ABSTRACT

Background*:* Group B streptococcus (GBS) is a bacterium carried by 20-25% of pregnant women in the UK, which can be transmitted from pregnant women to their babies at the time of birth. Women can be tested for GBS in pregnancy using a vaginal-rectal swab, however, this testing is currently not routinely offered in the UK. A large clinical trial is underway to determine the clinical and cost-effectiveness of routine testing. A crucial part of understanding whether this type of test should be implemented is women's views on the acceptability of being offered GBS tests, their preferences towards testing procedures and their willingness to receive these tests.

Aim: To explore women's views on the acceptability of different methods of Group B streptococcal bacteria (GBS) testing in pregnancy, including self-swabbing procedures.

Methods: A convenience sample of 19 women (5 pregnant and 14 postpartum) were interviewed using a semi-structured interview guide. Interviews were transcribed and analysed using systematic thematic analysis.

Results: Findings show that many of the women interviewed were not concerned about being offered a GBS test, were willing to provide a sample and felt positive towards samples being taken to detect GBS. Women varied in their preferences on the best time for sampling. Some thought being approached during pregnancy gave them time to understand the purpose of testing, prepare for what may happen next and ask questions about potential treatment if needed. Others thought labour was a good time to provide accurate results on GBS carriage at birth and reduce unnecessary worry during pregnancy. However, women were concerned that they may be unable to make an informed decision in labour due to time, pain and the prospect of birthing quickly. Women perceived clinician swabbing as more accurate than self-sampling; however, many thought clinician swabbing might be embarrassing so self-swabs should be available to increase uptake for some women.

Conclusions: Overall, women thought both pregnancy and labour were acceptable times to test for GBS. The majority found both clinician and self-swabbing procedures acceptable; however, many had a preferred swabbing option and thought women should be given the choice of the swabbing procedure most acceptable to them. It is important that women are given information about GBS testing and its procedures in pregnancy regardless of when the GBS swabbing is performed.

Keywords: group B streptococcus; GBS; screening; testing; maternal colonisation

Abbreviations:

GBS- Group B streptococcus

EOGBS – Early-onset Group B streptococcus

IAP - Intrapartum antibiotic prophylaxis

RCOG- Royal College of Obstetrics and Gynaecology

NIHR- National Institute for Health Research

INTRODUCTION

Group B streptococcus (GBS) is a bacteria carried by approximately 20-25% of women during pregnancy in the United Kingdom (UK) (Seedat, et al.,2016). For many women who carry GBS, there are no adverse effects (Bevan, White, Marshall, & Peckham, 2019; Rao et al., 2017), however, in others, GBS transmission during labour can lead to serious infections for the newborn (Rao & Khanna, 2020; Steer et al., 2020). In these instances, GBS can be a risk to the infant for up to three months after birth leading to infections such as sepsis, pneumonia and meningitis (McQuaid & Plumb, 2015; Rao et al., 2017). It is reported that around 517 babies will be affected by early-onset sepsis in the UK each year (O'Sullivan et al., 2019). Estimates suggest that around 36% of the babies born to mothers who are colonised with GBS will become colonised with the bacterium themselves and 1% of these infants will develop invasive GBS disease as a result (Seedat, et al., 2016). These babies are reported to experience severe complications, and it is estimated that GBS has a mortality rate of 6-10% in newborns in the United Kingdom (Bevan et al., 2019).

GBS testing using a vaginal-rectal swab enables women who are carrying GBS to be identified and offered intrapartum antibiotic prophylaxis (IAP) to reduce the risk of infection in the infant (Rao & Khanna, 2020; Steer et al., 2020). IAP is reported to reduce instances by up to 80% (Cools & Merlin, 2017). However, in the UK clinical guidelines do not recommend routine testing at this time until further evidence is available to determine whether it is both clinically and cost-effective (Steer et al., 2020; NICE, 2021). Instead, a risk-based screening approach is currently taken, which offers IAP to those women with an incidental finding of GBS carriage during pregnancy, those in pre-term labour, those presenting with a high temperature in labour or who had a previous known GBS infection (Bevan et al., 2019).The National Institute for Health Research, therefore, commissioned a randomised controlled trial to compare the effectiveness of offering universal testing compared to the usual risk-based strategy. This trial is currently in progress and is known as the GBS3 trial (https://www.gbs3trial.ac.uk/). This trial will be the first to compare two different types of tests with the usual care (risk-based screening approach); lab based test offered at 3-5 weeks before the anticipated due date, performed using a self-swab (Enriched Culture Medium Testing) and a bedside test offered at the start of labour, performed by a clinician (Intrapartum Rapid Testing).

