

Pregnant women's views on the timing of prophylactic antibiotics during caesarean delivery: a qualitative semi-structured interview study

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Abstract

Objective: To gain insight into pregnant women's preference if given a choice between getting antibiotic prophylaxis before or after cord clamping during caesarean delivery. **Design:** A qualitative semi-structured interview-study **Setting:** The interviews were conducted at a Danish Hospital, with about 4000 births a year. **Sample:** Fourteen pregnant women, either considering or having a planned caesarean section, or scheduled for induction due to post-term gestational age. **Methods:** Fourteen individual semi-structured interviews were conducted, and a systematic text condensation approach was used to analyse the transcribed interviews. **Main Outcome Measures:** Patient perspectives. **Results:** Ten of the fourteen women favoured antibiotic administration after cord clamping. Despite any adverse effects to the infant's microbiota and increased risk of long-term health outcomes were only hypothetical and the risk reduction in postpartum infections being well documented, they did not want to expose their offspring to antibiotics. Those who preferred antibiotic prophylaxis before cord clamping were concerned, if they would be able to care for the infant in case of a maternal infection. Three of the women preferring antibiotics after cord clamping said they would potentially change preference, if the maternal risk was higher. Most women preferred to be informed of the use of prophylactic antibiotic and that the timing has consequences for trans-placental exposure to the infant. **Conclusions:** With most of the interviewed women preferring antibiotic administration after cord clamping, we suggest patients should be involved in the decision regarding timing of prophylactic antibiotics before caesarean section. **Funding:** None.

Introduction

Whether prophylactic antibiotics should be administered before or after cord clamping at caesarean section have been discussed. Today most obstetric societies recommend administration 30-60 minutes before the caesarean section (1). However, currently no studies are available concerning pregnant women's attitude toward these recommendations. As intravenous antibiotics given before the caesarean section exposes the fetus to antibiotics via placental transfer and remain in the infant up to 24 hours postpartum, the practice is not without some potential risks to the infant. These risk factors are not satisfyingly investigated.

The current recommendations are based on meta-analyses of multiple studies that state a reduced risk of postpartum endometritis and surgical site-infection, when administering antibiotics before cord clamping (2-4). However, the individual RCTs are from 18 different countries (2) of whom only one country, Austria, is comparable to Danish healthcare standards. This large study conducted in Austria did not find any significant risk reduction when antibiotic treatment was given before umbilical cord clamping compared to after (5). In addition, the primary outcomes were heterogeneous in the 18 RCTs, since some also included

evaluation of pneumonia, urinary tract infections, pyelonephritis, and fever. These outcomes were not found to be affected by the timing of the antibiotic prophylaxis (6). For those reasons, the absolute risk reduction of postoperative infections after caesarean delivery is presumably lower in Denmark than stated in aforementioned meta-analyses. Infants born by caesarean delivery have an increased risk of developing long-term complications such as asthma, allergies, and atopic dermatitis (7). The causal mechanism is unknown, but previous studies suggest that antibiotics may interfere with the natural establishment of beneficial bacteria in the infant gut, which in turn may be associated with increased risk of these disorders (8–10).

Currently no studies are available concerning pregnant women’s attitude toward the recommendations on the timing of prophylactic antibiotics during caesarean delivery.

A patient-centred approach in clinical research is becoming more common. When involving specific patient groups and gauging their attitudes towards relevant medical issues, it enables optimal healthcare by taking personal opinions, preferences, and values into account (11). Hence the aim of this study was to identify pregnant women’s attitude towards the timing of antibiotic prophylaxis in caesarean delivery as no previous studies have included women’s attitude towards such issues.

Methods

Prior to the current study, a focus group of seven women were interviewed in order to test the interview guide. One of the design consequences of this initial focus group interview was to conduct single interviews as to minimize influence from the other women. Therefore it was decided to perform semi-structured individual interviews in the current study (12,13).

