Development and implementation of a pregnancy heart team at a Southeastern United States tertiary hospital: a qualitative study

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BACKGROUND: The United States has seen a significant rise in maternal mortality and morbidity associated with cardiovascular disease over the past 4 decades. Contributing factors may include an increasing number of parturients with comorbid conditions, a higher rate of pregnancy among women of advanced maternal age, and more patients with congenital heart disease who survive into childbearing age and experiencing pregnancy. In response, national medical organizations have recommended the creation of multidisciplinary obstetric-cardiac teams, also known as pregnancy heart teams, to provide comprehensive preconception counseling and coordinated pregnancy management that extend through the postpartum period.

OBJECTIVE: We sought to describe the development and implementation of a pregnancy heart team for parturients with cardiac disease at a southeastern United States tertiary hospital.

STUDY DESIGN: This was a qualitative study that was conducted among healthcare team members involved during the pregnancy heart team formation. Semi-structured interviews were conducted between April and May 2022, professionally transcribed, and the responses were thematically coded for categories and themes using constructs from The Consolidated Framework for Implementation Research.

RESULTS: Themes identified included intentional collaboration to improve outpatient and inpatient coordination through earlier awareness of patients who meet the criteria and via documented care planning. The pregnancy heart team united clinicians around best practices and coordination to promote the success and safety of pregnancies and not only to minimize maternal health risks. Developing longitudinal care plans was critical among the pathway team to build on collective expertise and to provide clarity for those on shift to reduce hesitancy and achieve timely, vetted practices without additional consults. Establishing a proactive approach of specialists offering their perspectives was viewed as positively contributing to a culture of speaking up. Barriers to the successful development and sustainability of the pregnancy heart team included unmet administrative needs and clinician turnover within a context of shortages in staffing and high workload.

CONCLUSION: This study described the process of developing and implementing a pregnancy heart team at 1 institution, thereby offering insights for future multidisciplinary care for maternal cardiac patients. Establishing pregnancy heart teams can enhance quality care for high-risk patients, foster learning and collaboration among physician and nursing specialties, and improve coordination to manage complex maternal cardiac cases.

Key words: Consolidated Framework for Implementation Research, coordinated pregnancy management, cultural shift, maternal cardiac disease, multidisciplinary team formation, obstetric-cardiac pathway, perceptions of benefit, qualitative analysis, specialized care pathways, transformative change

Introduction

In the past 4 decades, cardiovascular disease as a cause for pregnancy-related death has risen from 7.2 per 100,000 live births to 17.2 per 100,000 live births in the United States, making cardiovascular disease the leading cause of maternal mortality.[1] With the rise in maternal mortality and maternal health inequities, efforts have been made to determine the contributing etiologies and how best to reverse these trends. The prevalence of cardiovascular disease in the pregnant population,[2–7] along with the recognition that the majority of these fatalities have been deemed preventable,[8] is a call to action to improve processes and deliver equitable patient care.[8]

A pregnancy heart team is a multidisciplinary team that provides comprehensive preconception counseling and coordinated pregnancy management through labor-delivery and the postpartum period. Such teams were first proposed by the European guidelines for the management of cardiovascular diseases during pregnancy in 2018, with growing evidence supporting their use.[2,7,9] Similar teams have been described for the management of women with placenta accreta spectrum (PAS) with a reduction in maternal morbidity achieved through reduced blood transfusion and reducing the risk for reoperation.[10] Multiple national medical organizations have encouraged the formation of multidisciplinary teams comprising maternal-fetal medicine specialists, cardiologists, obstetrical and cardiothoracic anesthesiologists, specialized nurses, and others to help determine and manage coordinated care for this complex, heterogenous patient population.[2,3,7–9,11–14]

In 2021, a pregnancy heart team was created at our medical center to coordinate the care of pregnant patients with underlying cardiovascular comorbidities. Because these obstetric-cardiac pathway teams are increasingly being developed and implemented across the United States and beyond, we conducted a qualitative study to describe the development and implementation of the pregnancy heart team from the perspectives of the involved healthcare team members.

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AJOG MFM at a Glance

Why was this study conducted?

Because maternal death owing to cardiac disease is increasing, we sought to describe the development and implementation of a pregnancy heart team for parturients with cardiac disease at a southeastern United States tertiary hospital.

Key findings

Major themes identified during the development process included clinician (1) recognition of the need for improved care planning and coordination, (2) desire to promote positive patient outcomes and maternal experiences, (3) perceptions of benefit through increased clarity in practice and a shift in cardiology culture, and (4) navigation of healthcare system constraints to develop team sustainability.

What does this add to what is known?

Findings may inform ongoing strengthening of multidisciplinary and coordinated maternal cardiac care and the formation of other specialized care pathways for high-risk parturients. Using implementation science frameworks can contribute to awareness and address facilitators of and barriers to the success of future multidisciplinary teams.

Materials and Methods

This qualitative study involved semi-structured interviews regarding the development and implementation of the pregnancy heart team at [Anonymized Institution]. Review of the study was performed by the Biomedical Institutional Review Board (#21-3042) and met the criteria for human subject exemption. Healthcare team members who were involved in the creation of the pregnancy heart team were recruited for the study by research team investigators and included individuals from maternal-fetal medicine (3), cardiology (1), obstetric (2) and cardiothoracic (2) anesthesia, and nursing (2).