While work is being done to ascertain the efficacy of these GBS tests, an important part of the implementation of GBS testing in pregnancy is to ensure it is acceptable to women. Previous research shows that women's awareness of GBS is low (Alshengeti et al., 2020; Giles et al., 2019; McQuaid et al., 2014, 2016). A recent qualitative study also found women have varying levels of awareness of GBS and the majority have positive attitudes towards being offered and taking up GBS testing [redacted],2023). [redacted] study reports factors found to influence women's decisions to have GBS testing such as seeing GBS testing as just another routine test during pregnancy, believing that it would lower the risk of their infant becoming unwell and stating that it would provide reassurance. Allowing women to prepare for testing and providing informed choice were also important factors [redacted] However, participants also expressed a few concerns about GBS testing, including questioning the invasiveness of the procedure, risks to themselves and the infant and the risk of receiving antibiotics [redacted]., 2023).

Other research has explored women's attitudes towards a potential GBS vaccine (McQuaid et al., 2018; Patten et al., 2006). These studies often include an element of women's knowledge of GBS but do not assess women's views on the acceptability of the different GBS testing procedures used. However, there is some literature investigating mothers' acceptability of self-swabbing tests for GBS (Daniels et al., 2011; Law et al., 2013; Price et al., 2006). These studies indicate there may be some resistance from mothers against self-swabbing with reasons such as feeling physically unable to do the test or feeling uncomfortable performing the test themselves. Interestingly, one study also found that 89% of participants rated clinician swabbing as totally or somewhat acceptable, and 81.5% rated

self-swabbing as totally or somewhat acceptable (Price et al., 2006). Therefore, there is a lack of clarity over women's views and preferences towards different testing procedures. This qualitative study aims to examine how acceptable different GBS testing methods are to women, including self-swabbing procedures.

METHODS

Design

A qualitative study using semi-structured interviews to explore women's views on the acceptability of different GBS testing methods in pregnancy or labour, including self-swabbing procedures.

Ethical approval

The study received ethical approval from [redacted], School of Health Sciences Research Ethics Committee (Ref: ETH2021-0149).

Sample

The study used convenience sampling to recruit women. Eligibility criteria were that women were currently pregnant or had a baby in the last two years, aged 16 years or older (no upper age limit), had adequate spoken English and could give informed consent. There were no exclusion criteria. Participants were recruited via social media (e.g. Twitter, Instagram and Facebook) from April to August 2021.

Procedure

Digital advertisements were used to share the opportunity to participate in the study. These were distributed through social media sites. A prize draw of four prizes of a £25.00 retail voucher was included as an incentive to facilitate recruitment. Women interested in the study contacted the researcher [redacted], who sent them a study invitation and provided more information in the form of a participant information sheet. After they had time to consider the study information, participants could ask any questions they might have and decide if they would like to participate. Women interested in participating were screened against the eligibility criteria and were then asked to read and sign a study consent form and return this to the researcher. The researcher then contacted the woman to offer a time for the interview.

Interviews were conducted via telephone or video call and carried out by an experienced qualitative researcher ([redacted], female, PhD). These interviews were carried out on a one-to-one basis using a pre-approved semi-structured interview guide (see figure 1). This guide was created by GC & SA and reviewed by the research team and a representative of the Group B Strep Support (GBSS) organisation. The guide was designed to explore women's awareness of GBS and their views on the acceptability of different GBS testing methods (pregnancy vs in labour and self-swabbing vs clinician swabbing). Pilot interviews were carried out with 3 women prior to being used for data collection.

