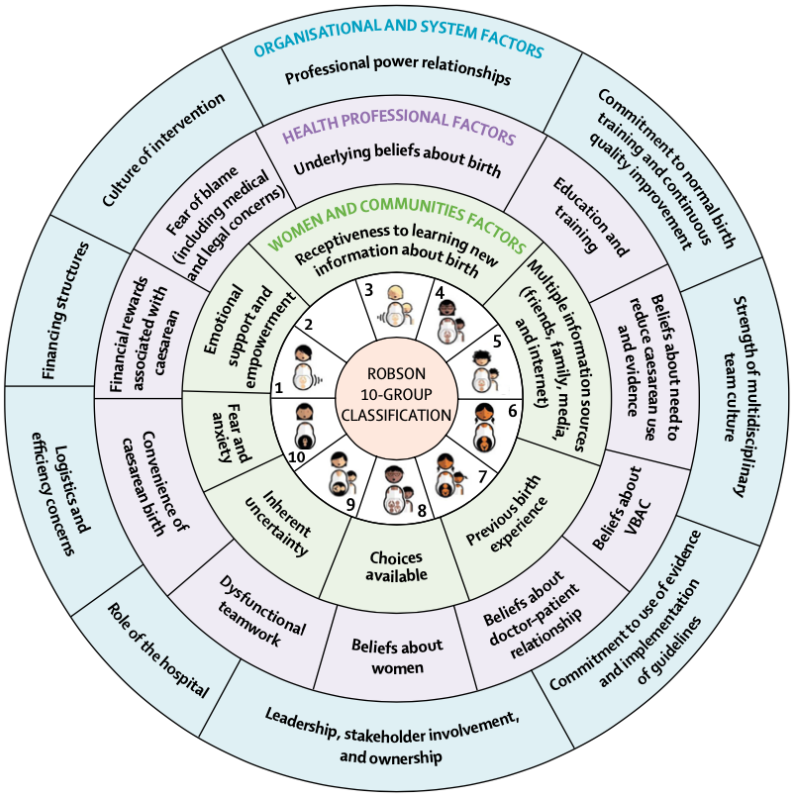
Using the Robson Classification to audit the Caesarean Sections of Hospital X in Robson group 1: a focus group study.



Cover image: Betran et al., 2018

PREFACE

I hereby present to you my thesis, which has been written in order to complete the master Physician Assistant – clinical midwifery at Rotterdam University of Applied Sciences. In this thesis, the caesarean section rate of hospital X at Z was audited using the Robson Classification in order to assess whether it reflects an appropriate rate. Potential areas of improvement in local protocols and practices were identified in order to enable the development of quality improvement recommendations that aim to optimize future caesarean section rates of X.

First of all, I would like to thank my mentor for his excellent guidance and support. By providing me with challenges, he maximized my learning opportunities. I am grateful for the time he took to guide me, his feedback on various projects, and the conversations we had.

I also want to thank all lecturers from Rotterdam University of Applied Sciences. They provided a varied educational program, which enabled me to develop into the Physician Assistant I am today. Special thanks go to My supervisors for providing feedback on this thesis, which enabled me to finish, and to , my coaches, for their valuable and personal guidance.

Furthermore, I want to thank my fellow students for the pleasant times we had over the past three years. My companions, thank you for being there, through good times and through bad, which I really appreciate.

In addition, I want to thank all my colleagues and team leader for the opportunities they gave me to complete this master and to learn new skills, their feedback, their support, their expressed interest, and their flexibility regarding our working schedule.

Michael Robson, I am honored that you have taken the time to provide our data with good and critical feedback, which improved the quality of our caesarean section audit.

Moreover, I want to thank the participants of the focus groups for interpreting the Robson Classification of X at Z and sharing their valuable opinions and experiences regarding (local) protocols and practices. This resulted in in-depth knowledge regarding the topic, enabling the identification of areas for improvement in local protocols and practices and to write this thesis.

Finally, I want to thank my family and friends for always being there for me and for the understanding of my busy schedule the last years. Dear mama and Anne, we have been through difficult years because our beloved and loving husband and father passed away and we miss him very much. I know he would we very proud of us. And last, but certainly not least: dear Tomas, thank you for your loving support, your patience, and all your help.

The researcher
24-09-2022

ABSTRACT

BACKGROUND Caesarean sections can prevent perinatal and maternal mortality but are associated with risks as well. The Robson Classification offers a starting point with which to audit caesarean sections, aiming to achieve and maintain appropriate caesarean section rates. The caesarean section rate of X at Z (28%) differs from the national caesarean rate of the Netherlands (23%). It is not possible yet to assess whether the caesarean section rate of X at Z reflects an appropriate rate, because the Robson Classification is unknown.

OBJECTIVE To audit the caesarean section rate of X at Z using the Robson Classification in order to assess whether the caesarean section rate in Robson group 1 reflects an appropriate rate. It is essential to identify potential areas for improvement in local protocols and practices in order to enable the development of quality improvement recommendations that aim to optimize future caesarean section rates of X at Z if needed.

METHODS This study used a qualitative approach consisting of two focus groups composed of obstetricians, resident physicians, clinical midwives, obstetric nurses, and community midwives affiliated with X at Z and six other Dutch hospitals. Based on the results of the Robson Classification of X at Z, they discussed whether the caesarean section rate reflects an appropriate rate and they identified areas for improvement in local protocols and practices. Data was analyzed according to thematical analysis.

RESULTS A total of 24 healthcare providers participated in two focus groups. They noticed that the caesarean section rate decreased over the years and is comparable now to international caesarean section rates. Most caesarean sections were performed because of fetal intolerance for oxytocin, which was considered appropriate, because it meant that the management of labour was performed according to protocol and other indications were considered less desirable. Areas for improvement were identified regarding expectation management, labour management, debriefing, providing continuous support, augmentation of labour with oxytocin, prevention, and mobilizing during labour.

CONCLUSION The caesarean section rate of X at Z in Robson group 1 did not reflect a clinical problem. Since areas for improvement were identified, it is not possible yet to conclude that the caesarean rate is appropriate, which means that future caesarean section rates can be further optimized. The focus should be on preventing first and repeat caesarean sections. This implies that future caesarean section audits should focus on Robson group 2, 5, 6 and 7 in addition to Robson group 1. It was recommended to convert the identified areas for improvement into quality improvement recommendations, which should be actioned through effective implementation strategies. In order to make well-informed statements, it was recommended to integrate the Robson Classification, including the classification of the indications for the caesarean sections, in all hospitals, both national and international, and to compare this classifications in the future.

KEYWORDS caesarean section, audit / Robson Classification / focus group

SAMENVATTING

ACHTERGROND Sectio caesarea kunnen perinatale en maternale sterfte voorkomen, maar worden ook met complicaties geassocieerd. De Robson Classification biedt een startpunt voor het auditeren van sectio caesarea, waarbij wordt beoogd om passende sectiopercentages te bereiken en te behouden. Het sectiopercentage van X at Z (28%) verschilt van het Nederlandse nationale sectiopercentage (23%). Het is nog niet mogelijk om te beoordelen of dit een passend percentage betreft, omdat de Robson Classification nog niet werd toegepast.

DOEL Het auditeren van de sectio caesarea van X te Z middels de Robson Classification om te beoordelen of het sectiopercentage in Robson groep 1 een passend percentage betreft. Het is essentieel om verbeterpunten in lokale protocollen en praktijkvoering te identificeren om het ontwikkelen van verbetermaatregelen die beogen om toekoX ige sectiopercentages van X te Z te optimaliseren, indien nodig, mogelijk te maken.

METHODE Dit kwalitatieve onderzoek betrof twee focusgroepen bestaande uit gynaecologen, arts-assistenten, klinisch verloskundigen, obstetrieverpleegkundigen en eerstelijns verloskundigen, aangesloten bij X te Z en zes andere Nederlands ziekenhuizen. Op basis van de resultaten van de Robson Classification van X te Z discussieerden zij of het sectiopercentage een passend percentage betreft en identificeerden zij verbeterpunten in lokale protocollen en praktijkvoering. De data werd geanalyseerd middels thematische analyse.

RESULTATEN In totaal namen 24 zorgverleners deel aan twee focusgroepen. Zij merkten op dat het sectiopercentage in de loop der jaren is gedaald en nu vergelijkbaar is met internationale sectiopercentages. De meeste sectio caesarea werden uitgevoerd vanwege foetale intolerantie voor oxytocine, wat passend werd geacht, omdat het betekende dat het beleid durante partu werd uitgevoerd conform protocol en omdat andere indicaties als minder wenselijk werden beschouwd. Verbeterpunten werden geïdentificeerd met betrekking tot verwachtingsmanagement, beleid durante partu, debriefen, het verlenen van continue begeleiding tijdens de baring, bijstimulatie met oxytocine, preventie en mobiliseren durante partu.

CONCLUSIE Het sectiopercentage van X te Z in Robson groep 1 weerspiegelt geen klinisch probleem. Aangezien er verbeterpunten zijn geïdentificeerd is het nog niet mogelijk om te concluderen dat het sectiopercentage een passend percentage betreft. Dit betekent dat toekoX ige sectiopercentages verder kunnen worden geoptimaliseerd. De focus moet hierbij liggen op het voorkomen van eerste en herhaalde sectio caesarea. Dit impliceert dat toekoX ige audits zich, naast Robson groep 1, ook op Robson groep 2, 5, 6 en 7 dienen te richten. Er werd aanbevolen om de geïdentificeerde verbeterpunten om te zetten naar verbetermaatregelen en om deze te implementeren middels effectieve implementatie strategieën. Om gefundeerde uitspraken te kunnen doen werd tevens aanbevolen om de Robson Classification, inclusief de classificatie van de indicaties van de sectio caesarea, te integreren in nationale en internationale ziekenhuizen en om deze classificaties in de toekoX te vergelijken.

TREFWOORDEN sectio caesarea audit / Robson Classification / focusgroep

INDEX

INTRODUCTION

In 1985, the World Health Organization (WHO) assessed the appropriate mode of birth as the caesarean section (CS) rate was considered remarkable and unjustified (WHO, 1985). At the time, the WHO recommended a CS rate no higher than 10-15%, which was considered the appropriate CS rate for almost three decades. However, worldwide CS rates continue to increase with no signs of leveling off (Betran et al., 2016; Robson et al., 2013; WHO, 2015; WHO, 2017; WHO, 2018). The cause of this increase is multifactorial and involves women, clinicians, healthcare systems, finances, society, and media (Betran et al., 2018). When medically necessary, CS can prevent perinatal and maternal mortality. However, CS is associated with short- and long-term risks as well. These risks can extend beyond the surgery and potentially affect future pregnancies (Sandell et al., 2018).

Concerns about the increase of the CS rate have been expressed by clinicians and governments due to the potential negative impact on perinatal and maternal health, unequal access, and cost issues (Betran et al., 2016; WHO, 2015; WHO, 2017). As more literature regarding the risks and benefits of CS has been published and the quality of obstetric care has improved over the years, the need to revise the recommended CS rate became more pronounced. The WHO revised its position on the recommended CS rate in 2015. Two studies showed that below a CS rate of 10%, the perinatal and maternal mortality decreased when the CS rate increased (Betran et al., 2015; Ye et al., 2015). A CS rate above this level was not associated with a further reduction in perinatal and maternal mortality. The association between the CS rate and outcomes as perinatal and maternal morbidity, stillbirths and psychosocial outcomes, however, could not be established due to lack of data. Therefore, the WHO recommended that every woman in need should receive a CS when medically necessary rather than striving towards a specific CS rate (Betran et al., 2016; WHO, 2015; WHO, 2018).

At the individual level of a healthcare facility, the CS rate is affected by differences in local obstetric populations, capacity, facilities, and protocols. For this reason, CS rates vary widely between different healthcare facilities (Betran et al., 2016; Robson, 2001; Robson et al., 2013; WHO, 2015). To determine whether CS rates are appropriate, rates in specific groups of women should be assessed as opposed to overall CS rates, which can be too ambiguous. Organizational, perinatal and maternal characteristics, epidemiological variables, events and outcomes should be taken into account (Robson, 2001; Robson et al., 2015). In 2015, the WHO proposed the Robson Classification as the global standard for monitoring, comparing, and assessing CS rates over time within and between healthcare facilities (Betran et al., 2016; Robson et al., 2015; WHO, 2015; WHO, 2017). The Robson Classification classifies all women who gave birth into ten groups, based on six obstetric parameters: parity, previous CS, onset of labour, number of fetuses, gestational age, and fetal lie (Figure 1). The Robson Classification provides information on the distribution of the population and the CS across the Robson groups, uses standardized indications for CS, and offers a common starting point with which to routinely audit CS (Robson, 2001; Robson et al., 2015; WHO, 2017). Auditing CS aims to achieve and maintain appropriate CS rates and consists of a cycle of collecting information, classifying information, assessing management, and modifying management if needed (Robson, 2001; Robson et al., 2013). In this way, auditing CS is considered a non-clinical intervention to reduce unnecessary CS (WHO, 2018).

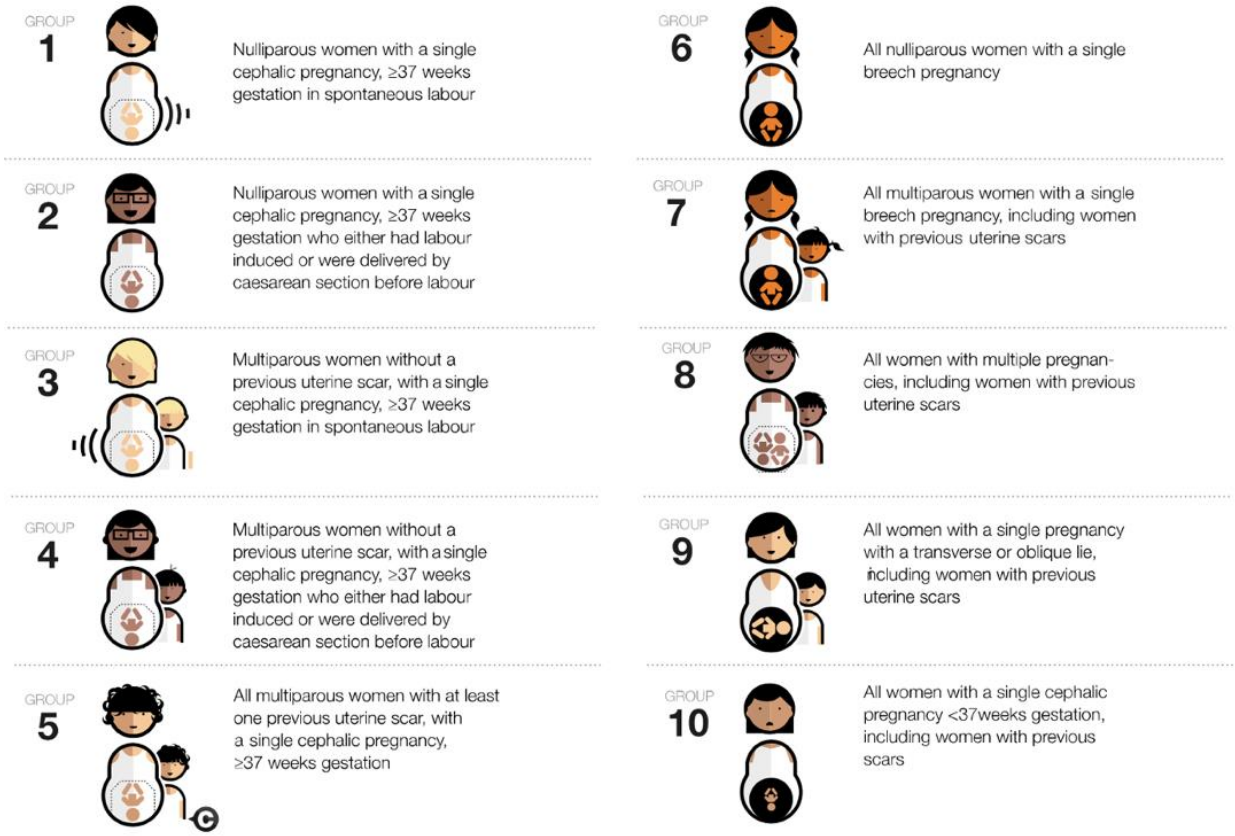


Figure 1 the ten groups of the Robson Classification (WHO, 2017)

Zeitlin et al. (2021) showed that the distribution of the populations and the CS across the Robson groups, the contribution of the Robson groups to the overall CS rates, and the overall CS rates varied between 18 different European countries. This might be explained by differences in practices, epidemiological variables, or poor data collection. In all countries, however, group 5 contributed more than all other groups to the overall CS rate. This reflected how CS in nulliparous women contribute to increasing CS rates. Compared to these European countries, the Netherlands had a low overall CS rate (17.4%). Rates ranged from 16.1% in Iceland to 56.9% in Cyprus. The Robson Classification of the Netherlands showed that group 3 (32.3%) and group 1 (28.1%) were the largest groups. Group 6 (82.9%) and group 7 (77.3%) were the groups with the highest group CS rates. Group 5 (25.8%) contributed the most to the overall CS rate, followed by group 1 (15.9%). These results reflected the Robson Classification applied at a population level and enable comparison of CS rates in specific groups between a population level and a healthcare facility level.