Informants were purposefully sampled with four groups of pregnant women based on the stage of pregnancy. The women in the first group were interviewed at a pregnancy consultation at 28 to 37 weeks of gestation concerning the mode of delivery. The second group comprised women at term, scheduled for elective caesarean delivery. The third group consisted of women in post-term pregnancies who were attending a planned examination prior to induction of labour.

The women were asked about their preferences regarding timing of prophylactic antibiotic treatment for caesarean delivery and asked to elaborate on their choices (Appendix S1). In addition, we noted their age, parity, and body mass index (BMI), but further demographics were not collected to ensure anonymity of participants.

Sampling strategy and structure of the interviews

Initially the women were contacted in person at the hospital when they arrived for a scheduled appointment. The aim of the current interview study was briefly outlined. If they volunteered to participate, they were given the informational pamphlet intended for participants in a possible future randomised trial on prophylactic antibiotics prior to or after cord clamping at caesarean delivery (Appendix S1). Thereafter they were given enough time to read the information undisturbed. The women were interviewed using an interview guide, to ensure a focused interview and that the same topics were discussed with all women (see Table S1). However, the interview structure remained flexible, allowing for follow-up questions to be asked if the women’s answers were unclear or needed elaboration. It allowed the researcher to explore unanticipated issues and to consider additional questions for the subsequent interviews. The women were both thoroughly asked about their preferences regarding antibiotic treatment and also about their attitudes to participation in a future RCT. Only the first issue about the preferences is discussed in this study.

The interviews were conducted from February to June 2020. All interviews were audio-recorded, and subsequently transcribed verbatim and anonymized by the first author. The women had no prior information regarding the local antibiotic prophylaxis procedures, until after the interview.

Additionally, post hoc interviews were performed where pregnant women in various stages of pregnancy were asked about their views on the neutrality and objectivity of the informational pamphlet (see Table S2).

Analyses

The analyses were performed by two authors, including the interviewer, using a systematic text condensation approach described by Malterud (12) to make a cross-sectional analysis of the interviews and to ensure a systematic interpretation aided by NVivo version 12 by QSR International (15).

First, themes were noted during a read-through of the interview-transcripts. Second, coding was then conducted by identifying and sorting *meaning units* - a text paragraph from the interview-transcript contributing to illustrate the issue - on which the main categories were based (Table 2). The main categories were divided into two or three sub-categories, but these sub-categories were adjusted if necessary, to ensure nuances of the answers were covered. When the two authors had agreed on the final sub-categories, they were used for the third step - condensation. Each sub-category was condensed in a process described as making false quotations, which is an essential step for the systematic text condensation approach. Finally, the condensates were synthesized and recontextualised. Our recapitulations were validated with the *meaning units* from the interview to ensure accordance between the data and our recontextualization and representative quotations were used as substantiation. The process remained flexible as the authors discussed the interviews as they progressed and if new themes emerged the above process was fully or partially repeated.

Results

Fourteen pregnant women from three different groups were asked to participate in the study, and all consented to an interview. Furthermore, eight women in different stages of the pregnancy were interviewed post hoc (Table 1).

Initially eight themes were noted in the first read of the transcripts, but from these themes two final main categories emerged, each with two sub-categories (Table 2 shows the two main categories). The post hoc interviews did not contribute with new themes.

Reflecting on attitudes towards the use of antibiotics

The women's preferences: Preferring antibiotics after cord clamping

Ten of fourteen women favoured getting antibiotics after cord clamping, if given the option.

Two out of the ten women found it especially difficult to decide. This was due to the lack of evidence concerning antibiotics and the effect of the baby's gut microbiota. However, they ultimately favoured antibiotics after cord clamping. A third woman mentioned that if possible, she would choose not to get antibiotics at all:

"It depends on how much it affects the baby and from what I can read, [the informational material] doesn't explain it fully, because you don't know exactly what [the antibiotics] do, I think [...] I would prefer not to have the [antibiotics] at all, because I can't tolerate penicillin ... [but if I had to choose] I think I would prefer after [cord clamping]." (P2)

Another woman noted that one of the reasons why she favoured antibiotics to be administered after cord clamping, was because most infections were not that serious:

"I look at the percentages, and the risk of what kind of infections you could get. It is something you normally could treat with oral medication. 'Is it worth [exposing the baby to antibiotics]?', I am left thinking. Well, then it would be easier to say 'no, I want it afterwards'." (P3)

Some of the women argued how they tried to avoid perfume and other things to be cautious about during pregnancy and they considered antibiotics as being yet another thing to avoid exposing your unborn baby to. A few women also expressed how 4% risk of getting an infection seemed very low. One of these women had previously had a wound-infection herself after a caesarean delivery:

"It was not a pleasant experience and I was admitted [to the hospital], I had an open admission over 7-8 days or so with visits [at the hospital] every second day [...]. I think 4% seems like a low risk and maybe I was just unfortunate to be one of them [...]. I want to be in the group [in the trial] getting antibiotic treatment after [...] because I don't want to risk [my child] getting asthma or anything else." (P14)

Most of the women did not have any knowledge about the use of prophylactic antibiotics during caesarean delivery, and some of the women, who in general had a casual attitude toward medication, were surprised to read about these potential side-effects of antibiotic treatment.

The women's preferences: Preferring antibiotics before cord clamping

The remaining four women favoured antibiotics before cord clamping. Two of these women expressed their own health to be important in order to be able to care for the baby. Also, the prospect of a shorter hospitalization seemed to influence their decision. One woman added how she was less worried about the risk to the infant as the pregnancy had been uncomplicated. Moreover, it was noted that antibiotic treatment was probably not the only reason for infants developing both asthma, eczema and so on later in life.:

"Well, I wouldn't be nervous about [getting antibiotics before cord clamping] and if my child got [asthma, allergies, or atopic eczema], the reason might as well be something else [than the antibiotics]. I would still choose to get it before." (P5)

One woman argued that she would prioritize her baby over herself but at the same time still choose to have the antibiotics before cord clamping. It remained unclear what her motivation for choosing antibiotic treatment before cord clamping was, as the contradictory statement was not discovered before the analysis was made.

In general, seven of the fourteen women spontaneously expressed great trust in the healthcare professionals even if the local practices may have differed from their preference.

Information concerning antibiotics should be obligatory

To some extent, all the women found it important to get information on prophylactic antibiotics during caesarean delivery and the possible side-effects the treatment may cause. Two out of the four women, who were scheduled for caesarean delivery and had attended an information meeting prior to the interview, even expressed how they did not feel they had the sufficient information concerning the antibiotic treatment. However, some mentioned how it can be overwhelming as a first-time mother to get too much information and that they trusted the healthcare professionals.

Offspring vs. maternal risk

The reasons for favouring prophylactic antibiotics either before or after cord clamping were strongly associated with concerns for the baby but some of the women prioritised their own health.

Considerations of the baby

Most of the women were more concerned with the health of their baby rather than their own. The considerations were both about short-term and long-term complications. Four of the women had asthma, allergies, or eczema themselves or an afflicted child from a previous pregnancy and felt that it was important to them not to increase the risk for their unborn baby:

“I have perfume allergies that cause skin rashes [...] and I think [...] if I can do as much as possible to make sure nothing unnecessary crosses over to the baby, which may cause health problems later in life, I think as a parent, you would always do that.” (P6)

One woman told how she had always thought of her pregnant friends as prudish, as they were very aware of avoiding perfume and hormone-disrupting ingredients. However, when she got pregnant herself, she could better relate to that feeling:

“It’s not like I’m thinking the baby is in mortal danger [...] if I had used perfume during my pregnancy, but you want [babies] to be as unexposed as possible [...] when their lives begin” (P7)

Avoiding exposure to harmful substances for the baby, including antibiotics, were considered as a very high priority, especially for the ten women preferring antibiotic treatment after cord clamping.