The first phase asked women questions about their knowledge and awareness of GBS to determine their prior understanding, and the following phase of questions asked women about their views on the different types of GBS testing methods to determine acceptability. In between these phases the researcher gave verbal information describing different types of testing methods (pregnancy vs in labour and self-swabbing vs clinician swabbing), which was summarised from the Group B Strep Support and Royal College of Obstetricians & Gynaecologists (RCOG) Patient Leaflet (Group B Strep Support (GBSS) & Royal College of Obstetricians & Gynaecologists, 2017). This leaflet provides a balanced view of the benefits and disadvantages of testing. This enabled participants to be given the same information about GBS and its testing methods before asking questions about their

attitudes towards these testing methods and the acceptability of being offered this testing. In addition, before asking participants about the different types of tests, these procedures were explained, providing detail about when, how and by whom the test would be offered, participants were given the opportunity to ask any questions about the options being explored.

Phase 1: Knowledge of GBS

1. Were you aware of GBS before or during pregnancy?

Yes - expand

No – did you find out about it since? Yes – expand, No-explain.

2. Do you know anyone who was affected by GBS?

(Give women a copy of the GBS Infographic to provide an introduction to Group B Strep (GBS) testing and different methods)

Phase 2: Testing for GBS

3. Have you ever been offered or had a test for GBS? If so, what were your experiences of this?

4. What do you think about GBS testing during pregnancy?

5. Would you have a GBS test if it was offered to you?

6. Would you recommend this type of testing to a friend or family member?

7. How important do you think it is for pregnant women to be tested for GBS?

8. How acceptable do you think GBS testing is to pregnant women?

Different types of tests

(Explanation of the different types of testing)

Pregnancy vs labour:

9. What are your views on having the test in pregnancy or during labour?

10. How acceptable are the pregnancy and labour tests to you?

Self-swabbing vs Clinician:

11. What are your views on self-swabbing or clinician swabbing?

12. Which type of test would you prefer (pregnancy/labour and self/clinician)?

13. How would you feel about performing self-swabbing tests on yourself?

14. How likely would you be to complete a self-swabbing test if asked to perform one?

15. If you had to give advice to midwives and doctors about GBS testing what would you say?

16. Is there anything else you would like to add?

Figure 1 Interview Schedule

Basic sociodemographic information was also collected from the women at the end of the interview, including: age, ethnicity, any previous GBS experience and whether or not this was their first child. Interviews were approximately 30 minutes and were audio recorded and transcribed verbatim. Field notes were recorded throughout data collection to monitor data saturation and maintain reflexivity.

Data Analysis

The audio recordings were transcribed verbatim by an approved service, transcripts were de-identified before analysis and participants' transcripts were numbered P1-19. Thematic analysis (Braun & Clarke, 2022) was used to analyse the interview transcripts using NVIVO12 qualitative analysis software (QSR International Pty Ltd, 2018). The transcripts were read twice by the researcher who conducted the interviews [redacted] to become familiar with the data. Transcripts were then coded until no new codes were found. Two researchers [redacted] reviewed these codes and identified the most frequent and salient codes that could be defined into themes, these were discussed in the research team and data were examined for confirming and disconfirming information for each theme. This process was supported by the field notes, recorded during the interviews, to maintain reflexivity during the analysis process.

RESULTS

1. Sample characteristics

The characteristics of the participants can be found in Table 1. Twenty-four women expressed interest in participating and nineteen (79%) consented to take part. The main reason for dropout was lack of time to participate. Participants were mostly White British and aged between 25 and 42 years (mean 32, SD 4.6). Three intended to or had experienced a home birth. Most had no prior experience with GBS/ GBS testing, which was expected as GBS testing is not currently recommended in the UK. However, three had received diagnoses of GBS in their current or previous pregnancy, these women did not specify how their GBS status was detected i.e. urine sample, other swabbing not specified for GBS. Interviews lasted 24 minutes on average (SD 5.68).

Table 1. Sample characteristics (N=19)

	N (%)
Pregnant	6 (32)
Postpartum	13 (68)
Ethnicity	
White British	18 (95)
Asian British	1 (5)
Experience of GBS	
Diagnosed with GBS	3 (16)
Other experience of GBS (Friends/family with GBS, professional role)	5 (26)
No experience	11 (58)
Number of children	
First Child	7 (37)
Two or more children	12 (63)

2. Thematic analysis

Women's views of GBS testing methods and their acceptability were grouped into three areas: (1) Testing in Labour, (2) Testing in Pregnancy and (3) Types of Swabbing. The themes within these areas are outlined in Table 2 and are discussed in more detail below.

