Original Article

Assessing feasibility and satisfaction in third-trimester pre-anaesthetic teleconsultations: A prospective observational study

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ABSTRACT

Background and Aims: Pregnancy presents risks, particularly for women with pre-existing health problems. Pre-anaesthetic consultations can help anticipate these risks and establish a medical management strategy on the delivery day. While teleconsultations gained popularity during the coronavirus disease 2019 (COVID-19) pandemic, research on pre-anaesthetic teleconsultations during pregnancy is limited. This study aimed to assess patient satisfaction and physician perception of teleconsultations for third-trimester pre-anaesthetic consultations. **Methods:** A prospective observational study included pregnant women who opted for teleconsultations for pre-anaesthetic consultations. Patient satisfaction was assessed using Likert scale questions and the System Use Scale. Anaesthetist satisfaction was evaluated using a Likert scale and by considering changes in anaesthetic techniques and missing clinical data in the pre-anaesthetic assessment. Data analysis utilised SPSS Statistics for Windows, Version 20.0. encompassing descriptive statistics, hypothesis testing and odds ratio calculations. This approach explored the correlation between patient and anaesthetist satisfaction and pertinent risk factors. **Results:** The study enroled 99 patients, with 85% expressing satisfaction and high satisfaction on the Likert scale and 88% finding the teleconsultation acceptable based on the System Use Scale (score ≥ 70). Anaesthetists reported being satisfied with the pre-anaesthetic consultations in 94% of cases. **Conclusion:** This study demonstrates the feasibility and effectiveness of telemedicine consultations in obstetric anaesthesia, showing high patient and anaesthetist satisfaction rates.

Keywords: Anaesthesia, obstetrical, patient satisfaction, pre-anaesthetic checkup, pregnancy, telemedicine, teleconsultations

INTRODUCTION

Pregnancy and childbirth pose challenges and risks, especially for women with medical comorbidities. With the progress of medical care, the number of pregnant women with medical comorbidities has increased dramatically. These comorbidities present additional challenges and risks during delivery, making pre-anaesthetic consultations necessary to ensure the best possible outcomes for the mother and child.[1] The pre-anaesthetic consultations allow for patient risk stratification and the development of personalised anaesthetic plans for delivery.

Certain medical specialities, such as anaesthesia, have expanded the use of remote consultations for pre-and post-operative care.[2] Implementing a telehealth system for pregnant women in Australia showed that telehealth care reduced the need for face-to-face visits by 50% and did not increase the complication rate compared to standard pregnancy monitoring.[3]

We conducted an observational study to evaluate patient and anaesthetist satisfaction with teleconsultation

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for third-trimester pre-anaesthetic consultation. The primary objective was to assess patient satisfaction, while secondary objectives included evaluating physicians' perception of safety, quality of anaesthetic preparation, and their satisfaction.

METHODS

This prospective observational study was conducted at a maternity unit in Toulouse, France, which functions as a tertiary referral centre, overseeing approximately 5000 deliveries annually. The study, granted approval by the National Review Board [French National Commission for Informatics and Liberties (CNIL) number: 2206723 v 0, dated 27 October 2021, and covered by the reference methodology of the CNIL], strictly adhered to ethical guidelines outlined in the Declaration of Helsinki, 2013 and good clinical practice. Patients received thorough information, and their participation in the study and utilising their data for research and educational purposes was ensured through written informed consent. The study focused on pregnant women who had chosen teleconsultation for pre-anaesthetic consultations over in-person consultations. Eligibility for teleconsultation in our institution was contingent upon adherence to several criteria, including a valid e-mail address, functional internet access, and proficient comprehension and speaking skills in French. If teleconsultation had no contraindications, it was systematically proposed to the patient.

The study included pregnant women scheduled for a routine pre-anaesthetic consultation, aged 18 years or older, and capable of reading and writing in French. Starting from 1 November 2021, participation in the study was offered to all eligible patients who opted for the pre-anaesthetic consultation via teleconsultation. Exclusion criteria encompassed technical issues necessitating the interruption of teleconsultation, fetal demise, and the requirement for an additional in-person pre-anaesthetic consultation at the anaesthetist's request. Patients who did not respond to the satisfaction questions were also excluded from the study.

Teleconsultations were conducted by a senior anaesthetist in a designated consultation office, utilising the TeleO™ regional telemedicine platform (Acetiam Nexus, version 5.92, NEHS Digital, France) with simultaneous access to the patient's electronic medical record. TeleO™ is a downloadable desktop application designed for secure video telemedicine, accessible via computers, digital tablets and smartphones with secure access through personal clinician accounts or via an email link (sent by the secretary) for the patient. Patients were instructed to create an account on the TeleO™ application and log in 15 minutes before their scheduled appointment. The application automatically conducted a functionality check of their connectivity tool, and in case of any issues, patients had the option to contact the hospital's technical support.