Considerations to themselves

Ten of the women were very straightforward in their prioritization. They did not think the risk of themselves getting an infection was convincing enough to consider getting antibiotics before cord clamping. The other four women were more likely to choose antibiotics before cord clamping. One woman argued that if the infant was healthy you should be allowed to have your own health prioritised:

“But in my situation where [the pregnancy is uncomplicated], I think I am allowed to take some considerations on behalf of myself as well, as I have to take care of the baby afterwards.” (P6)

Another woman had had a difficult experience during her first birth and moreover had a friend who developed a serious wound-infection after a caesarean delivery. The thought of going through such an experience, and at the same time risk feeling inadequate as a mum, was something she wanted to avoid. Yet, another woman added how a calm and safe atmosphere right after birth is important and that a longer hospitalization would affect this.

Finally, the ten women favouring antibiotic prophylaxis after cord clamping, were asked if their preferences would be different if they were told that their risk of getting an infection was twice as high as presented in the information material. To that, three women were more likely to choose before cord clamping instead.

Post hoc interviews

The post hoc interviews with additional eight women contributed to our knowledge concerning the neutrality of the informational pamphlet. Six of these women preferred antibiotic treatment after cord clamping, one preferred before cord clamping, and one was undecided. Four women felt the information was neutrally presented, with two more women also thinking it was mostly neutral but felt the pamphlet sometimes attached importance to choosing antibiotic treatment before cord clamping. The last two women both thought the informational pamphlet emphasized antibiotic treatment before cord clamping. None believed the authors of the information pamphlet preferred antibiotic treatment after cord clamping.

Discussion

Main findings

This qualitative interview study demonstrated that the majority of the respondents favoured antibiotic treatment after cord clamping to avoid exposure to their infant. Even though increased risk of asthma and allergies is hypothetical for infants exposed to antibiotics in early infancy, women mentioned this as their primary concern. The three women who favoured antibiotic treatment before cord clamping considered effects of their own health, as they were primarily responsible for taking care of the infant immediately after birth. They argued that their decision was influenced by the prospect of a shorter hospitalization since the

risk of postpartum infection was lower if antibiotics were given before cord clamping. They emphasized that theirs being an uncomplicated pregnancy, influenced their decision.

Interpretations

Some of the women found it difficult to make a deliberated decision, as they lacked more evidence-based information. As the women did not have the chance to look deeper into this issue before making a decision, this might indicate that their decision making was emotionally motivated – protecting their offspring from any harm - rather than factual insight. Hence, they seem to have chosen the safest option for their baby. In general, the women expressed a great trust in the health care professionals, which is interesting, as the majority of the women actually would choose the opposite treatment than recommended by the guidelines and healthcare professionals – something they were informed about. Possibly the wording of the informational pamphlet could have affected the outcome of the women’s answers, but the post hoc interviews did not indicate that this was a concern: Six of the eight women commented it was written mostly neutrally and the last two women expressed they thought the informational pamphlet emphasised antibiotic treatment before cord clamping in accordance with the applicable guidelines.

The fact that most postpartum infections related to a caesarean delivery could be treated with oral antibiotics also seemed to affect the decision of at least one woman. A study from Denmark, found that women with endometritis or wound infection after caesarean delivery were only referred to hospital in less than one in four cases – the rest were seen in general practice only (15). Moreover another Danish study showed that of those treated in hospital, more than half were treated in an out-patient setting (6). This implies that most infections that could be prevented through timing of antibiotic prophylaxis before cord clamping, are not serious infections and are treatable with oral antibiotics. Hence, our findings regarding women’s plea for further evidence should inspire to expand the general knowledge concerning consequences of the timing of prophylactic antibiotic treatment during caesarean delivery.

The women’s decision to avoid antibiotic exposure to the fetus in order to prevent potentially long-term effects, was made at the expense of their own increased infection risk, even though the risk to the infant was hypothetical. Indeed, evidence regarding the effects on the infant gut microbiota is limited compared to the solid evidence concerning the relative infection risk of the mother. This raises the question whether women’s risk perception of the infant is intensified. Pregnant women are encouraged to be aware of the many substances that can affect the fetus and therefore they may be suspicious of medication in general during the pregnancy (16). The fear of harming the baby’s gut microbiota does in some way outweigh – in the women’s own perception – her own risk of getting a postpartum infection. Other studies also show a change in the women’s use of drugs when they become pregnant (16–18). In a qualitative study based on participants from the ORACLE study, findings also imply how pregnant women poorly understand the concept of risk. The participants decisions seemed to be drawn from common sense and emotions, rather than facts and scientific deliberation, if they thought it would result in better conditions for the baby (19,20). Regardless, patients must have autonomy in matters regarding their own healthcare and it is the role of the clinicians to guide them as best as possible (21).