PROBLEM

The CS rate of X at Z (X) has been stable in recent years (28%) but differs from the national CS rate of the Netherlands on the secondary and tertiary care level (23%) (Perined, 2018). The Robson Classification of X , taking organizational, perinatal and maternal characteristics, epidemiological variables, events and outcomes into account, is unknown. For this reason, it is not possible yet to assess whether the CS rate of X reflects an appropriate rate.

OBJECTIVE AND RESEARCH QUESTION

OBJECTIVE

To audit the CS rate of X using the Robson Classification in order to assess whether the CS rate reflects an appropriate rate[1], taking organizational, perinatal and maternal characteristics, epidemiological variables, events and outcomes into account. Preventing CS is beneficial for most women but is especially important for low-risk nulliparous women. Preventing CS would not only improve the health of these women on the short-term but also prevents these women from classification to Robson group 5 in future pregnancies, which can improve future obstetric outcomes. Therefore, the focus of the CS audit is on Robson group 1 (nulliparous women with a single cephalic pregnancy and a spontaneous onset of labour[2] ≥37 weeks of gestation). It is essential to identify potential areas for improvement in local protocols and practices in order to enable the development of quality improvement recommendations that aim to optimize future CS rates of X if needed.

RESEARCH QUESTION

Does the caesarean section rate of X at Z in Robson group 1 reflect an appropriate rate?

Sub-questions

1. Which organizational characteristics are associated with the (indications for the) caesarean sections in Robson group 1?
2. Which perinatal epidemiological variables, events and outcomes are associated with the (indications for the) caesarean sections in Robson group 1?
3. Which maternal epidemiological variables, events and outcomes are associated with the (indications for the) caesarean sections in Robson group 1

The following stipulative definitions were used in this study (Verhoeven, 2018):

[1] **Appropriate rate:** no potential areas for improvement in local protocols and protocols were identified.

[2] **Spontaneous onset of labour:** an onset of contractions without interventions that intend to induce labour, with or without spontaneous rupture of membranes, and a doctor of midwife declared that labour had started.

METHODS

Setting

X is a secondary care teaching hospital in Z, the Netherlands, with approximately 1800 clinical births per year. Births are attended by clinical midwives, resident physicians, or obstetricians. Births before 32 weeks of gestation are referred to a tertiary care hospital, unless these are due to a termination of pregnancy, immature birth or stillbirth.

Design

This study used a qualitative approach consisting of two focus groups. Prior to the focus groups, the Robson Classification, the classification of the indications for the CS in Robson group 1, and the perinatal and maternal epidemiological variables, events and outcomes of the women in Robson group 1 of X from 2018 to 2021 were established (Attachment 1). These results were used as input for the focus group discussions.

A focus group is a qualitative research method in which a group of people is questioned about their perceptions, ideas, and opinions on a specific topic, using the social interaction between the participants (Boeije, 2014; Raats, 2019; Verhoeven, 2018). The environment of a focus group is open and safe, giving the participants the opportunity to explain and to deepen their answers. This provides in-depth knowledge on the topic. The outcome of a focus group is a representation of the participants' collective thoughts on the topic, making a focus group suitable for developing quality improvement recommendations as well.

Participants and recruitment

Purposive sampling was used to form two focus groups consisting of obstetricians, resident physicians, clinical midwives, obstetric nurses, and community midwives; a reflection of the daily multidisciplinary formation of obstetric healthcare providers (Verhoeven, 2018). The aim was to recruit two focus groups consisting of at least two healthcare providers per specialism. In order to gain in-depth knowledge on CS practices of X , the first focus group consisted of healthcare providers affiliated with X . The second focus group consisted of healthcare providers affiliated with both X and other Dutch hospitals. This, in order to create interaction, awareness and a learning effect, and to substantiate the perspectives of the healthcare providers affiliated with X . Obstetric healthcare providers affiliated with both X and other Dutch hospitals received an email consisting of an information letter (Attachment 2) and a request to participate in the focus groups. Due to the risk of no-show, multiple healthcare providers per specialism were approached (Boeije, 2014). After a low response from healthcare providers affiliated with other Dutch hospitals, the recruitment was expanded with snowball sampling (Verhoeven, 2018). Using the network of the participants and colleagues from X and Rotterdam University of Applied Sciences, various healthcare providers affiliated with other Dutch hospitals were approached in person by email or by WhatsApp in order to meet the study's recruitment goals.

Data collection

The participants received the results of the Robson Classification of X one week before the focus group meetings, which enabled them to prepare. The first focus group, a physical meeting in X , took place on 28-04-2022. The second focus group, a digital meeting using Microsoft Teams, took place on 16-05-2022. At the start of the meetings, the participants were asked to complete a questionnaire regarding their position, work experience, education level, and age (Attachment 3). This information reflected the baseline characteristics of the participants. The focus group discussions were guided by two moderators (NB and JB) using a topic list (Attachment 4). The topic list was based on the results of the Robson Classification of X , and clinical and non-clinical interventions that have proven to reduce CS rates (Betran et al., 2018; National Institute for Health and Care Excellence, 2021; WHO, 2018). It was discussed whether the CS rate of X in Robson group 1 reflects an appropriate rate and potential areas for improvement in local protocols and practices were identified. The first moderator (NB) guided the discussions, took notes, and monitored the time. The second moderator (JB) asked additional questions to achieve an in-depth discussion. During two 2.5-hour meetings, consensus on the topic was reached in both focus groups.

Data analysis

The data of the focus groups was analyzed according to thematical analysis (Kiger & Varpio, 2020). The moderators discussed their impressions, themes that had been discussed, important outcomes, and unexpected findings directly after the meetings. The focus groups were recorded. These records were transcribed verbatim using the program Amber Script and the webtool oTranscribe, and were emailed to the participants for a member check. All participants gave their consent regarding the use of and the content of the transcripts. One researcher (NB) coded the transcripts, which were reviewed by a second researcher (JB). Disagreements regarding coding were discussed until consensus had been reached, which resulted in a revised coding framework. NB used the revised coding framework to identify themes. A final review of all findings was completed by a third researcher (AR). All coding was performed in MAXQDA Analytics Pro 2022.

Ethical aspects

This study was conducted according to the principles of the Declaration of Helsinki, was in compliance with the Wet op de Geneeskundige Behandelingsovereenkomst and Algemene Verordening Gegevensbescherming, and was approved by the local Board of Directors of X (Attachment 5). It was concluded that this study does not fall under the remit of the Medical Research Involving Human Subjects Act. Informed consent (Attachment 6) was obtained from all participants. All data was treated confidentially, analyzed anonymously, and will be stored on a secured computer account for 20 years within X (Koninklijke Nederlandsche Maatschappij tot Bevordering der Geneeskunst, 2022).

RESULTS

Participants

A total of 285 healthcare providers was approached directly to participate in the focus groups. This concerned 119 healthcare providers affiliated with X , of which sixteen agreed to participate, and 166 healthcare providers affiliated with other Dutch hospitals, of which four agreed to participate. An unknown number of healthcare providers affiliated with other Dutch hospitals was approached indirectly to participate in the focus groups using snowball sampling, of which four agreed to participate.

Based on their availability and the hospital they worked for, the participants were stratified to a focus group consisting of healthcare providers affiliated with X (intern) and a focus group consisting of healthcare providers affiliated with both X and other Dutch hospitals (intern and extern): Flevoziekenhuis Almere, Gelre Ziekenhuizen Zutphen, Medisch Centrum Leeuwarden, Noordwest Ziekenhuisgroep, Wilhelmina Kinderziekenhuis, and Ziekenhuis Groep Z.

The focus groups were composed as follows:

- Focus group 1: intern, n=8
- Focus group 2: intern and extern, n=16

The baseline characteristics of both focus groups were comparable (Table 1).

Table 1 Baseline characteristics focus groups

	Focus group 1 (intern) n=8	**Focus group 2 (intern and extern)** n=16
Duration focus group (minutes)	148	150
Age (years) *mean (range)*	44 (29-56)	42 (25-59)
Position *n (%)*		
- Obstetrician	1 (12.5)	4 (25)
- Resident physician	2 (25)	2 (12.5)
- Clinical midwife	2 (25)	4 (25)
- Obstetric nurse	2 (25)	4 (25)
- Community midwife	1 (12.5)	2 (12.5)
Gender *n (%)*		
- Male	0 (0)	1 (6.25)
- Female	8 (100)	15 (93.75)
Work experience *n (%)*		
- <5 years	1 (12.5)	3 (18.75)
- 5 – 10 years	2 (25)	2 (12.5)
- 10 – 20 years	1 (12.5)	4 (25)
- ≥ 20 years	4 (50)	7 (43.75)
Education *n (%)*		
- University of Applied Sciences	5 (62.5)	9 (56.25)
- University	3 (37.5)	7 (43.75)

Codes and themes

The initial coding framework consisted of 234 codes. After analyzing, comparing, and combining, these codes were merged into ten subthemes. Revision and refinement of these subthemes resulted into three main themes: 1) caesarean section rate of X , 2) organizational characteristics, and 3) perinatal and maternal epidemiological variables, events and outcomes (Figure 2).

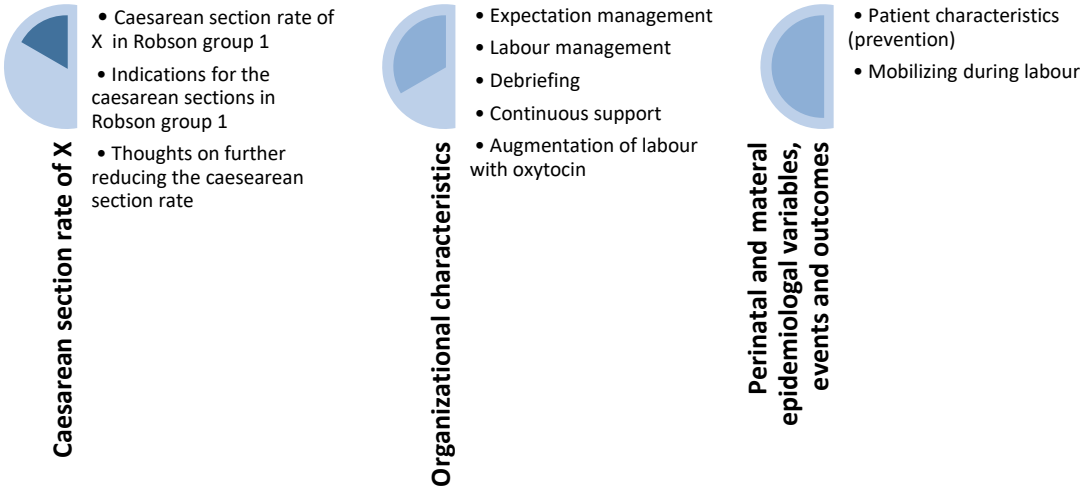


Figure 2 codes and themes

Caesarean section rate of X

Caesarean section rate of X in Robson group 1

The participants noticed that the average CS rate of X in Robson group 1 was slightly higher than international CS rates from 2018 to 2021. However, the CS rate decreased over the years and was comparable to international CS rates in 2020 and 2021. They indicated that the Netherlands has a unique healthcare system in which obstetric care is divided into primary, secondary and tertiary care. X is a secondary care hospital and does not facilitate low-risk births under the care of community midwives. These births were included in international CS rates, potentially making the CS rate of X more propitious. Taking this into consideration, the participants concluded that the CS rate of X did not reflect a clinical problem.

> ***"When you see such a table, it is of course immediately apparent that this decrease has taken place in group 1. And furthermore, that X is not doing so badly at all if you compare it with the advice that emerges from the international literature." (Participant 9)***

Indications for the caesarean sections in Robson group 1

Most CS of X in Robson group 1 were performed because of fetal intolerance for oxytocin.[3] Some participants stated it to be undesirable that fetuses became distressed because of the amount of oxytocin that was required to achieve vaginal births. However, most participants stated it to be appropriate that most CS were performed for this indication, because it also meant that the management of labour was performed according to protocol and they considered other indications less desirable.

> ***"I actually like that the bulk ends with fetal intolerance. Because if you have to perform a caesarean section for any other reason, well then, I think you're, you've got a major wrong diagnosis of labour. But that seems to me, shall we say, even worse. If you haven't reached the maximum dose of oxytocin, then, yes, I don't think you followed your protocol. In fact, we also established there must be progress and you want to move forward and then the fetal intolerance is the end point. Well, in that case, at least you've tried everything." (Participant 9)***

[3] **Fetal intolerance for oxytocin:** CS when oxytocin is prescribed and is unable to achieve the maximum dose because the fetus does not tolerate the oxytocin (Robson et al., 2015).

Thoughts on further reducing the caesarean section rate

The participants had two thoughts on further reducing the CS rate. They noticed that group 5 contributed the most to the overall CS rate. Therefore, some participants stated that group 5 is the group that needs the most attention to reduce future CS rates, where the focus should be on preventing repeat CS. Other participants stated that the future group 5 will be reduced by preventing first CS, which will reduce future CS rates as well. They stated that this makes group 1, the largest group in X , an important group, and that this underlined the importance of the current audit.

Organizational characteristics

Expectation management

The participants stated that patients' expectations not always matched the course of their labour. They felt that this could lead to a suboptimal or even traumatic experience of childbirth. In addition, they also felt that this could lead to the loss of maternal motivation to pursue a vaginal birth, to which they related CS because of a maternal request.

> ***''Patients are getting stricter, have more resistance than before, are in their heads a lot. Doesn't the patient's wish lead to caesarean sections?'' (Participant 1)***

The participants stated that the cause of the aforementioned was twofold. They felt that not all patients prepare for childbirth, which resulted in some not knowing what to expect and being overwhelmed during labour. In addition, they felt that the information provided by healthcare providers could be optimized. They indicated that this information should concern a realistic representation of childbirth and that it is important to provide uniform information to all patients.