Following the pre-anaesthesia teleconsultation, patients were invited to complete a survey via a secure link to assess their satisfaction with the pre-anaesthesia teleconsultation. The survey included a five-level Likert scale to gauge patient satisfaction and the System Usability Scale (SUS)[4] to measure patient acceptability regarding teleconsultation. To ensure the questionnaire's validity, patients must respond to all questions. For the statistical analysis of the Likert scale, patient responses were categorised into two groups: "Satisfied" if they answered "satisfied" or "very satisfied" on the Likert scale, and "dissatisfied" otherwise. Regarding classification according to the SUS Scale, responses were segregated into two groups: "positive acceptability" if the SUS score was greater than or equal to 70 and "negative acceptability" if it was less than 70.

This study assessed the satisfaction of anaesthetists involved in the patient's care on the day of delivery. Anaesthetists were considered to be involved in patient care if they participated in labour pain management, such as administering epidurals or implementing alternating techniques, performed anaesthesia for Caesarean sections, or were engaged in managing delivery-related haemorrhages.

The anaesthetists filled out a brief three-question questionnaire on the day of care. This questionnaire included a Likert scale to assess their satisfaction with the pre-anaesthetic teleconsultation. The second question aimed to ascertain whether any alterations were made to the recommended anaesthesia technique during the pre-anaesthetic teleconsultation. The third question sought to determine if there were any instances where clinical or paraclinical data not documented during the consultation were omitted. For the statistical analysis of the Likert scale, physicians' responses were categorised into two groups: "Satisfied"

if they answered "satisfied" or "very satisfied" on the Likert scale, and "dissatisfied" otherwise.

The cost analysis in this study was conducted from the patient's perspective. To collect data on patient-related costs, the questionnaire sent to patients included a simple question about estimated costs and travel time to and from the clinic if the patient had opted for an in-person consultation. This enabled us to evaluate teleconsultations' overall convenience and cost-saving potential for pregnant patients.

The sample size for this study was determined using the following formula: [z2*p(1-p)]/i2. A satisfaction rate prevalence (p) of 90% was chosen based on a pilot study conducted by Wong *et al*.,[5] which reported a 90% satisfaction rate among patients who received pre-anaesthetic consultations via teleconsultation. For a 90% confidence level, a Z-score (Z) of 1.65 was used, and a precision (i) of 5% was desired. Based on these parameters, the calculation yielded a required sample size of 98 patients to be included in the study.

Data were analysed using Statistical Package for the Social Sciences (SPSS) statistics software version 20.0 (Armonk, NY: IBM Corp, USA) statistical software. We presented the mean (SD) and compared the results using Student's *t*-test for quantitative data that followed a normal distribution. For non-normally distributed data, we provided the median (IQR) and compared the results using the Mann-Whitney U test. The Kolmogorov-Smirnov test was utilised to assess the normality of the distribution. Categorical variables were described as percentages and compared using the Chi-square test when the conditions for validity were met (i.e., theoretical numbers per cell were ≥5). If these conditions were not met, we utilised Fisher's exact test instead. A significance level of 5% was employed for result analysis, and the strength of associations was estimated by calculating the odds ratio (OR) and its 95% confidence interval (CI). In univariate analyses, we examined the associations between the degree of satisfaction among patients and physicians and various risk factors.

RESULTS

The study was proposed to 142 eligible patients, 119 of whom agreed to participate in our research. Of the 119 teleconsultations, only one patient could not connect due to a technical problem, requiring the appointment to be rescheduled for the following day. None of the 119 consultations required cancellation due to the need for an in-person consultation. Of the 119 patients who agreed to participate in the study, 99 completed the questionnaire [Figure 1]. Eighty-seven patients were managed on the day of delivery to assess the quality of pre-anaesthetic consultations.

The mean (SD) age of the study group was 31(4) years, with 28% having a notable or pregnancy-related medical history, primarily depression or gestational diabetes, asthma and hypothyroidism. All patients were classified as American Society of Anesthesiologists (ASA) II, indicating a moderate systemic disease. Forty-two patients experienced their first pregnancy. The majority (86/99) had a vaginal delivery, while 13 underwent caesarean delivery, including eight emergency caesarean. Most patients (84/99) received epidural anaesthesia for labour pain management, and five received spinal anaesthesia for caesarean delivery. A minority (10/99) experienced complications after delivery, including six cases of postpartum haemorrhage and three cases of pre-eclampsia. Patient satisfaction was assessed using the Likert scale, with 85% reporting satisfaction with the teleconsultation [Table 1]. According to the SUS scale, 88% of patients found the teleconsultation acceptable [Table 1]. The median amount of money saved was six dollars with a range of [0.00–80], and the median duration of time saved was 60 minutes with a range of [4–240]. Univariate analysis did not reveal any factors significantly associated with increased patient satisfaction; *P* values for variables such as age ($P = 0.573$), multiparous

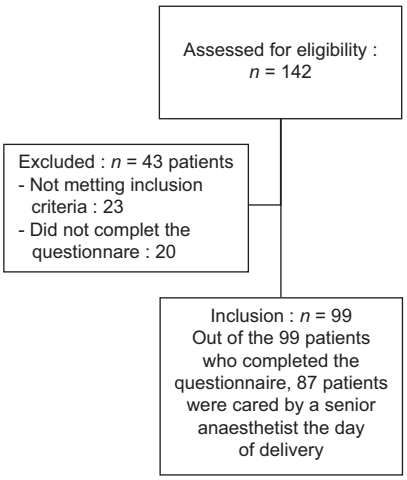

Figure 1: Flow Diagram for patient participation

Table 1: Satisfaction of patient and physician evaluated by a Likert Scale and by System Usability Scale