Table 2. Main themes and subthemes

Main Theme Groupings	**Themes**
Testing in Labour	What's another test Accuracy, speed and effectiveness Another thing to worry about Women birthing too quickly
Testing in Pregnancy	More time to think and prepare themselves Reduce interference during labour Induce early labour Change in GBS status
Types of Swabbing	Overall acceptability and preferences Would depend on the accuracy Ease and speed of clinician swabbing Embarrassing, triggering or inconvenient Familiarity with experiences of other types of self-testing Women should be given the choice

Testing in Labour

Women's views of being offered GBS testing in labour were varied. Many reported that receiving a test in labour would not concern them, with some saying, **'what's another test'** amongst many.

> *"you've already got a lot going on anyway, what's a swab in the grand scheme of giving birth" (P3)*

These participants emphasised that they would view GBS testing in labour the same way as the other testing or examinations performed as part of their care. Several women thought that having a GBS test in labour would mean they would not have to have an additional appointment at another time during pregnancy, something they were keen to avoid.

> *"the advantages of doing it in labour is that you are already kind of probably having examinations…anyway, so it's not an additional examination or procedure. (P1)"*

In addition, several women reported that labour is a time when they felt they lost modesty, therefore as they do not have 'modesty left to protect', this would make them more likely to agree to receive testing at this time.

> *"you've already lost your modesty at that point I think" (P3)*

Women also discussed the **accuracy, speed and effectiveness** of having the test done in labour. The perception was that it would be more accurate if a clinician performed the test, explaining that they would get the results more rapidly and be able to treat it quickly.

> *"I'd go for the during labour because if it's going to be a clinician that completes it, and the results come back pretty rapidly and they can give the treatment there and then"(P17)*

Being able to treat GBS soon after testing positive was also related to women's perceptions that the labour ward would be a preferred place for testing, with the recognition that the ward would be

prepared to monitor for signs of infection. However, women discussed this needing to be done discretely, not to interfere with the labour.

> *"if it was routine and it was done in a discrete way, within labour, in terms of that being the most reliable thing, then I would probably rather that" (P16)*

While many reported the benefits, some were opposed to the idea, saying it could be **another thing to worry about.** These women were concerned it would be difficult to decide whether or not they wanted to receive the testing when in labour, particularly when they may be uncomfortable, experiencing pain, or having a particularly difficult labour experience.

> *"if you are unsure about it and in labour and in pain, it might be quite a hard time to make a decision about something you are not particularly familiar with as well" (P1)*

The labour was explained to be a stressful time which could be overwhelming for women, and the introduction of testing could be an added thing to have to worry about particularly if unaware of the testing and its purpose. They also wondered whether they would have enough time to consider the option of testing in labour and expressed worries that this situation would not allow women to make an informed decision. A few women also stated that being offered a swab at this time would make her concerned that healthcare staff were aware of a risk they were not telling her about, causing unnecessary worry.

> *"during labour, it's something else that you're being told that they're testing for this and there's a worry, have they seen something? Have they found something?"(P15)*

Some also raised a concern about **women who may birth quickly** who, if tested positive for GBS in labour, may not have enough time to receive the necessary antibiotics.

> *"if you have a quick labour then your baby hasn't got any antibiotics to prevent them getting ill" (P10)*

One woman emphasised this, discussing her experience of the pressure healthcare professionals are under to provide timely care, worried that there might not be enough time for antibiotics to be administered to prevent illness.

> *"When I went into hospital recently…they were so low on staff, even just getting a fluid drip I was waiting for two or three hours before they put a fluid drip up for me which is no fault of their own it's just because of that. At the minute with the way the hospitals are, it would probably be beneficial to know more earlier on"(P11)*

When discussing this issue, several women highlighted that it would be more beneficial to be tested in pregnancy vs labour as this would also give healthcare staff enough time to prepare for the result of this test. Women felt that knowing about GBS earlier would give them the opportunity to make sure healthcare teams followed through with what they needed to when they arrived at the hospital.

> *"having that knowledge myself from testing in pregnancy would mean that I would be pushing to make sure that it was all prepared and ready" (P12)*

Testing in pregnancy

The benefit of being offered the test during pregnancy was having **more time to think and prepare themselves** about whether or not they would like the test or treatment if needed. The opportunity to ask questions and talk about what might happen next with their midwife if the test was positive was

also considered a strength of this option. Participants felt that during pregnancy the woman could speak to more people about it if they wanted to and felt this would not be possible in labour.