> ***''I think we can do more with expectation management as well. We do a lot of check-ups. But we're not really talking about what it's like to give birth and that it hurts. And almost half of the people no longer attend a pregnancy course. I really think that helps. That people are well prepared to give birth. And we actually do, on that part, we do very little.'' (Participant 6)***

Labour management

The participants indicated that it varied per healthcare provider how long they pursued a vaginal birth when labour failed to progress after (artificial) rupture of membranes and augmentation of labour with oxytocin. No local agreements have been made about this. In general, they felt that, as long as there is a good fetal and maternal condition, more time can be taken to pursue a vaginal birth when labour fails to progress. In addition, they mentioned the importance of individualized labour management and patient-centered care as well as the need to involve the patient in decisions in the context of patient satisfaction and shared decision-making.

> ***''Just give people a little more time, give them a little more choice, give them a little more... Wouldn't that lead to improvements?'' (Participant 1)***

The participants indicated that it is difficult to determine when they should and should not pursue a vaginal birth when labour fails to progress. They all agreed that they want to provide good and safe care but mentioned the lack of a protocol that describes how long they can pursue a vaginal birth without increasing the risks involved. Therefore, they considered it valuable to make local agreements on labour management.

''What I'd find difficult about it is: when are you going to provoke pathology? At some point you're also going to, you're going to create other pathology. And I find it quite difficult to, look, if I safely stick to those two hours, yes then I will never be wrong. But if I continue too long, I'll end up with my shoes covered in blood, so to speak, in the OR. So, what is safe? I find that quite difficult.'' (Participant 3)

Debriefing

The participants described debriefing after CS as important, valuable and educational. They felt that retrospective debriefing took place on a daily basis. They mentioned that the initiation of auditing CS using the Robson Classification led to a conscious approach to setting indications for CS and critically assessing obstetric outcomes. This might have contributed to the decrease in the CS rate in Robson group 1. However, they also mentioned that the outcome, CS, cannot be undone by retrospective debriefing. The participants saw added value in debriefing during the moments where it is decided whether or not to perform CS. They stated that during this prospective debriefing should be assessed whether all possibilities have been used to enable a vaginal birth.

''I think that, it can be very useful to look back together during the morning reports. But it is always in retrospect, so you can't prevent anything at that moment. So, I think during the moments where the decision is made whether or not to perform a caesarean section, that these moments serve a useful function.'' (Participant 4).

The participants mentioned that prospective debriefing does not currently take place in all cases. In addition, they indicated that the obstetric nurses and the patients are not always involved, while their input was considered valuable. In order to further reduce the CS rate, the participants recommended structural prospective and retrospective debriefing with the entire team, ideally involving the patient as well.

Continuous support

The participants mentioned the positive effects they experienced when they were able to provide continuous support. They described continuous support as one-to-one care which enables them to be there for their patients when they need their (emotional) support, to build a relationship of trust, and to coach their patients by helping them with comfort measures and coping techniques.

''I am convinced that if I could give one-to-one care I would get people further than when I have a very busy shift where I have to take care of three women in labour. Then you can really stay with them. You can make people feel seen.'' (Participant 6)

However, the participants also mentioned that they often had a high workload, which meant that continuous support has become an exception rather than the norm. They stated that this could lead to CS because of fetal intolerance for oxytocin and to CS because of protocol violation. Sometimes the oxytocin infusion rate was increased too fast if there was no time to observe whether the woman was having enough contractions, and sometimes there was no time to increase the oxytocin infusion rate at all.

''Because you're not physically in that room, you have a different policy when it comes to increasing the oxytocin infusion rate and that maybe could have an influence on whether or not you develop fetal intolerance or protocol violation.'' (Participant 19)

In addition, the participants mentioned an increased demand for pain relief when they were not able to provide continuous support during shifts with a high workload. However, especially during these shifts, (adequate) pain relief was not always directly available. The participants felt that inadequate pain relief could lead to insufficient therapy options for failure to progress, which could result in CS due to either a failure to progress or a maternal request.

The participants considered enabling continuous support to be an important part in reducing the CS rate. They stated the need for additional staff in order to be able to provide continuous support. Ideally, nurses should be appointed for this purpose, since nurses combine medical knowledge with coaching. They considered a clinical doula or interns as a continuous factor during labour as alternative options.

Augmentation of labour with oxytocin

Some participants noticed that X used a higher oxytocin regimen than they were used to in other hospitals. They felt that they had experienced more episodes of fetal bradycardias and increased use of tocolysis during labour in X than in the hospitals they used to work for. Therefore, they associated this oxytocin regimen with CS because of fetal intolerance for oxytocin and CS because of uterine tachysystole. They recommended lowering the dosage of oxytocin in terms of the oxytocin infusion rate as well as the maximum dosage of oxytocin.

> ***''I also think very often that we, that we are causing the fetal distress, or the fetal intolerance. That we by increasing the oxytocin infusion rate too quickly, then, yes, that we ourselves are the external factor, that we cause the fetal intolerance.'' (Participant 19)***

The participants indicated that the oxytocin regimen in X was applied uniformly to all patients. However, they stated that the optimal dosage of oxytocin may differ between patients. They mentioned that growth-restricted fetuses, for example, are much more likely to be intolerant for oxytocin than normally developed fetuses. Therefore, they recommended individualization of the oxytocin regimen per patient.

The participants mentioned their positive experiences with temporarily discontinuing the oxytocin infusion rate when labour failed to progress. They experienced that this could result in vaginal births. They mentioned that this also can be considered if fetal intolerance for oxytocin occurs.

> ***''What I think is positive is that we are much more likely to temporarily stop the oxytocin infusion rate when labour fails to progress. We restart the oxytocin after a few hours of waiting. I experienced very good results with that. It eventually ends in a vaginal birth, while a few years ago it would have ended in a caesarean section. I think that is nice to see.'' (Participant 6)***

Perinatal and maternal epidemiological variables, events and outcomes

Patient characteristics (prevention)

The participants associated an increasing maternal age and smoking with fetal growth restriction due to an impaired placental function, to which they related CS because of fetal distress and CS because of fetal intolerance for oxytocin. In addition, they associated maternal obesity with fetal macrosomia, to which they related CS because of cephalopelvic disproportion.

The participants considered it important to provide patients with insight into the effect of patient characteristics on pregnancy outcomes. They stated that these insights may contribute to maternal adaptations of these characteristics. Ideally preconceptionally, otherwise during the pregnancy.

> ***"Patients have a right to that too, insight in the effect of patient characteristics, if that's really significantly different, they're entitled to know that, don't they? Before the pregnancy and during early pregnancy. I don't know if they do anything with it. But it is important that you know these kinds of things. Maybe a little earlier, maybe a little slimmer, maybe not smoking… If they also know that you have better pregnancy outcomes with that. Then they might be more motivated." (Participant 1)***

The participants stated that these insight are important for healthcare providers as well, because it enables them to adjust their management during antenatal and natal care.

Mobilizing during labour

The participants mentioned that many women were bedridden and barely mobilized during labour. They associated this with CS because of fetal malposition. They stated that the facilities and the design of the delivery rooms do not invite mobilizing during labour. The lack of a wireless CTG restricts women in their movements and many women lie down during labour because of the central position of the delivery bed. The participants felt that this influenced their patients birthing experience and to what extent they asked for pain relief as well.

The participants considered redesigning the delivery rooms to an environment in which patients can feel at home and can move freely as valuable. In addition, the participants indicated that there is a role for healthcare providers in encouraging patients to mobilize. However, they mentioned that their possibilities to do so are determined by their workload and that it differs per patient to what extent they can be motivated to mobilize.

> ***"We do say that patients are allowed to mobilize, but that is a hell of a thing with all the cables. We don't have that much either. We can completely remodel the bed. That is possible. But there is little attractive in our rooms to do something else." (Participant 6)***

DISCUSSION

Principal findings

This qualitative study audited aspects of the CS rate of X using the Robson Classification in order to assess whether the CS rate in Robson group 1 reflects an appropriate rate, taking organizational, perinatal and maternal characteristics, epidemiological variables, events and outcomes into account.

The average CS rate of X in Robson group 1 was slightly higher than international CS rates from 2018 to 2021. However, the CS rate decreased over the years and was, even with the exclusion of low-risk births guided by community midwives, comparable to international CS rates in 2020 and 2021. Most CS in Robson group 1 were performed because of fetal intolerance for oxytocin, which was considered appropriate, because it meant that the management of labour was performed according to protocol and other indications were considered less desirable. Taking this into consideration, it was concluded that the CS rate of X in Robson group 1 did not reflect a clinical problem. Since areas for improvement in local protocols and practices were identified, it is not possible yet to conclude that the CS rate is appropriate, which means that future CS rates can be further optimized. The focus should be on preventing first and repeat CS.

Areas for improvement were identified regarding expectation management, labour management, debriefing, providing continuous support, augmentation of labour with oxytocin, prevention, and mobilizing during labour. Identification of these areas for improvement enables the development of quality improvement recommendations that aim to optimize future CS rates of X .

Comparison with literature

The participants stated that patients' expectations not always matched the course of their labour. They associated this with suboptimal or traumatic experiences of childbirth and with CS because of a maternal request. These findings may have been different had there been patient-representation on the focus groups. However, these findings were consistent with literature. Hildingsson (2015) reported that unfulfilled birth expectations were associated with negative birth experiences and instrumental or surgical births. Negative birth experiences were associated with requests for CS in subsequent pregnancies as well (Karlström et al., 2011). This underlines the importance of expectation management (Veltjen, 2017). Clear and honest prenatal information prepares women for birth and may reduce CS rates (Chen et al., 2018; Stuurgroep Zwangerschap en Geboorte, 2009).

The participants mentioned that the initiation of auditing CS using the Robson Classification may have contributed to the decrease in the CS rate of X . Van Dillen et al. (2008) showed a similar decrease in the CS rate after the introduction of a CS audit during daily report meetings. They described behavioral change as the most likely explanation for this reduction in CS, as they experienced that auditing created awareness and encouraged discussion concerning indications for CS. Since the WHO recommended the Robson Classification as the global standard for auditing CS rates and considered auditing a non-clinical intervention to reduce unnecessary CS, various international studies have been published using the Robson Classification. Where most studies focus on the analysis, Senanayake et al. (2018) described how to use the Robson Classification to develop quality improvement recommendations.

The participants associated the lack of continuous support with CS because of fetal intolerance for oxytocin and CS because of protocol violation, and an increased demand for pain relief. Bohren et al. (2017) reported that women who received continuous support during labour were less likely to have CS and instrumental vaginal births, to use intrapartum analgesia, to report negative feelings about their childbirth, and to have a baby with a low five-minute APGAR score. Women's preferred support persons varied (Lunda et al., 2018). This qualitative study suggested that a range of caregivers can provide continuous support. Doulas were perceived the ideal support person, because they are trained paraprofessionals and able to individualize attention to women, whereas medical staff often is unable to be continuously present because of their diverse roles. Lettink et al. (2022) showed that continuous support can be provided by maternity care assistants as well.

The participants mentioned that many women were bedridden and barely mobilized during labour. They felt that the birth environment contributed to this. They associated a recumbent position and the lack of mobilizing during labour with CS because of fetal malposition, an increased demand for pain relief and negative experiences of childbirth. Lawrence et al. (2013) showed that walking and upright positions during the first stage of labour reduced CS rates, the duration of labour, the demand for epidural analgesia, and admissions to the neonatal unit. Hodnett, Downe & Walsh (2012) showed that the majority of women did not use the bed while birthing vaginally in an ambient clinical environment, while the majority of women giving birth in standard rooms did spend at least 75% of their labour on the bed.

Strengths and limitations

To our knowledge, this is the first Dutch study that demonstrates how the Robson Classification can be used to identify areas for improvement in local protocols and practices. Quantitative data (Attachment 1) was used as input for the focus group discussions. In this way, an inductive approach was reached by using triangulation, which may have increased the reliability of this study. All obstetric disciplines were represented in the focus groups. Due to the interaction that arose, the perspectives of all obstetric disciplines with regard to CS practices of X were inventoried, which resulted in in-depth knowledge on the topic. By including both internal and external participants, the perspectives of the internal participants were substantiated by the external participants, which may have increased the generalizability and external validity of the results. Furthermore, several measures were taken to increase the reliability and validity of the study. The Consolidated Criteria for Reporting Qualitative research were applied (Attachment 7). The topic list was compiled by three midwives and an obstetrician and was tested with a test interview. In the context of investigator triangulation, aiming to reach intersubjectivity and objectivity, two moderators were present at the focus groups and debriefed directly after. The transcripts of the focus groups were presented to the participants for a member check. Peer feedback from an expert was requested regarding coding and identifying themes. Last, the research process was described in a logbook.

While the resident physicians, clinical midwives and obstetric nurses were represented by two participants per discipline, the obstetrician and community midwife were represented by only one participant in the first focus group. Due to busy work schedules, it was not possible to compose this focus group in such a way that all disciplines were represented by two participants.

Despite the wide and valuable input of the obstetrician and the community midwife, their opinions could not be substantiated by colleagues, which may have introduced bias and in turn could have reduced the reliability and validity of the study. The second focus group consisted of sixteen participants. This may have come at the expense of achieving in-depth knowledge. Last, a large number of healthcare providers was approached to participate in the focus groups. The response rate, however, was low. It is likely that healthcare providers with the most affinity for auditing participated in the focus groups, which may have introduced selection bias and influenced external validity.

CONCLUSION

Revealed from the focus groups it was concluded that the CS rate of X in Robson group 1 did not reflect a clinical problem. Since areas for improvement in local protocols and practices were identified, it is not possible yet to conclude that the CS rate is appropriate, which means that future CS rates can be further optimized. The focus should be on preventing first and repeat CS. Areas for improvement were identified regarding expectation management, labour management, debriefing, providing continuous support, augmentation of labour with oxytocin, prevention, and mobilizing during labour. Identification of these areas for improvement enables the development of quality improvement recommendations that aim to optimize future CS rates of X .

Recommendations

We recommend converting the identified areas for improvement into quality improvement recommendations. These quality improvement recommendations should be actioned through an effective implementation strategy. In order to evaluate the effect of the quality improvement recommendations on perinatal outcomes, a prospective quantitative study must be carried out using the Robson Classification.

Our findings imply that future research regarding CS rates should focus on preventing first and repeat CS. Thus, future CS audits should focus on Robson group 2, 5, 6 and 7 in addition to Robson group 1.

Currently, there are no Dutch and only few international references for the classification of the indications for the CS. In order to make well-informed statements, we recommend the integration of the Robson Classification including the classification of the indications for the CS in all hospitals, both national and international, and to compare this classifications in the future.

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ATTACHMENT 1: the Robson Classification of X at Z

Data collection and data analysis

All women who gave birth in X from 2018 to 2021 were classified in the ten Robson groups using six obstetric parameters: parity, previous CS, onset of labour, number of fetuses, gestational age, and fetal lie (Figure 3). This resulted in the Robson Classification Report Table. The data were retrospectively extracted from the hospital's obstetric database (Mosos CTG, Mosos P and xCare). Women with a termination of pregnancy, immature birth (before 24 weeks of gestation), or stillbirth were excluded. Trends over a four-year period regarding the total number of women, the overall CS rate, the overall elective CS rate, the overall CS rate after a trial of labour, the group sizes, the group CS rates, the relative group contributions to the overall CS rate, the group elective CS rates, and the group CS rates after a trial of labour were depicted in graphs.