Strengths and limitations

Prior to the current study, a focus group of seven women were interviewed in order to test the interview guide, discover new topics, and evaluate the dynamics between respondents in a group. However, individual single interviews may facilitate a more personal relationship between the interviewer and participant and may permit more focused, personal, and detailed answers (22). The women were all interviewed right after reading the informational pamphlet which allowed their answers to be intuitive and with no influence from their partners and families. In that way all the women had the same preconditions for answering the questions.

One of the strengths to the study is that the women were not informed about the local procedure regarding

prophylactic antibiotic treatment until after the interview, as to avoid bias originating from demand characteristics (23) and where they might adjust their answers. Nevertheless, the women might have had an assumption of what we wanted to hear after having read the informational pamphlet, thereby affecting the outcome. However, the eight women we interviewed post hoc found the informational pamphlet to be either neutrally worded or leaning towards recommending antibiotics before cord clamping, which did not indicate demand characteristics bias.

This study is limited in that the interviews were restricted in length, due to practical circumstances and for that reason the longest interview took approximately 25 minutes. However, the transcribed text from the interviews revealed no further follow-up questions that were either unposed or unanswered.

Conclusion

The majority of the women preferred getting prophylactic antibiotic treatment after cord clamping, to avoid antibiotic exposure to their baby and thereby its possible long-term consequences. Even though there are nuanced considerations for each pregnancy, most women would also trust the recommendation by their healthcare professional. These results suggest that women should be closely involved in the decision-making regarding the timing of prophylactic antibiotics before caesarean delivery.

Disclosure of interest

All authors declare no conflicts of interest.

Contribution to authorship

PBA, ECLL, TDC, RV and ADA originated the idea for the interview-study and ADA carried out the initial focus group interview. SHP, MML and JB contributed to the final design of the study. All authors, but especially MML, JB, ADA and RV, assisted the preparation of the interview guide. SHP performed the single semi-structured interviews and was supervised by MML. The analyses and interpretations of the results were performed by SHP and PBA. SHP and PBA wrote the manuscript draft with input and critical revisions from ECLL, TDC, RV, ADA, MML and JB. All authors approved the final version of the paper and agreed to be accountable for all aspects of the work.

Ethical approval

According to Danish law, interview and questionnaire studies are exempted from approval by ethics committees, the Data Protection Agency, and the Danish Health Authorities, as long as the participants and data remain anonymous (24). The department head at our delivery ward approved the study. Participation in the study was voluntary and conducted in an undisturbed and confidential setting.

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Not relevant.

Legends for tables and supplementary

Table 1:

Interview participants' characteristics. Their age varied from 24 to 38 years (mean 32 years) and most had a normal BMI (kg/m^2). The women were recruited from three groups: those scheduled for caesarean delivery

and at term, those not yet having delivered and in the 41st week gestation, and women in third trimester but not at term (weeks 28-37 gestation).

Table 2:

The two main categories that emerged from analyses of the interviews, and their subcategories

sTable A

The interviewguide with main- and subquestions

sTable B

The interviewguide for the post hoc interviews

Appendix A

The informational pamphlet given to the women before the interviews

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Table 1 - Interview participant's characteristics.docx available at <https://authorea.com/users/727772/articles/709355-pregnant-women-s-views-on-the-timing-of-prophylactic-antibiotics-during-caesarean-delivery-a-qualitative-semi-structured-interview-study>

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Table 2 - Main- and subcategories.docx available at <https://authorea.com/users/727772/articles/709355-pregnant-women-s-views-on-the-timing-of-prophylactic-antibiotics-during-caesarean-delivery-a-qualitative-semi-structured-interview-study>