> *"there's more people you can talk to, whereas if you're in labour you're sort of just thrown in aren't you?"(P19)*

It was important to these participants that women could choose without feeling rushed into making a decision and participants with this attitude reiterated that they would rather know early so they can prepare themselves. They discussed this preparation as also critical in helping midwifery teams prepare for their care if the test was positive.

> *"I think it's better to know earlier anyway and then you can prepare yourself and…it can be in your pregnancy notes so when you get to the hospital they can read it and be like, okay, she's got GBS, we need to make sure we're putting her on an antibiotic drip when she's in labour…rather than it being all a bit of a last minute thing"(P11)*

However, some participants were concerned that testing in pregnancy might be missed, and having the timepoint for routine GBS testing earlier would mean they could request this testing again to make sure it is done before their infant is born. In contrast, a missed test in labour would not allow them this opportunity. Additionally, planning for how their care may change if they tested positive was viewed as safer for themselves and the infant.

> *"if it's something that you know is a possibility, then I would feel a lot safer going into hospital knowing that the midwifes are aware, knowing that something is in place for when the baby arrives" (P4)*

The benefit of testing in pregnancy would r**educe interference during labour**, with many women expressing that they would find a pregnancy GBS test more acceptable as they want 'to be left alone in labour' and therefore would not want to 'deal' with being offered a test at this time.

> *"I wouldn't want the test in labour, just because I think you're already dealing with a lot anyway, so I'd probably rather have it in pregnancy" (P8)*

However, not all women preferred being offered the test during pregnancy, with several concerned about whether being swabbed late in pregnancy could **induce early labour**.

> *"so risks of the vaginal swabbing at 35 to 37 weeks… like are there risks of inducing of early labour through that?"(P5)*

Others also stressed that they may find the test uncomfortable or find self-swabbing too challenging to perform on themselves in such a late stage of pregnancy.

A **change in GBS status** was raised by several participants who noted that GBS can be transient and therefore come and go throughout pregnancy. These women worried that if they tested during pregnancy and received a negative result, this may provide a false sense of security at the infant's birth.

> *" I could be tested at thirty six weeks, not have it, and then actually pick it up or just suddenly have it at thirty nine weeks…you could then be like lulled into a false sense of security" (P16)*

Therefore, some women thought it was more acceptable to provide testing when the infant is most at risk, which would be during labour. Women said that the reassurance that their GBS status is accurate at the time of birth was important, making testing in labour acceptable.

" [labour] probably is the best way to know if you definitely have it at that time and if it's going to be a risk." (P4)

Others also recognised that women who tested positive in pregnancy may experience unnecessary worry if GBS had gone by the time they had their infant.

"if you have it done early, you might be a little bit more anxious and worried and built up about it"(P3)

It was also discussed that it would be challenging to trust in an earlier test, and some women would want to request a second test to ensure they were not GBS-positive at labour.

"if I got a negative swab, then I'd be like, okay great, I don't have it now, but then I'd probably still want to test in labour…, and then it's just double testing"(P16)

Types of swabbing

Women shared their views on the **overall acceptability and preferences** for different testing methods. While both pregnancy and labour testing was viewed to be acceptable by the majority of participants, it was recognised that different women might have a preferred choice if given the option to choose. In this sample, choosing clinician-swabbing was an overall preference, with nearly half stating they would choose for this to be carried out during their pregnancy and roughly a quarter interviewed choosing the labour timepoint for the clinician to collect the swab. However, another stated they would choose the clinician to perform the swab but would not be concerned about when it was carried out. The remaining four women chose pregnancy to be the ideal timepoint and the majority of these women would choose the self-swabbing option.

The acceptability of who performs the swabbing varied among participants, for most, their preferences surrounding testing **would depend on the accuracy** of the testing. Many believed that a clinician performing their GBS swab would result in improved accuracy.

"if you're trying to do it yourself you might not get as accurate result doing yourself than a clinician doing it."(P11)

This was due to a concern that relying on women to self-swab leaves more room for error.