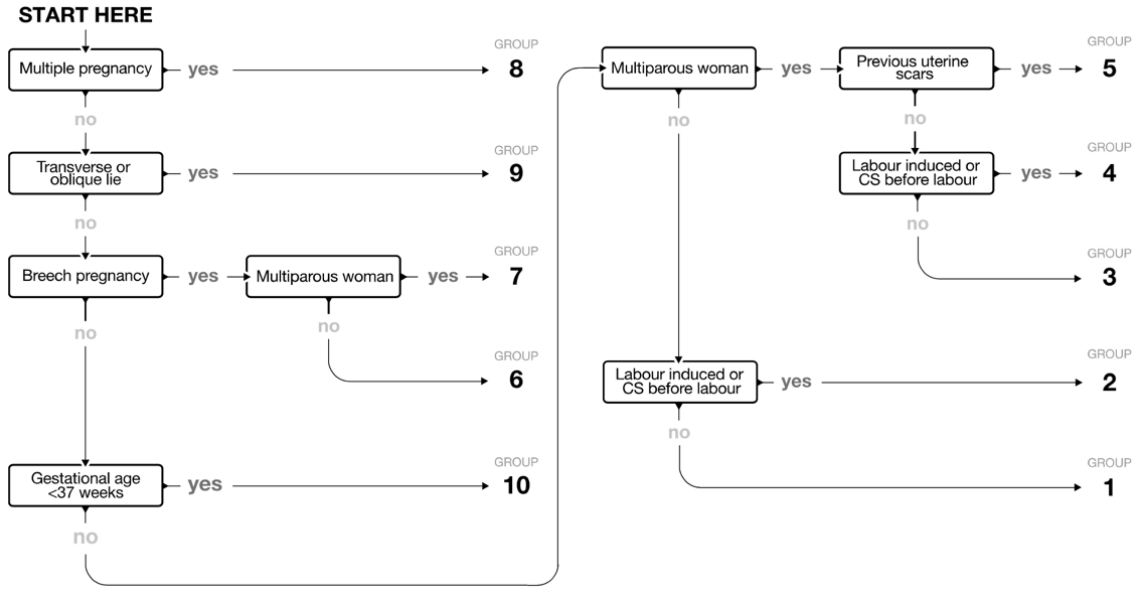


Figure 3 flowchart for the classification of women in the Robson Classification (WHO, 2017)

Robson group 1

All women in Robson group 1 were analyzed in more detail. Differences in perinatal and maternal epidemiological variables, events and outcomes between women with and without a CS in Robson group 1 were calculated with the independent t-test, Mann-Whitney U test, Chi-square test, Fisher's exact test and Fisher-Freeman-Halton exact test. A p-value less than 0.05 was considered statistically significant. Statistical analysis was carried out using SPSS (version 28.0).

In order to classify the actual indications for the CS, the indications for the CS in Robson group 1 were classified in plenary during the morning reports in 2020 and 2021 based on a flowchart until consensus had been reached (Robson, 2001; Robson et al., 2013; Robson et al., 2015) (Figure 4). During these morning reports, (Physician Assistant) clinical midwives, resident physicians and obstetricians were present. Frequencies and percentages of the classification of the indications for the CS in Robson group 1 were depicted in a cumulative relative frequency table. Perinatal and maternal epidemiological variables, events and outcomes were described per indication for the CS in Robson group 1.

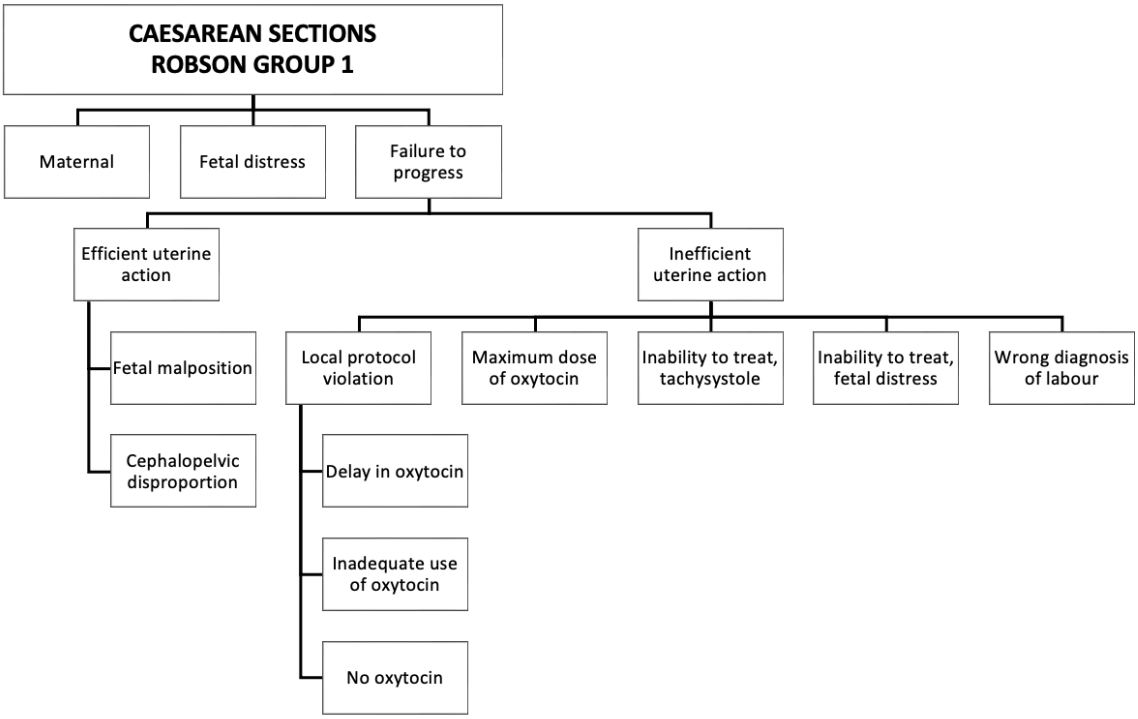


Figure 4 classification of the indications for the CS in Robson group 1

To classify the indications for the CS, a distinction has been made between maternal reasons, fetal distress (when no oxytocin was given), and failure to progress (when oxytocin was given). Failure to progress was subdivided into inefficient uterine action (IUA) and efficient uterine action (EUA). IUA is a progression of less than 1 cm/hour in the first 6cm of the first stage of labour. EUA is a progression of less than 1 cm/hour after 6cm of the first stage of labour. Both IUA and EUA were subdivided.

IUA

- Local protocol violation
  - Delay in oxytocin
    Oxytocin was not started within 2 hours after the diagnosis of failure to progress according to local protocol (progression less then 1 cm/hour in a 2-hour interval after spontaneous rupture of membranes or artificial rupture of membranes).
  - Inadequate use of oxytocin
    Oxytocin is prescribed, but the dose was not increased every 15 minutes.
  - No oxytocin is prescribed, because of different reasons
- Maximum dose of oxytocin, but labour fails to progress
  The start dose of oxytocin is 0.167IU/h. The dose of oxytocin will be increased every 15 minutes with 0.167IU/h until the dose is 1.0IU/h. From 1.0IU/h the dose of oxytocin will be increased every 15 minutes with 0.333IU/h until the maximum dose of 3.333IU/h is reached (X at Z, 2019).
- Inability to treat because of an overcontracting uterus
  ≥6 contractions / 10 minutes (Nijhuis et al., 2016)

- Inability to treat because of fetal distress
  Abnormal or preterminal CTG, according to the FIGO-classification of intrapartum cardiotocography, or based on a neonatal pH ≤7.2 in a fetal blood sample (Nijhuis et al., 2016)
- Wrong diagnosis of labour

EUA

- Fetal malposition
- Cephalopelvic disproportion

Assessment quality of data

The data quality is good (WHO, 2017). No statements can be made about the distribution of the population and the group sizes because low-risk birth under the care of community midwives were excluded from analysis. In the Netherlands, the health care system divides obstetric care into a primary level, secondary level and tertiary level. X concerns a secondary level hospital and does not facilitate low-risk births under the care of community midwives. The CS rates in group 1 and 3 were slightly higher than international CS rates in these groups. This might be explained by the exclusion of low-risk births. The CS rate in group 5 was high when compared to international CS rates in this group. This might be explained by a relative high elective CS rate in group 5a (74% to 78%) and a relative high proportion of group 5b (25% of the women in group 5), resulting from previous CS. The CS rates in group 2, 4, 8 and 10, and the relative group contribution of group 1, 2 and 5 combined were comparable to international CS rates in these groups.

Results

The total population increased from 1736 women in 2018 to 1855 women in 2021. The overall CS rate decreased from 28% to 25%. The overall elective CS rate varied between 58% and 62%. The overall CS rate after a trial of labour varied between 11% and 14%. Group 1 and group 2a were the largest groups. The group size of group 1 increased from 25% to 29%. The group size of group 2a varied between 16% and 18%. Group 6 and group 7 were the groups with the highest group CS rates. In group 6, the group CS rate decreased from 95% to 76%, and the CS rate showed a decrease in both the group elective CS rate (94% to 83%) and the group CS rate after a trial of labour (57% to 36%). In group 7, the group CS rate increased from 77% to 89%. The group elective CS rat decreased from 96% to 88%, but the group CS rate after a trial of labour increased from 11% to 50%. Group 5a contributed the most to the overall CS rate with a contribution that varied between 24% and 30%, followed by group 2a with a contribution of 12% to 14%.

From 2018 to 2021, 1831 women were classified to group 1, of which 220 received a CS (12%). Women with a CS were older (2.3% vs 0.9% ≥40 years, p=0.008), were more often augmented with oxytocin (83.6% vs 67.5%, p<0.001), used more often epidural analgesia (63.2% vs 46.6%, p<0.001), had less postpartum haemorrhage (4.1% vs 10%, p=0.005), had less blood transfusions (0% vs 2.2%, p=0.017), and had more meconium stained amniotic fluid (30.9% vs 22.8%, p=0.011) compared to women without a CS. The neonates of women with a CS had a higher birth weight (19.1% vs 12% ≥4000gr, p=0.020), had more often an APGAR <7 at 5 minutes (4.1% vs 1.4%, p=0.008), were admitted to the neonatal intensive care unit more often (0.9% vs 0%, p<0.001), and were admitted to the neonatal unit more often (15.9% vs 7.9%, p<0.001) compared to the neonates of women without a CS. The CS rate in group 1 decreased from 14% to 9%.

In 2020 and 2021, 95 CS were performed in group 1. Most of these CS were performed because of fetal intolerance for oxytocin (41%), followed by failure to progress because of fetal malposition (24%), and cephalopelvic disproportion (11%). No statements can be made about differences in the perinatal and maternal epidemiological variables, events and outcomes between the indications for the CS in Robson group 1 because of small numbers.

X AT Z, , THE NETHERLANDS.
JANUARY – DECEMBER 2018

GROUP	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative group contribution to overall CS rate (%)
GROUP 1	62	438	25%	14%	4%	13%
GROUP 2A	66	271	16%	24%	4%	13%
GROUP 2B	13	13	1%	100%	1%	3%
GROUP 3	11	261	15%	4%	1%	2%
GROUP 4A	13	230	13%	6%	1%	3%
GROUP 4B	24	24	1%	100%	1%	5%
GROUP 5A	129	207	12%	62%	7%	26%
GROUP 5B	30	30	2%	100%	2%	6%
GROUP 6	63	66	4%	95%	4%	13%
GROUP 7	27	35	2%	77%	2%	5%
GROUP 8	15	32	2%	47%	1%	3%
GROUP 9	5	5	0%	100%	0%	1%
GROUP 10	34	124	7%	27%	2%	7%
TOTAL	492	1736				

OVERALL CS RATE 28%
- 60% ELECTIVE CAESAREAN SECTIONS
- 40% NON-ELECTIVE CAESAREAN SECTIONS
- 14% CAESAREAN SECTIONS AFTER TRIAL OF LABOUR

X AT Z, , THE NETHERLANDS.
JANUARY – DECEMBER 2019

GROUP	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative group contribution to overall CS rate (%)
GROUP 1	63	452	25%	14%	4%	13%
GROUP 2A	69	318	18%	22%	4%	14%
GROUP 2B	18	18	1%	100%	1%	4%
GROUP 3	10	283	16%	4%	0%	2%
GROUP 4A	11	192	11%	6%	1%	2%
GROUP 4B	21	21	1%	100%	1%	4%
GROUP 5A	145	248	14%	58%	8%	30%
GROUP 5B	40	40	2%	100%	2%	8%
GROUP 6	54	61	3%	89%	3%	11%
GROUP 7	19	23	1%	83%	1%	4%
GROUP 8	15	28	2%	54%	1%	3%
GROUP 9	7	7	0%	100%	0%	0%
GROUP 10	18	91	5%	20%	1%	4%
TOTAL	490	1782				

OVERALL CS RATE 27%
- 58% ELECTIVE CAESAREAN SECTIONS
- 42% NON-ELECTIVE CAESAREAN SECTIONS
- 14% CAESAREAN SECTIONS AFTER TRIAL OF LABOUR

X AT Z, THE NETHERLANDS.
JANUARY – DECEMBER 2020

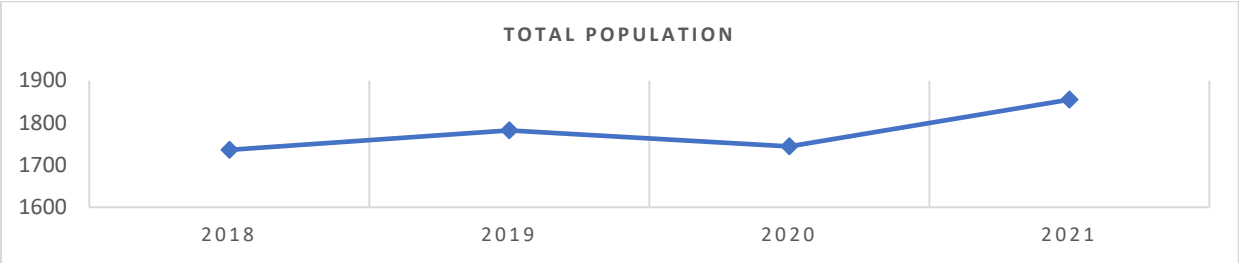
GROUP	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative group contribution to overall CS rate (%)
GROUP 1	44	425	24%	10%	3%	10%
GROUP 2A	55	291	17%	19%	3%	13%
GROUP 2B	5	5	0%	100%	0%	1%
GROUP 3	10	242	14%	4%	1%	2%
GROUP 4A	11	272	16%	4%	1%	3%
GROUP 4B	18	18	1%	100%	1%	4%
GROUP 5A	127	213	12%	60%	7%	29%
GROUP 5B	57	57	3%	100%	3%	13%
GROUP 6	52	61	3%	85%	3%	12%
GROUP 7	22	25	1%	88%	1%	5%
GROUP 8	8	28	2%	29%	0%	2%
GROUP 9	5	5	0%	100%	0%	1%
GROUP 10	23	102	6%	23%	1%	5%
TOTAL	437	1744				

