), foetal malposition (breech or transverse), and oligohydramnios are included in this group. Research by Ambarwati and Nugroho (2020) shows that 15% of C-sections were caused by foetal malposition and 10% by CPD. CPD occurs when the size of the foetal head is not proportional to the capacity of the mother's pelvis, thereby hindering the descent of the foetal head despite strong uterine contractions (Nicholson & Kellar, 2020). Additionally, oligohydramnios (low amniotic fluid) can cause umbilical cord compression and foetal distress, which are also indications for immediate surgical intervention (Aningsih & Amalia, 2025). The role of maternity nursing in passenger factors is crucial during the antenatal and intranatal assessment stages, particularly through monitoring the

foetal heart rate, foetal position, and evaluating foetal well-being using the non-stress test (NST) or ultrasound. With early detection and continuous education, complications requiring a caesarean section can be minimised (Gynecologists, 2024).

The position factor in this study was the least common cause of caesarean section, accounting for 7 cases (5.9%). Although the number is relatively small compared to other factors, the mother's position during labour plays an important role in the physiological process of labour. The correct position can influence the progress of labor by increasing the efficiency of uterine contractions, facilitating the descent of the lowest part of the fetus, and improving uteroplacental blood flow, which affects fetal well-being (Gynecologists, 2024). Conversely, an inappropriate position, such as lying supine for an extended period, can cause supine hypotensive syndrome due to compression of the inferior vena cava by the enlarging uterus, thereby obstructing venous return to the heart and reducing placental perfusion. This condition has the potential to cause fetal hypoxia and increase the risk of fetal distress (Graham et al., 2021).

Psychological factors contributed to 15 cases (12.7%) and were a crucial component in the success of the delivery process. The mother's psychological aspects, such as anxiety, fear, and emotional stress, had a significant influence on the body's physiological response during labour. High emotional tension can trigger an increase in the secretion of stress hormones, particularly catecholamines (adrenaline and noradrenaline), which affect blood vessel vasoconstriction, reduce blood flow to the uterus, and inhibit effective contractions. As a result, cervical dilation becomes slower, the active phase of labour is prolonged, and the risk of caesarean section increases (Karla & Wisnuwardani, 2025). In addition, psychological factors do not stand alone but are influenced by previous birth experiences, social and family support, and the mother's perception of pain (Ranjbar et al., 2025).

Mothers with traumatic childbirth experiences or a lack of emotional support tend to experience high anxiety, which further exacerbates their perception of pain and reduces their sense of control over their bodies during the birthing process. This condition can create a cycle of stress that hinders the progress of labour and increases the likelihood of medical intervention. In the context of maternity nursing care, attention to the psychological aspects of mothers is an integral part of services oriented towards the safety and well-being of mothers and babies. Nurses play an important role in providing emotional and psychosocial support through the application of therapeutic communication, relaxation and breathing techniques, and targeted prenatal education. This approach helps mothers build confidence, reduce anxiety, and increase their readiness for the delivery process. These efforts are in line with the principles of Family-Centered Maternity Care (FCMC), which places the family as an active partner in the care process, emphasising the importance of emotional support, family involvement, and the provision of adequate information (Graham et al., 2021). The consistent application of the FCMC concept is expected to create a supportive delivery environment, increase the mother's comfort, accelerate the progress of labour, and reduce the rate of caesarean sections caused by psychological factors.

CONCLUSION

The results of the study show that most mothers who gave birth by cesarean section were of ideal reproductive age (21–30 years), had full-term pregnancies (37–40 weeks), and had low parity. Based on the Five P concept analysis, the Power factor was the main cause of CS, followed by Passage, Psyche, Passenger, and Position. Conditions such as failed induction, premature rupture of membranes, anemia, and mechanical obstructions in the birth canal are the most common causes requiring surgical intervention. These findings emphasize that maternity nursing interventions should focus on strengthening contractions through active labor monitoring, improving the mother's physical readiness, and providing emotional support to cope with labor stress. The application of a holistic and collaborative approach among healthcare providers is necessary to reduce the rate of

medically unindicated cesarean sections, prevent maternal-neonatal complications, and support the achievement of Sustainable Development Goals (SDGs) related to maternal and child health.

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