"But I do believe that self-swabbing leaves room for error, and therefore it can't be as accurate" (P12)

The main concern for participants about self-swabbing was worries about its accuracy due to inexperience, with views that clinicians' are well-practised in collecting vaginal and rectal swab samples and that women would be unable to do the test correctly or would need to repeat it if asked to collect the sample. Other concerns included that self-swabbing may take longer to perform and might be easily contaminated if performed at home as opposed to clinician-performed swabbing which was viewed as more hygienic and effective.

"I always worry that there's the chance of contaminating it, as you're trying to work out what's happening, while you read the paper and hold a swab and I think I'd always, if given

the choice, rather have a professional who does it, a hundred times a day do it, rather than me have to do it and potentially mess it up"(P16)

Clinician swabs were also more acceptable to some due to the **ease and speed of clinician swabbing**. These participants compared this to self-swabbing, perceiving it to be too difficult to do on themselves when heavily pregnant, and felt that it would be more comfortable to be performed by the clinician.

"When you're heavily pregnant, how easy is that going to be? And I mean this in all seriousness, like, I can't … I would happily have a clinician do it"(P4)

Some participants thought it might be possible to hurt themselves while swabbing or it may be uncomfortable at this late stage in pregnancy.

"I might do it wrong or I might hurt myself, I don't know but I'd be more uncomfortable if I did it"(P3)

However, some participants discussed a solution for this would be to ask their partner to do the self-swab, which allowed them to retain their privacy still while overcoming the perceived challenges.

"I would probably get my husband to do it"(P13)

Not all agreed that clinician swabbing would be a better choice, with some discussing clinician swabbing as **embarrassing, triggering or inconvenient**. It was discussed that some women may be self-conscious about swabbing, so they would rather do it themselves, and if not able to do so, participants thought these women might avoid GBS testing if a clinician was the only option.

"I think, you know, a lot of women are self-conscious about that kind of thing… if it is done by a clinician, that might be an appointment that they avoid" (P4)

It was recognised that asking a clinician to swab may be unnecessary, with self-swabbing being a simple procedure that women can perform alone.

"Well, I just don't want to sound big–headed, but I don't think swabbing's that difficult. It's just like, you follow the instructions and, it's not like performing a complex procedure, it is literally just in and round. So, they're quite easy things to do"(P6)

Participants also said that acceptability might be different for women with a previous history of sexual abuse who may be uncomfortable with having the test performed on them, as opposed to being able to swab for themselves.

"I think it could be very triggering as well if you've ever had any kind of sexual abuse. I just don't think it's necessary, you know. Do it in the comfort of your own home"(P6)

In addition, it was discussed that women from different cultural or ethnic groups and those first-time mothers might prefer not to be swabbed by a clinician and prefer a self-swabbing option.

"especially for first-time mums or for different cultures, it might be more acceptable to do self-swabbing" (P4)

Those participants who found self-swabbing the more acceptable choice said how it would save embarrassment and afford privacy. This was particularly important for performing rectal swabs, which were perceived as more personal than vaginal swabbing.

"I think women probably generally might prefer it…I don't know particularly rectum I think women would prefer to do it themselves"(P1)

While the majority of participants preferred clinician-swabbing (n=15), many found self-swabbing an acceptable option if clinician-swabbing was not possible. When asked about their willingness to conduct self-swabs and whether or not they would be likely to complete a self-swab, 17 of the 19 participants said they would do so as long as they had clear instructions provided.

"if it's relatively straightforward and people are given clear instructions, then I don't see why that would be a problem"(P1)

Participants' thoughts around self-swabbing acceptability were often linked to use of tampons and their **familiarity with other types of testing,** for example comparison to COVID19 testing and testing for sexually transmitted infections (STI); these were performed easily, so they would be perceived to be a similar task.

"I went for a sexual health test, and I did that swab by myself, so I'm not, you know, not bothered"(P14)

Overall, participants stressed that **women should be given a choice** in the type of testing offered, and while a blanket approach may be used to offer the timing of routine GBS testing, participants felt the option of a self-swab or clinician swabbing should be offered to women. The benefit would be engaging more to have the test and potentially reduce the risk of GBS to the infant. Without this option women may decline the test.