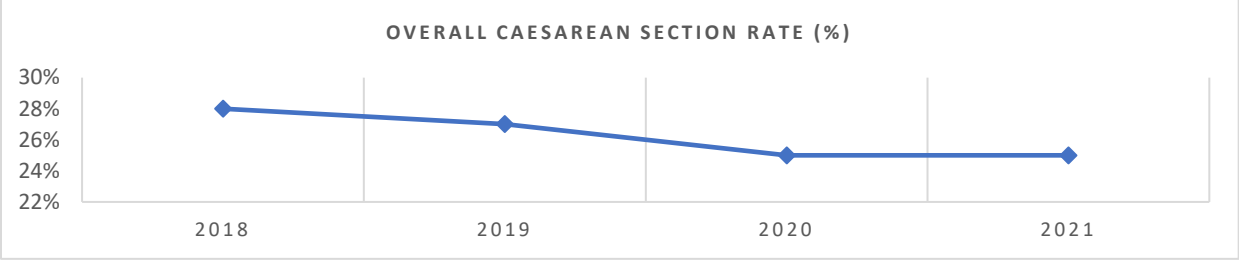
OVERALL CS RATE 25%
- 62% ELECTIVE CAESAREAN SECTIONS
- 38% NON-ELECTIVE CAESAREAN SECTIONS
- 11% CAESAREAN SECTIONS AFTER TRIAL OF LABOUR

X AT Z, , THE NETHERLANDS.
JANUARY – DECEMBER 2021

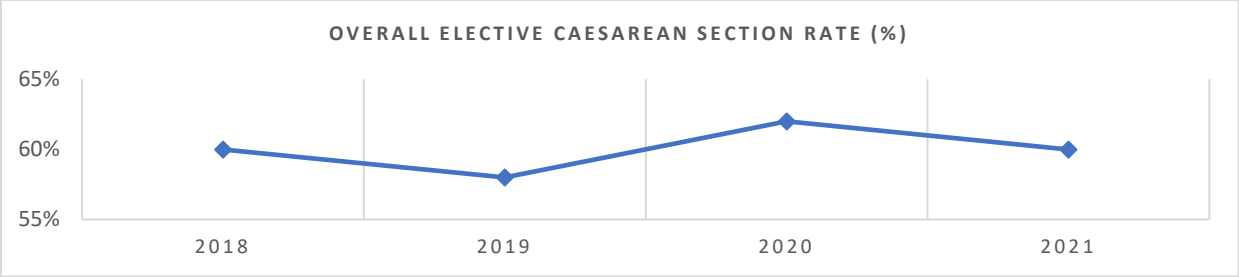
GROUP	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative group contribution to overall CS rate (%)
GROUP 1	51	538	29%	9%	3%	11%
GROUP 2A	64	305	16%	21%	3%	14%
GROUP 2B	14	14	1%	100%	1%	3%
GROUP 3	11	259	14%	4%	1%	2%
GROUP 4A	8	222	12%	4%	0%	2%
GROUP 4B	23	23	1%	100%	1%	5%
GROUP 5A	112	192	10%	58%	6%	24%
GROUP 5B	47	47	3%	100%	3%	10%
GROUP 6	52	68	4%	76%	3%	11%
GROUP 7	25	28	2%	89%	1%	5%
GROUP 8	22	43	2%	51%	1%	5%
GROUP 9	6	6	0%	100%	0%	1%
GROUP 10	26	110	6%	24%	1%	6%
TOTAL	461	1855				

OVERALL CS RATE 25%
- 60% ELECTIVE CAESAREAN SECTIONS
- 40% NON-ELECTIVE CAESAREAN SECTIONS
- 12% CAESAREAN SECTIONS AFTER TRIAL OF LABOUR

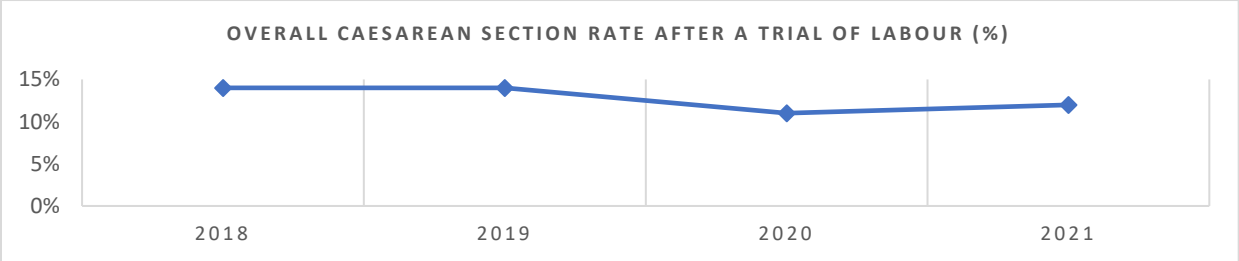




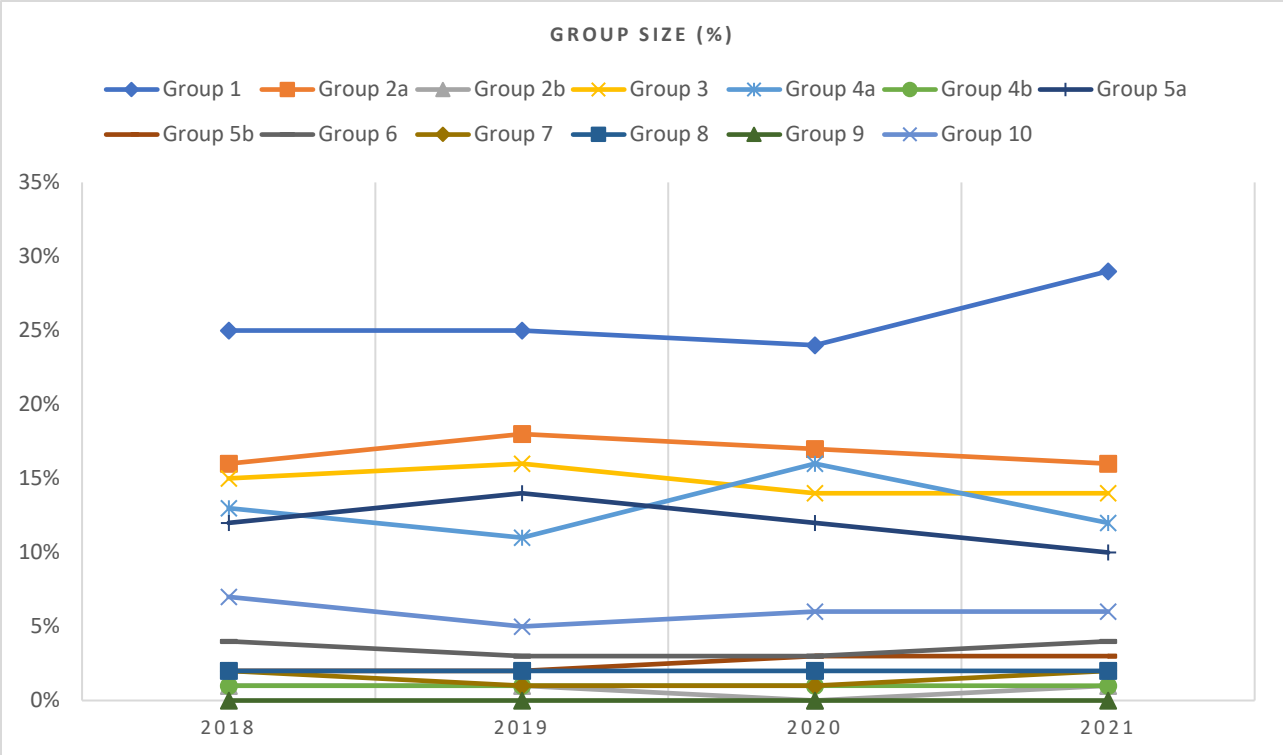
Overall caesarean section rate: calculated by the number of caesarean sections in the population divided by the number of women in the population x 100%



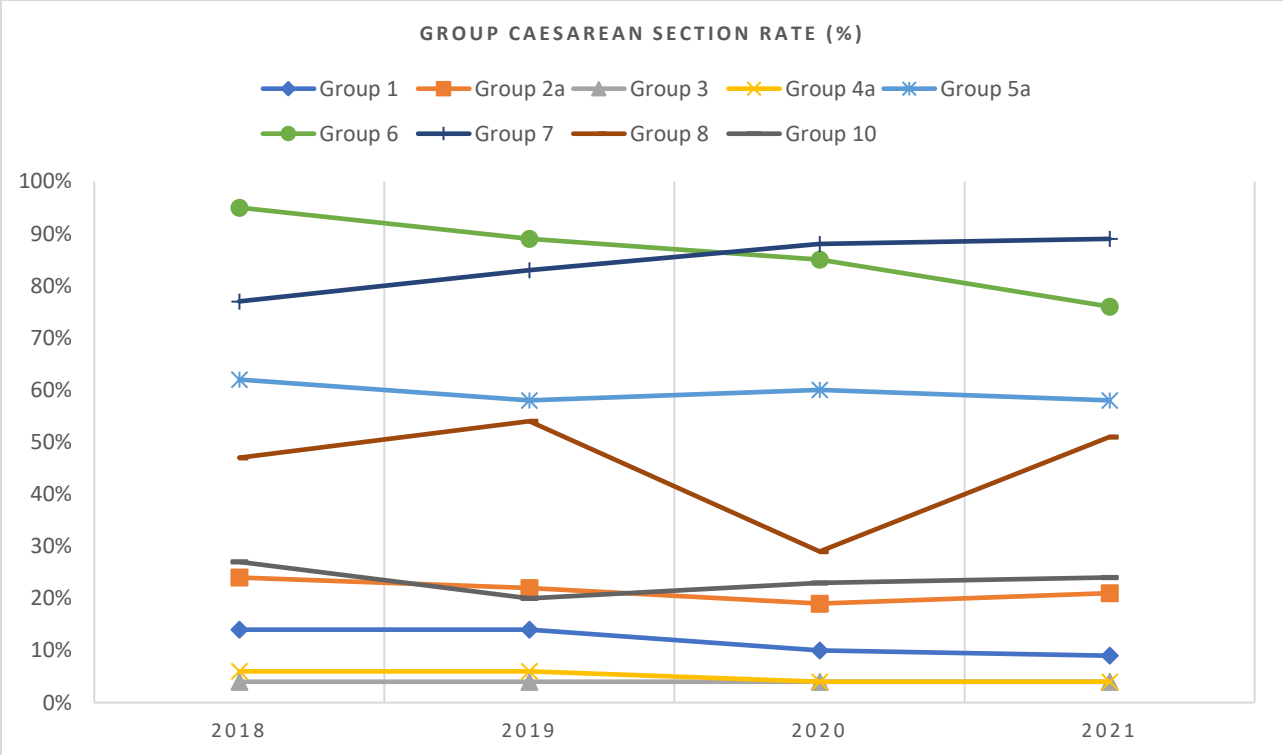
Overall elective caesarean section rate: calculated by the number of elective caesarean sections in the population divided by the number of caesarean sections (elective and emergency) in the population x 100%



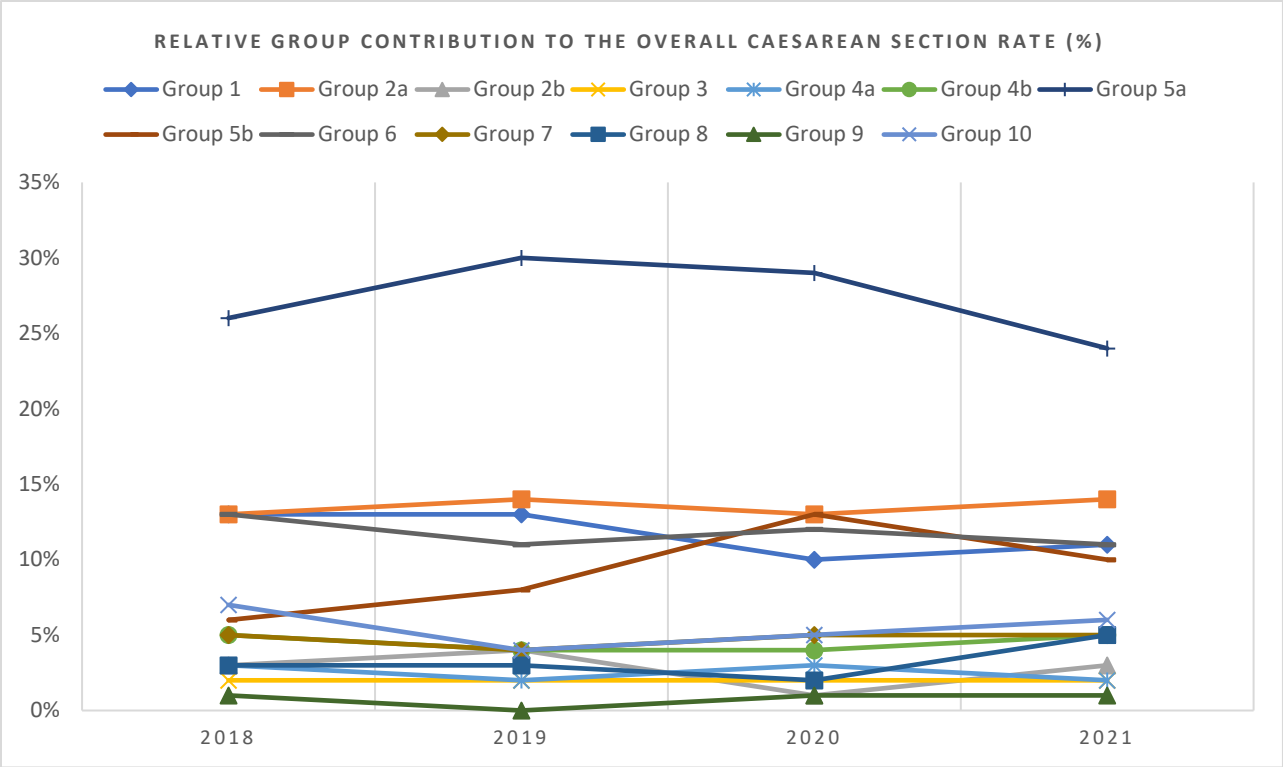
Overall caesarean section rate after a trial of labour: calculated by the number of caesarean sections among women in the population who entered a trial of labour divided by the number of women in the population who entered a trial of labour 100%



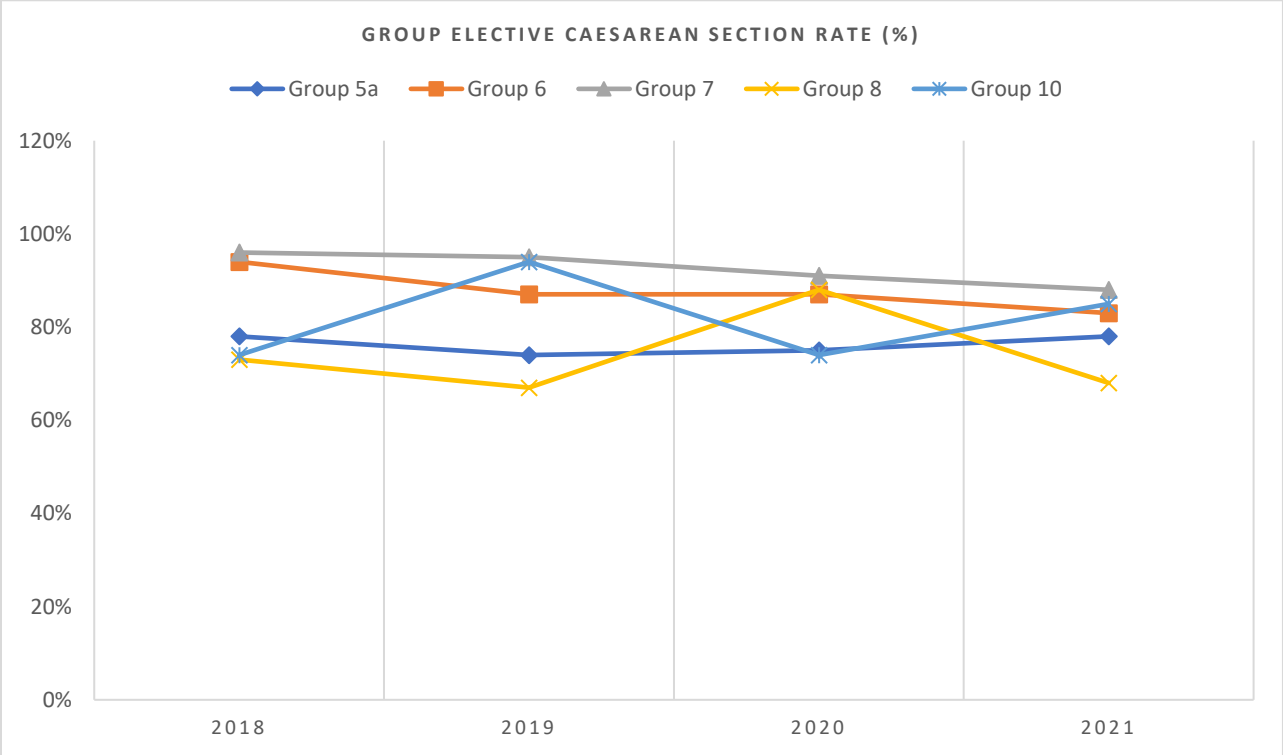
Group size: calculated by the number of women in the group divided by the number of women in the population x 100%