	Patient (*n*-99)
Satisfaction of patients by Likert scale	
1	5
2	2
3	8
4	36
5	48
	Patient (*n*-99)
Satisfaction of patients by System Usability Scale	
<71	12
71-80	33
80-90	16
<90	38
	Patient (*n*-87)
Satisfaction of physician by Likert scale	
1	1
2	2
3	2
4	33
5	49

status ($P = 0.439$), medical history ($P = 0.757$), saved time in minutes ($P = 0.323$) and saved money in euros ($P = 0.563$) did not indicate statistical significance. We could not ascertain the reasons for the non-participation of 20 patients who did not reply to the questionnaire even though they had agreed to participate in the study.

Of the 99 patients included in the study, 97 had given birth in our maternity hospital. Two patients had given birth in another hospital and received an epidural for an uncomplicated vaginal delivery. Of the 97 patients who gave birth in our maternity hospital, 87 required the medical intervention of an anaesthetist, while 10 gave birth vaginally without the intervention of an anaesthetist. Of these 87 patients, 74 delivered vaginally, while 13 underwent caesarean delivery, including eight emergency caesareans. Of the patients, 71 received epidural anaesthesia, 5 received spinal anaesthesia for caesarean delivery, and 11 patients received an alternative analgesia technique. After delivery, ten patients experienced complications, including six cases of delivery haemorrhage. Of the 71 epidurals performed, no postoperative headaches were reported. The anaesthetists judged the pre-anaesthetic consultation in 94% of patients [Table 1]. Only one case of missing data was reported, which required a change in the anaesthetic technique. This change occurred because of delayed caesarean delivery and the need to seek a dermatologist's opinion regarding a 3-mm angioma at the L4-L5 interspinous space. At the time of the teleconsultation, the angioma was not visible on the video, which led to a request for a dermatologist's opinion.

DISCUSSION

The study findings indicate a remarkably high level of patient satisfaction and strong acceptability of teleconsultation for pre-anaesthetic consultations during pregnancy.

Our results align with similar satisfaction rates reported in reviews.[6-12] Positive feedback from previous pilot studies further supports patient and anaesthetist satisfaction with telemedicine consultations.[7,13] In our study, 95% of anaesthetists expressed satisfaction with the quality of teleconsultation. This aligns with an integrative review citing four studies reporting 80% or higher clinician satisfaction rates.[14-17] Gilbert *et al*.[18] assessed satisfaction using a customised questionnaire, reporting high patient and physician satisfaction rates (90/100 for patients, 78/100 for physicians). Dissatisfaction, identified in a previous French study (73% satisfaction), was linked to concerns about dehumanisation, error risk, and technical issues.[19] Addressing technical challenges, as emphasised by Leng *et al*.,[20] involves improving software performance and enhancing physician training.

Teleconsultations offer time and cost savings for patients. Despite our well-connected centre, women's cost savings were modest due to efficient public transport. In larger countries like the United States, obstetric telehealth programmes save up to $90 per consultation.[21] With an average travel time of 83 minutes in our study, women often require a day off, aligning with a 48% estimation from a previous review.[22] This global trend, driven by centralised guidelines, especially in maternity centres,[2] highlights the increasing importance of telehealth. Anaesthetists, recognising its potential since 2010,[23] particularly for remote patients, emphasise telemedicine's role in pre-admission anaesthesia consultations despite its slower integration into the anaesthesia speciality.

In examining the strengths of our study, we acknowledge the relevant study question, robust study design, meticulous data collection, and rigorous

analysis and interpretation. However, it is essential to recognise the limitations, including the potential bias introduced by allowing patients to choose their consultation method. Additionally, our focus on feasibility and satisfaction did not assess specific outcomes for women and babies. The absence of a comparative group and the reliance on self-reported distances may impact the comprehensive evaluation of the study's outcomes.

Considering the totality of the evidence, our study adds valuable insights beyond existing literature, emphasising the positive acceptability of teleconsultation in obstetric anaesthesia. While systematic reviews have been conducted in related areas,[14-17] the scarcity of literature on telemedicine in anaesthesia, particularly its impact on maternal and fetal outcomes, underscores the significance of our contribution. The positive effects on patient care, potential cost savings, and improved access to specialised care highlight the relevance of telemedicine in obstetric anaesthesia.

CONCLUSION

This study demonstrates the feasibility and effectiveness of telemedicine in obstetric anaesthesia. High patient satisfaction and positive acceptability suggest the potential success of this approach. Anaesthetists were satisfied in 94% of cases, with less than 1% deemed inadequate, supporting broader implementation.

Study data availability

De-identified data may be requested with reasonable justification from the authors (email to the corresponding author) and shall be shared after approval as per the authors' Institution policy.

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Conflicts of interest

There are no conflicts of interest.

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