"I think it's a really personal decision… I think it's just each person, has to make that decision for themselves… I think, you can offer both" (P18)

DISCUSSION

This study aimed to explore women's views on the acceptability of different testing methods for Group B streptococcus in pregnancy or during labour. Findings show that many of the participants interviewed were willing to have a GBS test and felt positive towards routine GBS testing. Participants varied in their preferences about the suitable time for routine testing to take place, discussing pregnancy as a good time to have the testing explained, understand the purpose of testing, prepare for what may happen next if the test is positive and ask questions about potential treatment if warranted. Others discussed labour as a good time to provide reassurance the GBS test was accurate at the time of birth, reducing unnecessary worry during pregnancy and limiting the need for an additional appointment. However, there were concerns that women may be unable to make an informed decision in labour due to time, pain and the prospect of birthing quickly. The majority of participants perceived clinician-swabbing to be more accurate than self-swabbing. However, many deemed clinician-swabbing unnecessary or embarrassing and felt self-swabs should be available to increase testing uptake for some women.

Participants considered both pregnancy and labour GBS tests as acceptable however, had varied preferences for time of test. Some women were concerned that being offered the test in labour would make it difficult for them to make an informed choice with the worry that they would be physically uncomfortable, experiencing pain or difficult circumstances in labour and therefore felt this might influence their decision making. While previous literature has not identified women's experiences of GBS tests carried out in labour, fear of pain during swabbing has been recognised to be a factor influencing the acceptability of GBS swabs in general (Madrid et al., 2018). Women may be perceiving the test as during active-labour when they may be experiencing the most pain, however,

the test would be offered when they arrive at the hospital, as explained by the researcher, so this may minimise this impact. Further study is warranted with those women receiving the swabs in labour to determine the impact of the test on pain and decision making at this time. It was also recognised that offering information about testing early in pregnancy, regardless of the time of testing, was important and may also alleviate pressure to decide about testing during the actual labour.

Preferences for the pregnancy timepoint were linked to concerns that there would not be enough time or level of preparation to offer IAP to the woman if testing was carried out during labour. Other research has shown that 81% women who were GBS positive birthed more than 3 hours after their GBS test, 74% birthed more than 5 hours after their GBS test and those who birthed in less than 3 hours accounted for only 19% of women (Babu et al., 2018). Timely provision of IAP is important, the 2017 RCOG guideline recommends that prophylaxis should be administered at least 4 h prior to delivery (Hughes, Brocklehurst, Steer, Heath, & Stenson, 2017). As the turnaround for results with GBS testing in labour is recognised to be less than one hour (Babu, et al., 2018) it is expected that results to inform clinical decision making for most women would be provided within that hour of GBS testing. Therefore, for 74% of women birthing in more than 5 hours there is sufficient time to offer IAP, relinquishing some of the participants' concerns in the current study. However, participants were concerned for those women who 'birth quickly', this other research recognised this to be a smaller number of women who birth in less than 3 hours after their test (19%) before receiving optimal IAP (Babu, et al., 2018). In relation to participants' concerns it is important to note that their infant can still be closely monitored due to the recognition of the mother's GBS status (Babu, et al., 2018) allowing identification of signs of those needing treatment to be timely. This may reduce women's concerns about labour testing if aware of the smaller number of women it may affect and the planned action in place if optimal IAP was not achieved.

The opposing preference for testing in labour by participants was viewed as more accurate due to the transient nature of GBS carriage in pregnancy which may mean their status could change between testing at 35-37 weeks and birth. A systematic review reported a positive predictive value (PPV) of antenatal culture (mean 69%; range 43-100%) and negative predictive value (NPV) (mean 94%; range 80-100%), meaning 6% of women colonised by GBS at delivery would not be offered IAP, unless other risk factors were apparent (Valkenburg-van den Berg et al., 2010).While women had a perception that clinician-swabbing was more accurate, the majority still found self-swabbing as acceptable if this was the only option offered and would be willing to perform a self-swab if asked. This aligns with previous research which showed that, while clinician screening was preferred, the majority expressed an interest in trying self-screening in a future pregnancy and would recommend this to a friend or family member (Ko, et al., 2016). Women's perceptions may change with further evidence being provided to support the effectiveness of self-sampling versus clinician-sampling (Odubamowo *et al*, 2023). Previous research shows women preferred clinician-swabbing over self-swabbing because of the clinicians' greater expertise, associating this with greater reliability of results (Sormani et al., 2021). This is consistent with the findings of the current study where accuracy was one of the top factors women considered when discussing the pros and cons of who does the testing. In addition to this, participants also discussed the risk of contamination if performing the test themselves and concerns about needing to repeat the test due to incorrect sampling. This is supported by the existing literature which shows women's concerns that they may not perform self-swabbing correctly and provide good quality samples for HPV screening (Sormani et al., 2021; Nishimura et al., 2021; Morgan et al., 2019). While Ko et al., (2016) found that 69% and 61% of women said they were comfortable enough to perform the vaginal swab and rectal swabs themselves respectively. Our findings also raised women's concerns about doing this while heavily pregnant, including physical difficulty performing the test and how comfortable or easy it would be.