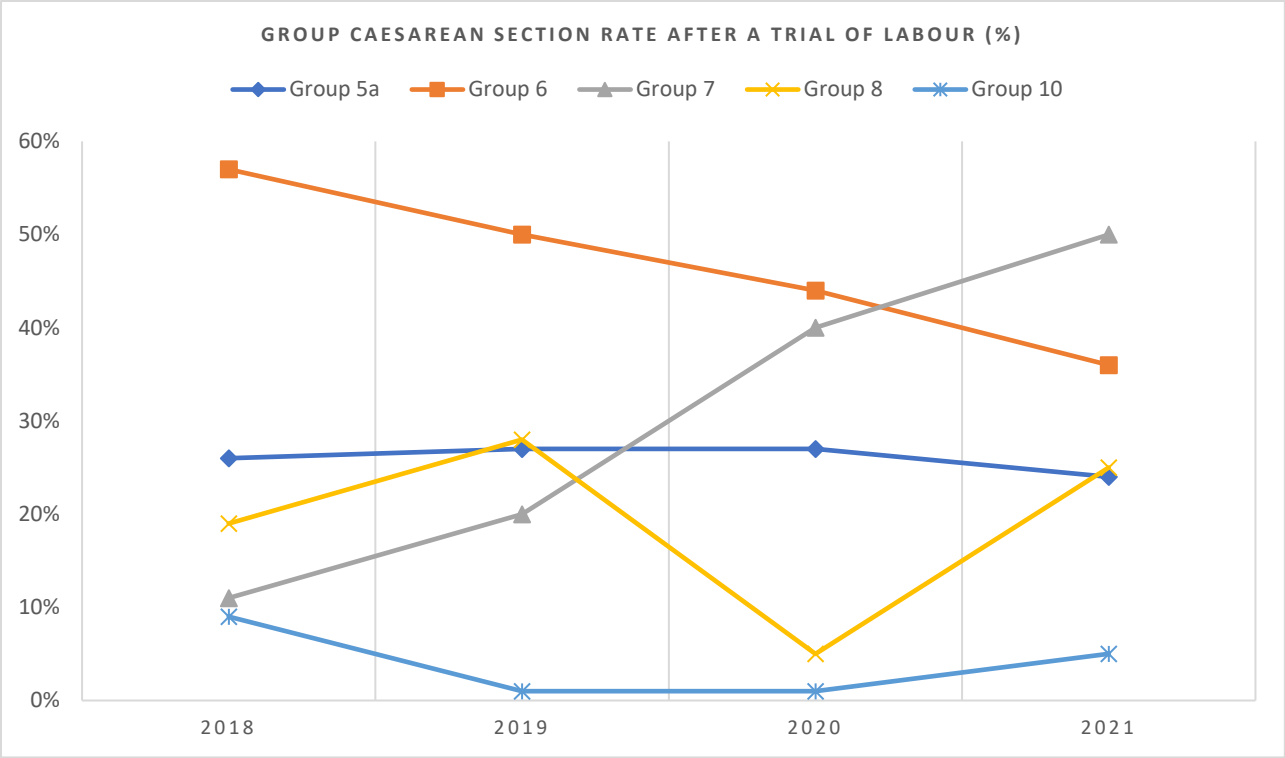
Group caesarean section rate: calculated by the number of caesarean sections in the group divided by the number of women in the group x 100%



Relative group contribution to the overall caesarean section rate: calculated by the number of caesarean sections in the group divided by the number of caesarean sections in the population x 100%



Group elective caesarean section rate: calculated by the number of elective caesarean sections in the group divided by the number of caesarean sections (elective and emergency) in the group x 100%
Only groups 5a, 6, 7, 8, and 10 have been presented, because women in these groups may opt for an elective caesarean section or a trial of labour.



Group caesarean section rate after a trial of labour: calculated by the number of caesarean sections among women in the group who entered a trial of labour divided by the number of women in the group who entered a trial of labour 100%.
Only groups 5a, 6, 7, 8, and 10 have been presented, because women in these groups may opt for an elective caesarean section or a trial of labour.

ASSESSMENT QUALIITY OF DATA	
Total number of CS and women delivered	✓
Size of group 9 <1%	✓
CS rate of group 9 100%	✓

ASSESSMENT CAESAREAN SECTION RATES X VS ROBSON GUIDELINE

Group	Group CS rate X 2018 to 2021	Group CS rate X 2018	Group CS rate X 2019	Group CS rate X 2020	Group CS rate X 2021	Robson guideline
Group 1	11%	14%	14%	10%	9%	<10%
Group 2	24%	27%	25%	20%	24%	20-35%
Group 3	4%	4%	4%	4%	4%	<3%
Group 4	12%	14%	15%	10%	12%	<15%
Group 5	66%	67%	64%	68%	66%	50-60%
Group 6	86%	95%	89%	85%	76%	-
Group 7	83%	77%	83%	88%	89%	-
Group 8	45%	47%	54%	29%	51%	60%
Group 9	100%	100%	100%	100%	100%	100%
Group 10	23%	27%	20%	23%	24%	30%

PERINATAL AND MATERNAL EPIDEMIOLOGICAL VARIABLES, EVENTS AND OUTCOMES IN ROBSON GROUP 1 IN 2018 TO 2021
CAESAREAN SECTION VERSUS VAGINAL BIRTH

	Robson group 1: caesarean section (n = 220)	**Robson group 1: vaginal birth (n = 1611)**	**p-value**
Maternal age (years) *mean (range)*	30 (16-43)	28 (16-44)	**<0.001**
Maternal age *% (n)*			
- <20 years	0.9 (2)	1.9 (31)	**0.008**
- 20-30 years	45 (99)	54.7 (882)	
- 30-40 years	51.8 (114)	42.4 (683)	
- ≥40 years	2.3 (5)	0.9 (15)	
BMI (kg/m2) *mean (range)*	25 (18-48)	24 (14-50)	**0.037**
BMI *% (n)*			
- <30 kg/m2	52.3 (115)	56.6 (912)	0.494
- ≥30 kg/m2	9.5 (21)	8.7 (140)	
- Missing	38.2 (84)	34.7 (559)	
Ethnicity *% (n)*			
- Caucasian	79.5 (175)	77.5 (1248)	0.487
- non-Caucasian	20.5 (45)	22.5 (363)	
Smoking *% (n)*			
- Yes	6.8 (15)	6.3 (102)	0.717
- No	70.9 (156)	73.1 (1178)	
- Missing	22.3 (49)	20.5 (331)	
Augmentation with oxytocin *% (n)*			
- Yes	83.6 (184)	67.5 (1088)	**<0.001**
- No	16.4 (36)	32.5 (523)	
Pain relief *% (n)*			
- None	21.4 (47)	27.1 (437)	**<0.001**
- Epidural analgesia	63.2 (139)	46.6 (751)	
- Remifentanil	12.7 (28)	23.9 (385)	
- Epidural analgesia and remifentanil	2.7 (6)	2.4 (38)	
Mode of birth *% (n)*			
- Spontaneous	0 (0)	78.5 (1265)	**<0.001**
- Operative vaginal delivery	0 (0)	21.5 (346)	
- Caesarean section	95.5 (210)	0 (0)	
- Operative vaginal delivery and caesarean section	4.5 (10)	0 (0)	
OASIS *% (n)*			**<0.001**
- Yes	0 (0)	4.3 (69)	
- No	100 (220)	95.7 (1541)	
- Missing	0 (0)	0.1 (1)	
Episiotomy *% (n)*			**<0.001**
- Yes	1.8 (4)	48.6 (783)	
- No	98.2 (216)	51.3 (826)	
- Missing	0 (0)	0.1 (2)	
Blood loss (ml) *mean (range)*	393 (100-2000)	482 (50-5000)	0.282
Postpartum haemorrhage (≥ 1000ml) *% (n)*			
- Yes	4.1 (9)	10 (161)	**0.005**
- No	95.9 (211)	90 (1450)	
Blood transfusion *% (n)*			
- Yes	0 (0)	2.2 (36)	**0.017**
- No	99.1 (218)	97.1 (1564)	
- Missing	0.9 (2)	0.7 (11)	
Gestational age (days) *mean (range)*	281 (259-294)	279 (259-297)	**<0.001**
Meconium-stained amniotic fluid *% (n)*			
- Yes	30.9 (68)	22.8 (368)	**0.011**
- No	64.5 (142)	71.4 (1151)	
- Missing	4.5 (10)	5.7 (92)	
Birth weight (grams) *mean (range)*	3597 (2175-4825)	3458 (1880-5005)	**<0.001**
Birth weight *% (n)*			
- <2000 gram	0 (0)	0.1 (1)	**0.020**
- 2000-3000 gram	10.5 (23)	14 (226)	
- 3000-4000 gram	70.5 (155)	73.9 (1190)	
- ≥4000 gram	19.1 (42)	12 (194)	
APGAR <7 at 5 minutes *% (n)*			
- Yes	4.1 (9)	1.4 (22)	**0.008**
- No	95.5 (210)	98.6 (1589)	
- Missing	0.5 (1)	0 (0)	
Umbilical cord arterial pH *mean (range)*	7.19 (6.96-7.33)	7.17 (6.78-7.45)	**0.006**
Umbilical cord arterial pH *% (n)*			
- <7.00	1.4(3)	0.9 (14)	0.372
- 7.00-7.10	5.9 (13)	8.4 (136)	
- ≥7.10	53.6 (118)	56 (902)	
- Missing	39.1 (86)	34.7 (559)	
Neonatal admission *% (n)*			
- Admission to the NICU	0.9 (2)	0 (0)	**<0.001**
- Admission to the neonatal unit	15.9 (35)	7.9 (127)	
- No admission	83.2 (183)	92.1 (1484)	

CLASSIFICATION OF THE CAESAREAN SECTIONS IN ROBSON GROUP 1 IN 2020 AND 2021

CLASSIFICATION OF THE CAESAREAN SECTIONS	Frequency	Cumulative frequency	Relative frequency	Cumulative relative frequency
MATERNAL	1	1	1%	1%
FETAL	9	10	10%	11%
FAILURE TO PROGRESS				
• **Inefficient uterine action**				
• Local protocol violation				
> delay in oxytocin	1	11	1%	12%
> inadequate use of oxytocin	7	18	7%	19%
> no oxytocin	0	18	0%	19%
• Maximum dose of oxytocin	1	19	1%	20%
• Tachysystole	2	21	2%	22%
• Fetal intolerance for oxytocin	39	60	41%	63%
• Wrong diagnosis of labour	2	62	2%	65%
• **Efficient uterine action**				
• Fetal malposition	23	85	24%	89%
• Cephalopelvic disproportion	10	95	11%	100%