However, not all women preferred clinician swabbing and some women discussed whether having a clinician perform the swab was necessary or a good use of their time. While the existing evidence supports that women may prefer this option due to the clinician's expertise in collecting samples (Ko

et al., 2016), the current study suggested many women felt self-swabbing is simple enough to perform themselves with the appropriate instruction. Women related their experiences of previous STI testing and use of tampons to their ability to perform a self-swab, this is consistent with other studies (Sormani et al., 2021; Camara et al., 2021; Morgan et al; 2019) which also show that capability in performing self-swabbing may be different for women without experiences of tampon use or STI testing.

Participants views of clinician-swabbing reflect those found in the literature on screening for cervical cancer (Sormani et al., 2021; Nishimura et al., 2021; Morgan et al., 2019), which included worry and embarrassment which are reported to make women hesitate or decline cervical cancer screening, something that could be mirrored in GBS testing. This is expected as evidence highlights that self-swabbing can lead to some women feeling anxious, careful information is needed to alleviate unnecessary stress/worry for women. Among the women who described feeling anxious for screening for HPV (Sormani et al., 2021), it was found that those women who would opt for clinician-swabbing were significantly more anxious with reasons such as; fear of a positive result, fear of the self-sampling procedure. In addition to these studies, the current study findings also recognised the importance of choice in swabbing procedures for those women with a previous history of trauma or sexual abuse who may be less inclined to accept clinician-swabbing a unique finding of the study.

However, while the strengths of self-swabbing procedures were recognised, the perception of difficulty performing the test and the detailed information and instructions accompanying the test kit is something women felt important. These were viewed to impact their willingness and ability to perform the self-swab accurately and easily. However, other research has shown that few women reported any difficulty performing a self-HPV swab (Sormani et al., 2021), and the benefits of choosing this procedure were its ease of use and increased privacy, which were concerns raised for women in the current study, so it is expected that future studies asking women to carry out sampling would be able to comment on these issues for GBS testing.

Also, while previous evidence found that the majority of women perceived an additional antenatal appointment to have GBS screening as acceptable (Ko et al., 2016), the current study found that many women wanted to avoid additional appointments and would rather have it incorporated into a routine midwife appointment or perform at home themselves if possible.

Overall, while participants were not opposed to either of the time points for GBS swabbing, the findings in the current study stressed the importance of choice in sampling methods for women, to empower them to accept the offer for testing in a way that was appropriate for them. A key part of this was providing detailed information about GBS testing and its procedures earlier rather than later to allow them to make an informed choice.

Methodological limitations

This study is based on a small sample of mostly White British women, which limits the generalisability of findings to women from minority groups. Further research is therefore needed to understand the perspectives of women from ethnic minority groups. In addition, the majority of the women in the study were postpartum as opposed to currently pregnant, which may influence the way women consider testing procedures. Although in the current study themes extracted for pregnant and postpartum women were similar, further research may want to examine whether there are the differing perspectives between postpartum and pregnant women.

While this study allows understanding of the acceptability of different testing timepoints and procedures to women, for some participants we explored these issues theoretically as they had never been offered a test for GBS. Further research exploring the experiences of women who are offered the test, accept it and potentially are treated for GBS would be beneficial to determine the most acceptable testing procedures from first hand experiences.

Conclusion

Overall, women found both pregnancy and labour time points acceptable, and the majority found both clinician or self-swabbing procedures acceptable; however, many had a preferred swabbing option feeling that women should be provided with the choice of which swabbing procedure was suitable to their needs. While this study discusses women's perspectives on the acceptability of testing procedures, it is important that women are given information about GBS testing and its procedures in pregnancy regardless of when the swabbing is performed.

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