PERINATAL AND MATERNAL EPIDEMIOLOGICAL VARIABLES, EVENTS AND OUTCOMES IN ROBSON GROUP 1 IN 2020 AND 2021

PER INDICATION FOR CAESAREAN SECTION

	Fetal intolerance for oxytocin n=39	**Fetal malposition n=23**	**CPD n=10**	**Fetal n=9**	**Inadequate use of oxytocin n=7**	**Tachysystole n=2**	**Wrong diagnosis of labour n=2**	**Maternal n=1**	**Maximum dose of oxytocin n=1**	**Delay in oxytocin n=1**
Maternal age (years) *mean (range)*	30 (19-43)	30 (25-39)	30 (25-39)	27 (16-36)	30 (23-33)	36 (35-38)	35 (35-36)	27	35	24
Maternal age *% (n)*										
- <20 years	2.6 (1)	0 (0)	0 (0)	11.1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- 20-30 years	35.9 (14)	47.8 (11)	30 (3)	44.4 (4)	28.6 (2)	0 (0)	0 (0)	100 (1)	0 (0)	100 (1)
- 30-40 years	59 (23)	52.2 (12)	70 (7)	44.4 (4)	71.4 (5)	100 (2)	100 (2)	0 (0)	100 (1)	0 (0)
- ≥40 years	2.6 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BMI (kg/m2) *mean (range)*	25 (18-48)	25 (18-34)	23 (18-27)	26 (20-35)	24 (18-32)	24 (23-26)	30 (30-30)	22	23	29
BMI *% (n)*										
- <30 kg/m2	59 (23)	65.2 (15)	70 (7)	44.4 (4)	71.4 (5)	100 (2)	0 (0)	100 (1)	100 (1)	100 (1)
- ≥30 kg/m2	10.3 (4)	8.7 (2)	0 (0)	22.2 (2)	14.3 (1)	0 (0)	50 (1)	0 (0)	0 (0)	0 (0)
- Missing	30.8 (12)	26.1 (6)	30 (3)	33.3 (3)	14.3 (1)	0 (0)	50 (1)	0 (0)	0 (0)	0 (0)
Ethnicity *% (n)*										
- Caucasian	79.5 (31)	91.3 (21)	60 (6)	100 (9)	85.7 (6)	100 (2)	50 (1)	100 (1)	0 (0)	0 (0)
- non-Caucasian	20.5 (8)	8.7 (2)	40 (4)	0 (0)	14.3 (1)	0 (0)	50 (1)	0 (0)	100 (1)	100 (1)
Smoking *% (n)*										
- Yes	12.8 (5)	0 (0)	20 (2)	11.1 (1)	0 (0)	0 (0)	50 (1)	0 (0)	0 (0)	0 (0)
- No	61.5 (24)	87 (20)	80 (8)	88.9 (8)	85.7 (6)	100 (2)	50 (1)	100 (1)	100 (1)	100 (1)
- Missing	25.6 (10)	13 (3)	0 (0)	0 (0)	14.3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Augmentation with oxytocin *% (n)*										
- Yes	100 (39)	87 (20)	80 (8)	0 (0)	71.4 (5)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
- No	0 (0)	13 (3)	20 (2)	100 (9)	28.6 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pain relief *% (n)*										
- None	10.3 (4)	39.1 (9)	30 (3)	44.4 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Epidural analgesia	87.2 (34)	34.8 (8)	50 (5)	55.6 (5)	71.4 (5)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
- Remifentanil	0 (0)	21.7 (5)	20 (2)	0 (0)	28.6 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Epidural analgesia and remifentanil	2.6 (1)	4.3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mode of birth *% (n)*										
- Spontaneous	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Operative vaginal delivery	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Caesarean section	92.3 (36)	91.3 (21)	100 (10)	100 (9)	100 (7)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
- Operative vaginal delivery and caesarean section	7.7 (3)	8.7 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Blood loss (ml) *mean (range)*	424 (150-1500)	404 (200-800)	525 (150-2000)	283 (150-400)	307 (200-400)	550 (400-700)	200 (100-300)	500	100	300
Postpartum haemorrhage (≥ 1000ml) *% (n)*										
- Yes	5.1 (2)	0 (0)	20 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- No	94.9 (37)	100 (23)	80 (8)	100 (9)	100 (7)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
Blood transfusion *% (n)*										
- Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- No	100 (39)	100 (23)	100 (10)	100 (9)	100 (7)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
Gestational age (days) *mean (range)*	282 (262-292)	280 (265-290)	280 (261-292)	281 (275-287)	280 (270-290)	283 (279-287)	280 (279-281)	283	288	285
Meconium-stained amniotic fluid *% (n)*										
- Yes	35.9 (25)	26.1 (6)	40 (4)	22.2 (2)	0 (0)	50 (1)	50 (1)	0 (0)	0 (0)	0 (0)
- No	64.1 (25)	69.6 (16)	60 (6)	44.4 (4)	100 (7)	50 (1)	50 (1)	100 (1)	100 (1)	100 (1)
- Missing	0 (0)	0 (0)	0 (0)	33.3 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Birth weight (grams) *mean (range)*	3575 (2625-4280)	3532 (2745-4700)	3706 (3145-4310)	3247 (2985-3640)	3900 (3290-4825)	3955 (3950-3960)	3456 (2868-4045)	4005	4145	4214
Birth weight *% (n)*										
- <2000 gram	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- 2000-3000 gram	5.1 (2)	8.7 (2)	0 (0)	11.1 (1)	0 (0)	0 (0)	50 (1)	0 (0)	0 (0)	0 (0)
- 3000-4000 gram	82.1 (32)	87 (20)	70 (7)	88.9 (8)	57.1 (4)	100 (2)	0 (0)	0 (0)	0 (0)	0 (0)
- ≥4000 gram	12.8 (5)	4.3 (1)	30 (3)	0 (0)	42.9 (3)	0 (0)	50 (1)	100 (1)	100 (1)	100 (1)
APGAR <7 at 5 minutes *% (n)*										
- Yes	0 (0)	0 (0)	10 (1)	22.2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	100 (1)
- No	100 (39)	100 (23)	90 (9)	77.8 (7)	100 (7)	100 (2)	100 (2)	100 (1)	100 (1)	0 (0)
Umbilical cord arterial pH *mean (range)*	7.19 (6.97-7.32)	7.18 (7.01-7.31)	7.27 (7.25-7.30)	7.09 (6.97-7.25)	7.21 (7.17-7.28)	7.27 (7.24-7.31)	-	7.22	7.24	7.23
Umbilical cord arterial pH *% (n)*										
- <7.00	2.6 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- 7.00-7.10	5.1 (2)	8.7 (2)	0 (0)	33.3 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- ≥7.10	56.4 (22)	65.2 (15)	30 (3)	44.4 (4)	42.9 (3)	100 (2)	0 (0)	100 (1)	100 (1)	100 (1)
- Missing	35.9 (14)	26.1 (6)	70 (7)	22.2 (2)	57.1 (4)	0 (0)	100 (2)	0 (0)	0 (0)	0 (0)
Neonatal admission to the neonatal unit *% (n)*										
- Admission to the NICU	2.6 (1)	0 (0)	0 (0)	11.1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- Admission to the neonatal unit	10.3 (4)	0 (0)	10 (1)	33.3 (3)	0 (0)	0 (0)	50 (1)	0 (0)	0 (0)	100 (1)
- No admission	87.2 (34)	100 (23)	90 (9)	55.6 (5)	100 (7)	100 (2)	50 (1)	100 (1)	100 (1)	0 (0)
OASIS *% (n)*										
- Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- No	100 (39)	100 (23)	100 (10)	100 (9)	100 (7)	100 (2)	100 (2)	100(1)	100 (1)	100 (1)
Episiotomy *% (n)*										
- Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
- No	100 (39)	100 (23)	100 (10)	100 (9)	100 (7)	100 (2)	100 (2)	100 (1)	100 (1)	100 (1)
Fetal scalp blood *% (n)*										
- Yes	25.6 (10)	-	-	33.3 (3)	-	-	-	-	-	-
- Yes, failed	15.4 (6)	-	-	22.2 (2)	-	-	-	-	-	-
- Yes, pH >7.25	20.5 (8)	-	-	0 (0)	-	-	-	-	-	-
- No	38.5 (15)	-	-	44.4 (4)	-	-	-	-	-	-
Fetal presentation *% (n)*										
- Occipitoanterior	-	17.4 (4)	-	-	-	-	-	-	-	-
- Occipitoposterior	-	52.2 (12)	-	-	-	-	-	-	-	-
- Sinciput presentation	-	8.7 (2)	-	-	-	-	-	-	-	-
- Brow presentation	-	8.7 (2)	-	-	-	-	-	-	-	-
- Other	-	8.7 (2)	-	-	-	-	-	-	-	-
- Missing	-	4.3 (1)	-	-	-	-	-	-	-	-

ATTACHMENT 2: participant information form / proefpersonen informatie formulier (CCMO, 2022a; CCMO, 2022b)

PARTICIPANT INFORMATION FORM

Using the Robson Classification to audit the Caesarean Sections of X at Z in Robson group 1: a focus group study.

Dear Sir/Madam,

With this letter, we would like to ask you to take part in a medical study in X at Z. Participation is voluntary. You have received this letter because there is interest in your perception, ideas, and opinion on the caesarean section rate of X at Z. In this information sheet you can read about the study, what the study means for you, and what the pros and cons are. Can you read the information and decide if you want to take part? If you want to take part, you can fill in the informed consent form at the bottom of this form.

Ask your questions
You can take your decision based on the information in this information sheet. We also suggest that you do this:
- Put your questions to the investigator who gave you this information.
- Read the information on www.rijksoverheid.nl/mensenonderzoek.

General information
Rotterdam University of Applied Sciences and X at Z have set up this study. Below, we always call Rotterdam University of Applied Sciences and X at Z the 'sponsors'. An investigator, The researcher, conducts the study in X at Z as part of her training to become a Physician Assistant. The Board of Directors of X at Z has approved this study.

What is the background of the study?
Worldwide caesarean section rates increase. Caesarean sections can prevent perinatal and maternal mortality but are associated with risks as well. The World Health Organization recommends that every women in need should receive a caesarean section rather than striving towards a specific rate. Caesarean section rates vary between healthcare facilities, because of differences in local obstetric populations, capacity, facilities, and protocols. To determine whether caesarean section rates are appropriate, rates in specific groups of women should be assessed, taking organizational, perinatal and maternal characteristics, epidemiological variables, events and outcomes into account. The Robson Classification is the global standard for monitoring, comparing, and assessing caesarean section rates within and between organizations. The Robson Classification classifies all women who gave birth into ten groups, based on six obstetric parameters, and offers a starting point with which to routinely audit caesarean sections, aiming to achieve and maintain appropriate caesarean section rates.

The caesarean section rate of X at Z differs from the national caesarean rate of the Netherlands. It is not

possible yet to assess whether the caesarean section rate of X at Z reflects an appropriate rate, because the Robson Classification was unknown.

In a preliminary quantitative study, the Robson Classification of X at Z has been established from 2018 to 2021. The indications for caesarean section in Robson group 1 were classified in 2020 and 2021.

What is the purpose of the study?
To audit the caesarean section rate of X at Z using the Robson Classification in order to assess whether the caesarean section rate reflects an appropriate rate. It is essential to identify potential areas for improvement in local protocols and practices in order to enable the development of quality improvement recommendations that aim to optimize future caesarean section rates of X at Z if needed. The focus is on Robson group 1 (nulliparous women with a single cephalic pregnancy and a spontaneous onset of labour ≥37 weeks of gestation).

What happens during the study?
You will be invited to a focus group that will take place on 28-04-2022 or 16-05-2022. The focus group will be composed of obstetricians, resident physicians, clinical midwives, obstetric nurses, and community midwives. For the study, you need to visit X at Z, or you will be invited for a digital meeting using Microsoft Teams. The focus group meeting will take about 2-to-2.5 hours. You will receive the results of the quantitative study no later than one week before the focus group. During the focus group, you will, based on the results from the quantitative study, discuss in a group whether the caesarean section rate of X at Z reflects an appropriate rate and identify potential areas for improvement in local protocols and practices. When no consensus will be reached during the focus group, you will be invited for a second focus group that will take about 2-to-2.5 hours. You will be asked to complete a questionnaire regarding information about your position, work experience, education level, and age. The focus group will be recorded to enable data analysis. The transcript of the focus group will be presented to you.

What agreements do we make with you?
We want the study to go well. That is why we want to make the following agreements with you:

- You go to every focus group.
- You agree with a record of the focus group.
- You should contact the investigator if you no longer want to take part in the study.

What are the pros and cons if you take part in the study?
You yourself do not benefit from taking part in this study. But if you take part, you will help the investigators to get more insight in the caesarean sections of X at Z and potential areas for improvement in local protocols and practices, which will help to develop quality improvement recommendations with the aim to optimize future caesarean section rates. Taking part in the study can have the cons that it will cost you time, and that you must comply with the study agreements.

When does the study end?
The investigator will let you know if there is any new information about the study that is important to you. The investigator will then ask you if you want to continue to take part.

In these situations, the study will stop for you:

- The end of the whole study has been reached.
- You want to stop participating in the study yourself. You can stop at any time. Report this to the investigator immediately. You do not have to explain why you want to stop. The investigators use the data that has been collected up to the moment that you decide to stop participating in the study.
- One of the following authorities decides that the study should stop:
    - Rotterdam University of Applied Sciences or X at Z
    - The Board of Directors or the Medical Ethics Review Committee assessing the study

What happens after the study has ended?
After you took part in the study, the investigator will inform you about the most important results of the study.

What will be done with your data?
Are you taking part in the study? Then you also give your consent to collect, use and store your data.

What data do we store?
- A record of the focus group
- Your name
- Your position
- Your work experience
- Your educational level
- Your age

Why do we collect, use and store your data?
We collect, use and store your data to answer the questions of this study and to be able to publish the results.

How do we protect your privacy?
To protect your privacy, all data will be treated confidentially, analyzed anonymously, and will be stored on a secured computer account. In reports and publications about the study, nobody will be able to see that it was about you.

Who can see your data?
Some people can see your name and other personal information. These are people checking whether the investigators are carrying out the study properly and reliably. These people will keep your information confidential. We ask you to give permission for this access. These persons can access your data:

- Members of the committee that keeps an eye on the safety of the study.
- An auditor who works for the sponsors.

For how long do we store your data?
Your data may also be important after this study for other medical research. For this purpose, your data will be stored for 20 years. Please indicate in the consent form whether you agree with this. Do you not

want to give your consent? Then you can still take part in this study.

Can you take back your consent for the use of your data?
You can take back your consent for the use of your data at any time. But please note: if you take back your consent, and the investigators have already collected data for research, they are still allowed to use this information.

Do you want to know more about your privacy?

- Do you want to know more about your rights when processing personal data? Visit www.autoriteitpersoonsgegevens.nl.
- Do you have questions about your rights? Or do you have a complaint about the processing of your personal data? Please contact the person who is responsible for processing your personal data. For the present, this is The researcher.
- If you have any complaints about the processing of your personal data, we recommend that you first discuss them with the investigator. You can also contact the Data Protection Officer of X at Z or submit a complaint to the Dutch Data Protection Authority.

Will you receive compensation if you participate in the study?
You will receive no compensation if you participate in the study.

Do you have any questions?
You can ask questions about the study to The researcher.

How do you give consent for the study?
You can first think carefully about this study. Then you tell the investigator if you understand the information and if you want to take part or not. If you want to take part, fill in the consent form that you can find with this information sheet. You and the investigator will both get a signed version of this consent form.

Thank you for your attention.

Kinds regards,

The researcher

PROEFPERSONEN INFORMATIE FORMULIER

Using the Robson Classification to audit the Caesarean Sections of X at Z in Robson group 1: a focus group study.

Geachte heer/mevrouw,

Met deze informatiebrief willen we u vragen of u wilt meedoen aan medisch-wetenschappelijk onderzoek in X at Z. Meedoen is vrijwillig. U krijgt deze brief omdat er interesse is in uw perceptie, ideeën en mening over de sectio caesarea van X at Z. U leest hier om wat voor onderzoek het gaat, wat het onderzoek voor u betekent, en wat de voor- en nadelen zijn. Wilt u de informatie doorlezen en beslissen of u wilt meedoen? Als u wilt meedoen kunt u het toestemmingsformulier invullen dat u onderaan deze informatiebrief kunt vinden.

Stel uw vragen
U kunt uw beslissing nemen met de informatie die u in deze informatiebrief vindt. Daarnaast raden we u aan om dit te doen:
- Stel vragen aan de onderzoeker die u deze informatie geeft.
- Lees de informatie op www.rijksoverheid.nl/mensenonderzoek.

Algemene informatie
Hogeschool Rotterdam en X at Z hebben dit onderzoek opgezet. Hieronder noemen we Hogeschool Rotterdam en X at Z steeds de 'opdrachtgever'. De onderzoeker voert dit onderzoek uit in X at Z in het kader van haar opleiding tot Physician Assistant. De Raad van Bestuur van X at Z heeft goedkeuring gegeven om dit onderzoek uit te voeren.

Wat is de achtergrond van het onderzoek?
Wereldwijd neemt het sectiopercentage toe. Sectio caesarea kunnen perinatale en maternale mortaliteit voorkomen, maar zijn ook geassocieerd met risico's. De Wereldgezondheidsorganisatie beveelt aan dat elke vrouw een sectio caesarea dient te krijgen wanneer dat medisch is geïndiceerd, in plaats van het streven naar een specifiek sectiopercentage. Sectiopercentage variëren tussen ziekenhuizen vanwege verschillen in lokale obstetrische populaties, capaciteiten, faciliteiten en protocollen. Om te bepalen of sectiopercentages passend zijn dienen sectiopercentages bij specifieke groepen vrouwen te worden beoordeeld, waarbij organisatorische, perinatale en maternale variabelen mede worden beoordeeld. De Robson Classification wordt aanbevolen als de wereldwijde standaard voor het monitoren, vergelijken en beoordelen van sectiopercentages binnen en tussen ziekenhuizen. De Robson Classification classificeert alle bevallen vrouwen in tien groepen op basis van zes obstetrische parameters en biedt een uitgangspunt voor het routinematig auditeren van sectio caesarea, waarbij het behalen en behouden van een passend sectiopercentage wordt beoogd.

Het sectiopercentage van X at Z verschilt van het Nederlandse sectiopercentage. Het is nog niet mogelijk om te beoordelen of het sectiopercentage van X at Z passend is of niet, omdat de Robson Classification nog niet bekend was.

In een voorafgaande kwantitatieve studie is de Robson Classification van X at Z van 2018 tot en met 2021 opgesteld. De indicaties voor de sectio caesarea in Robson groep 1 zijn geclassificeerd in 2020 en 2021.

Wat is het doel van het onderzoek?
Het auditeren van de sectio caesarea van X at Z middels de Robson Classification om te beoordelen of het sectiopercentage een passend percentage betreft. Het is essentieel om verbeterpunten in lokale protocollen en praktijkvoering te identificeren om het ontwikkelen van verbetermaatregelen die beogen om toekomstige sectiopercentages van X at Z te optimaliseren, indien nodig, mogelijk te maken. De focus ligt op Robson groep 1 (nullipara met een eenling in hoofdligging en een spontaan begin van de baring ≥37 zwangerschap).

Hoe verloopt het onderzoek?
U wordt uitgenodigd voor een focusgroepbijeenkomst die zal plaatsvinden op 28-04-2022 of 16-05-2022. De focusgroep zal bestaan uit perinatologen, A(N)IOS obstetrie & gynaecologie, klinisch verloskundigen, obstetrie verpleegkundigen en eerstelijns verloskundigen. Voor het onderzoek moet u naar X at Z komen of u wordt uitgenodigd voor een digitale bijeenkomst via Microsoft Teams. De focusgroepbijeenkomst duurt ongeveer 2 tot 2.5 uur. Uiterlijk een week voor de bijeenkomst ontvangt u de resultaten van de kwantitatieve studie. Tijdens de focusgroepbijeenkomst bespreekt u op basis van deze resultaten of het sectiopercentage van X at Z een passend percentage betreft en identificeert u potentiële verbeterpunten in lokale protocollen en praktijken. Wanneer er tijdens de focusgroepbijeenkomst geen consensus wordt bereikt, wordt u uitgenodigd voor een tweede focusgroepbijeenkomst die ongeveer 2 tot 2.5 uur zal duren. U wordt gevraagd een vragenlijst in te vullen omtrent informatie over uw functie, werkervaring, opleidingsniveau en leeftijd. Er wordt een opname van de focusgroepbijeenkomst gemaakt om data-analyse mogelijk te maken. Het transcript van de focusgroepbijeenkomst wordt aan u toegestuurd.

Welke afspraken maken we met u?
We willen graag dat het onderzoek goed verloopt. Daarom maken we de volgende afspraken met u:

- U neemt deel aan iedere focusgroepbijeenkomst .
- U geeft toestemming voor een opname van de focusgroepbijeenkomst .
- U neemt contact op met de onderzoeker indien u niet meer wilt meedoen met het onderzoek.

Wat zijn de voordelen en de nadelen als u meedoet aan het onderzoek?
U heeft zelf geen voordeel van meedoen aan dit onderzoek. Maar met uw deelname helpt u de onderzoekers om meer inzicht te krijgen in de sectio caesarea van X at Z en in potentiële verbeterpunten in lokale protocollen en praktijken, wat helpt bij het ontwikkelen van verbetermaatregelen met als doel om toekomstige sectiopercentages te optimaliseren. Meedoen aan het onderzoek kan als nadelen hebben dat het u tijd kost en dat u zich moet houden aan de afspraken die horen bij het onderzoek.

Wanneer stopt het onderzoek?
De onderzoeker laat het u weten als er nieuwe informatie over het onderzoek komt die belangrijk voor u is. De onderzoeker vraagt u daarna of u blijft meedoen.

In deze situaties stopt voor u het onderzoek:

- Het einde van het hele onderzoek is bereikt.
- U wilt zelf stoppen met het onderzoek. Dat mag op ieder moment. Meld dit dan meteen bij de onderzoeker. U hoeft er niet bij te vertellen waarom u stopt. De onderzoekers gebruiken de gegevens die tot het moment van stoppen zijn verzameld.
- Een van de volgende instanties besluit dat het onderzoek moet stoppen:
    - Hogeschool Rotterdam of X at Z
    - De Raad van Bestuur of Medische Toetsingscommissie die het onderzoek beoordeelt

Wat gebeurt er na het onderzoek?
Na uw deelname laat de onderzoeker u weten wat de belangrijkste uitkomst en zijn van het onderzoek.

Wat doen we met uw gegevens?
Doet u mee met het onderzoek? Dan geeft u ook toestemming om uw gegevens te verzamelen, gebruiken en bewaren.

Welke gegevens bewaren we?
- Een opname van de focusgroepbijeenkomst
- Uw naam
- Uw functie
- Uw werkervaring
- Uw opleidingsniveau
- Uw leeftijd

Waarom verzamelen, gebruiken en bewaren we uw gegevens?
We verzamelen, gebruiken en bewaren uw gegevens om de vragen van dit onderzoek te kunnen beantwoorden en om de resultaten te kunnen publiceren.

Hoe beschermen we uw privacy?
Om uw privacy te beschermen worden uw gegevens vertrouwelijk behandeld, anoniem geanalyseerd en opgeslagen op een beveiligd computeraccount. Ook in rapporten en publicaties over het onderzoek kan niemand terughalen dat het over u ging.

Wie kunnen uw gegevens zien?
Sommige personen kunnen wel uw naam en andere persoonlijke gegevens inzien. Dit zijn mensen die controleren of de onderzoekers het onderzoek goed en betrouwbaar uitvoeren. Deze personen houden uw gegevens geheim. Wij vragen u voor deze inzage toestemming te geven. Deze personen kunnen bij uw gegevens komen:

- Leden van de commissie die de veiligheid van het onderzoek in de gaten houdt.
- Een controleur die voor de opdrachtgever werkt.

Hoelang bewaren we uw gegevens?
Uw gegevens kunnen na afloop van dit onderzoek ook nog van belang zijn voor ander wetenschappelijk

onderzoek. Daarvoor zullen uw gegevens 20 jaar worden bewaard. In het toestemmingformulier geeft u aan of u dit goed vindt. Geeft u geen toestemming? Dan kunt u nog steeds meedoen met dit onderzoek.

Kunt u uw toestemming voor het gebruik van uw gegevens weer intrekken?
U kunt uw toestemming voor het gebruik van uw gegevens op ieder moment intrekken. Maar let op: trekt u uw toestemming in, en hebben onderzoekers dan al gegevens verzameld voor een onderzoek? Dan mogen zij deze gegevens nog wel gebruiken.

Wilt u meer weten over uw privacy?

- Wilt u meer weten over uw rechten bij de verwerking van persoonsgegevens? Kijk dan op www.autoriteitpersoonsgegevens.nl.
- Heeft u vragen over uw rechten? Of heeft u een klacht over de verwerking van uw persoonsgegevens? Neem dan contact op met degene die verantwoordelijk is voor de verwerking van uw persoonsgegevens. Voor uw onderzoek is dat de onderzoeker.
- Als u klachten heeft over de verwerking van uw persoonsgegevens, raden we u aan om deze eerst te bespreken met het onderzoeksteam. U kunt ook naar de Functionaris Gegevensbescherming van X at Z gaan of een klacht indienen bij de Autoriteit Persoonsgegevens.

Krijgt u een vergoeding als u meedoet aan het onderzoek?
U krijgt geen vergoeding als u meedoet aan dit onderzoek.

Heeft u vragen?
Vragen over het onderzoek kunt u stellen aan de onderzoeker.

Hoe geeft u toestemming voor het onderzoek?
U kunt eerst rustig nadenken over dit onderzoek. Daarna vertelt u de onderzoeker of u de informatie begrijpt en of u wel of niet wilt meedoen. Wilt u meedoen? Dan vult u het toestemmingsformulier in dat u onderaan deze informatiebrief vindt. U en de onderzoeker krijgen allebei een getekende versie van deze toestemmingsverklaring.

Dank voor uw tijd.

Met vriendelijke groet,

De onderzoeker

ATTACHMENT 3: questionnaire / vragenlijst

QUESTIONNAIRE BELONGING TO 'USING THE ROBSON CLASSIFICATION TO AUDIT THE CAESAREAN SECTIONS OF X AT Z IN ROBSON GROUP 1: A FOCUS GROUP STUDY.'

1. **What is your name?**

   …….

2. **What is your function?**
   - ☐ Obstetrician
   - ☐ Resident physician
   - ☐ Clinical midwife
   - ☐ Community midwife
   - ☐ Nurse
   - ☐ Other, namely: …….

3. **What is your work experience in obstetrics?**
   - ☐ < 5 years
   - ☐ 5 – 10 years
   - ☐ 10 – 20 years
   - ☐ > 20 years

4. **What is your educational level?**
   - ☐ University
   - ☐ University of applied science (HBO)
   - ☐ Other, namely: …….

5. **What is your age?**

   ……. years

VRAGENLIJST BEHORENDE BIJ 'USING THE ROBSON CLASSIFICATION TO AUDIT THE CAESAREAN SECTIONS OF X AT Z IN ROBSON GROUP 1: A FOCUS GROUP STUDY.'

1. **Wat is uw naam?**

   …….

2. **Wat is uw functie?**
   - ☐ Gynaecoloog
   - ☐ A(N)IOS obstetrie & gynaecologie
   - ☐ Klinisch verloskundige
   - ☐ Eerstelijns verloskundige
   - ☐ Obstetrie verpleegkundige
   - ☐ Anders, nameljik: …….

3. **Wat is uw werkervaring in de obstetrie?**
   - ☐ < 5 jaar
   - ☐ 5 – 10 jaar
   - ☐ 10 – 20 jaar
   - ☐ > 20 jaar

4. **Wat is uw opleidingsniveau?**
   - ☐ Universiteit
   - ☐ Hoger Beroepsonderwijs (HBO)
   - ☐ Anders, namelijk: …….

5. **Wat is uw leeftijd?**

   ……. jaar

ATTACHMENT 4: topic list focus group

Key questions

- Reflects the caesarean section rate an appropriate rate?
- Which organizational characteristics are associated with the indications for the caesarean sections in Robson group 1?
- Which perinatal and maternal epidemiological variables, events and outcomes are associated with the indications for the caesarean sections in Robson group 1?
- Which areas for improvement in local protocol and practices can be identified?
- Which quality improvement recommendations are possible?
- Which quality improvement recommendations are feasible?

Key points

- Education, birth preparation classes and support programmes
- Caesarean section audit
- Second opinion for caesarean section indications
- Model of obstetric care
- Implementation of evidence-based practice clinical guidelines
- Partogram
- Diagnosing fetal distress
- Birth environment
- Continuous labour support

Introduction

- Welcome
- Goal
- Practical information
- Informed consent
- Questionnaire
- Questions?

2. Robson Classification

- Experiences & insights

3. Classification of the indications for the caesarean sections in Robson group 1

- Maternal
- Fetal distress (no oxytocin)
- Fetal malposition
- Cephalic disproportion
- Local protocol violation
- Maximum dose of oxytocin
- Inability to treat, tachysystole
- Inability to treat, fetal distress
- Wrong diagnosis of labour

4. **Other**
    - Which quality improvement recommendation should be introduced first?
    - For which other Robson groups subgroup future analysis is recommended?

5. **Closing**
    - Summary
    - Practical information
    - Questions?

ATTACHMENT 6: informed consent / toestemmingsformulier (CCMO, 2022a; CCMO, 2022b)

INFORMED CONSENT BELONGING TO 'USING THE ROBSON CLASSIFICATION TO AUDIT THE CAESAREAN SECTIONS OF X AT Z IN ROBSON GROUP 1: A FOCUS GROUP STUDY.'

- I have read the information sheet. I was able to ask questions. My questions have been answered well enough. I had enough time to decide if I wanted to take part.
- I know that taking part is voluntary. I also know that at any time I can decide not to take part in the study. Or to stop taking part. I do not have to explain why.
- I give consent to collect and use my data.
- I know that some people will be able to see all of my data to review the study. These people are mentioned in the information sheet. I give consent to let them see my data for this review.
- Please tick yes or no in the table below.

I give consent to ask me after this study if I want to participate in a follow-up study.	Yes ☐	No ☐
I give consent to store my data to use for other research, as stated in the information sheet.	Yes ☐	No ☐

- I want to take part in this study.

My name is (subject): ……..
Signature: …… Date : __/__/__

I declare that I have fully informed this subject about the study mentioned.

If any information becomes known during the study that could influence the subject's consent, I will let this subject know in good time.

Investigator name: .....
Signature:…… Date: __/__/__

TOESTEMMINGSFORMULIER BEHORENDE BIJ 'USING THE ROBSON CLASSIFICATION TO AUDIT THE CAESAREAN SECTIONS OF X AT Z IN ROBSON GROUP 1: A FOCUS GROUP STUDY.'

- Ik heb de informatiebrief gelezen. Ook kon ik vragen stellen. Mijn vragen zijn goed genoeg beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.
- Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen met het onderzoek. Of om ermee te stoppen. Ik hoef dan niet te zeggen waarom ik wil stoppen.

- Ik geef de onderzoekers toestemming om mijn gegevens te verzamelen en gebruiken.
- Ik weet dat voor de controle van het onderzoek sommige mensen al mijn gegevens kunnen inzien. Die mensen staan in deze informatiebrief. Ik geef deze mensen toestemming om mijn gegevens in te zien voor deze controle.
- Wilt u in de tabel hieronder ja of nee aankruisen?

Ik geef toestemming om mij eventueel na dit onderzoek te vragen of ik wil meedoen met een vervolgonderzoek.	Ja ☐	Nee ☐
Ik geef toestemming om mijn gegevens te bewaren om dit te gebruiken Voor ander onderzoek, zoals in de informatiebrief staat.	Ja ☐	Nee ☐

- Ik wil meedoen aan dit onderzoek.

Mijn naam is (proefpersoon): ……..
Handtekening: …… Datum : __ / __ / __

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Wordt er tijdens het onderzoek informatie bekend die die de toestemming van de proefpersoon kan beïnvloeden? Dan laat ik dit op tijd weten aan deze proefpersoon.

Naam onderzoeker (of diens vertegenwoordiger):…….
Handtekening:…… Datum: __ / __ / __

ATTACHMENT 7: COREQ (COnsolidated criteria for REporting Qualitative research) checklist

Topic	Item No.	Guide/Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	11
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	1
Occupation	3	What was their occupation at the time of the study?	1
Gender	4	Was the researcher male or female?	1
Experience and training	5	What experience or training did the researcher have?	1
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	10
Participant knowledge of the interviewer	7	What did the participants know about the researcher? E.g. personal goals, reasons for doing the research	11, 38-45
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? E.g. bias, assumptions, reasons and interests in the research topic	1, 8-9
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? E.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	10
Participant selection			
Sampling	10	How were participants selected? E.g. purposive, convenience, consecutive, snowball	10
Method of approach	11	How were participants approached? E.g. face-to-face, telephone, mail, email	10
Sample size	12	How many participants were in the study?	12
Non-participation	13	How many people refused to participate or dropped out? Reasons?	N/A
Setting			
Setting of data collection	14	Where was the data collected? E.g. home, clinic, workplace	11
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	11
Description of sample	16	What are the important characteristics of the sample? E.g. demographic data, date	12
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	11,19
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect data?	11
Field notes	20	Were field notes made during and/or after the interview or focus group?	11,19

Duration	21	What was the duration of the interviews or focus group?	12
Data saturation	22	Was data saturation discussed?	11
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	11
Domain 3: Analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	11
Description of the coding tree	25	Did authors provide a description of the coding tree?	13
Derivation of themes	26	Were themes identified in advance or derived from the data?	13
Software	27	What software, if applicable, was used to manage the data?	11
Participant checking	28	Did participants provide feedback on the findings?	11
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? E.g. participant number	13-17
Data and findings consistent	30	Was there consistency between the data presented and the findings?	12-17
Clarity of major themes	31	Were major themes clearly presented in the findings?	12-17
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	12-17