The inclusion criteria were individuals aged ≥18 years, current or former employees of the institution, and involvement in the development or implementation of the pathway. Participants were contacted via email and invited to participate in a single, semi-structured interview. Following verbal consent, interviews were conducted virtually, and audio was recorded by a trained, institutional review board (IRB)—approved research assistant. The semi-structured interview guide was developed by the authors using constructs from The Consolidated Framework for Implementation Research (CFIR) (Appendix A).[15,16] The interview guide used a combination of open-ended and closed-ended questions to elicit narrative responses regarding participant characteristics, their perspectives on the role of an obstetric-cardiac pathway in clinical care, the culture of safety at the institution, development, implementation, and considerations for sustainability.

Audio files were transcribed verbatim by a human through a professional medical transcription service with an investigator reading the documents in full to verify or correct words for accuracy in relation to the audio files and to de-identify the transcripts by replacing names with roles as applicable. The audio was then deleted. The data were securely stored, labeled by participant ID numbers, and were accessible only to IRB-approved study personnel. Participants were not compensated for their time. Because transcriptions were available, the data were read in their entirety for initial familiarization, and responses from each participant were grouped into categories by interview questions. The interview guide is presented in Appendix B. The senior author deductively coded the responses using CFIR constructs[15,16] and inductively coded the responses for additional latent themes. Highlighting and memos were used by the study team, and codes were discussed for categorization and to iteratively arrive at a consensus about common themes.

Results

A total of 10 healthcare team members participated. Their characteristics are presented in the Table. The CFIR constructs applicable to this initiative are outlined in Appendix A. The themes that were identified include clinician (1) recognition of the need for improved care planning and coordination, (2) desire to promote positive patient outcomes and maternal experiences, (3) perceptions of benefit through increased clarity in practice and a shift in cardiology culture, and (4) navigation of healthcare system constraints, which created barriers to quality care and challenges with pregnancy heart team sustainability.

Recognition of the need for improved obstetric-cardiac care planning and coordination

In response to rising cases of patients who have cardiac issues and are becoming pregnant at (Anonymized Institution, The University of North Carolina at Chapel Hill), multidisciplinary healthcare team members created real-time forums for integrated perinatal-cardiac care planning to improve the quality of care through the healthcare system and thereby optimize processes for maternal and infant outcomes. Although the institution was described as having a strong patient safety culture, as referenced by clinicians by practicing time outs during procedures and anonymous electronic safety event reporting, a clinician summarized that the pregnancy heart team was developed in response to an adverse event at the site, consistent with some other patient safety initiatives in the setting:

> "Unfortunately, it always happens where an adverse outcome tends to be the nidus for change, and that happened with both the hemorrhage. . .the abnormal placentation or PAS—that protocol and also the cardiac pathway where it was identified the areas of improvement could have potentially led to improving care or better outcomes." (P02)

TABLE
Healthcare team sample characteristics

Participants	n/N (%)
Primary professional role:	
Maternal-Fetal Medicine	3/10 (30)
Cardiology	1/10 (10)
Nursing	2/20 (20)
Obstetric Anesthesiology	2/20 (20)
Cardiac Anesthesiology	2/20 (20)
Primary role with the pathway:	
Development	6/10 (60)
Implementation	6/10 (60)
Clinical use	10/10 (100)
Self-identified race and ethnicity:	
Black	2/10 (20)
Non-Hispanic White	8/10 (80)
Identified sex:	
Female	7/10 (70)
Male	3/10 (30)
Number of years in professional role:	
<5 y	2/10 (20)
6–10 y	4/10 (40)
11–20 y	4/10 (40)

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The pregnancy heart team was seen as important for integrating expertise as a clinical team. This collaboration was consistent with healthcare team members' perspectives of a learning culture with shared governance across service lines. A clinician described that before the pathway, "...there was clinician goodwill and siloed expertise, as the healthcare system lacked infrastructure to incorporate multidisciplinary perspectives and effectively coordinate care for this population at high-risk of poor outcomes." (P01)

Desire to promote positive patient outcomes and maternal experiences

The driving force behind the pregnancy heart team structure was framed around both maternal-infant health outcomes and birthing people's experiences during the birthing process (P09). The pathway entailed monthly virtual clinician meetings during a standing time for group discussion of all relevant cases through patient identification throughout the postpartum period. The previous approach was an ad hoc consultation only about the patients with the most complex or time-sensitive needs. This proactive approach of specialists offering their perspectives enabled more comprehensive care plans early and ongoing with additional healthcare team members across specialties identified for individual patients to meet and address aspects of their care if or when complications arose. A clinical template was developed and consistently used in the electronic health record (EHR) system to address and document core aspects of patient needs (Appendix C). This was coupled with an organizational tree of the team and identified inclusion criteria for the patients (Appendix D–E).

The pregnancy heart team was structured as an opt-in collaboration, based on individual clinician interest and availability. The disciplines involved included maternal-fetal medicine, obstetrics, cardiology, nursing, obstetrical anesthesiology, and cardiac anesthesiology with fixed faculty, staff, and trainees. Fixed faculty were intentionally invited to promote physician discipline continuity because trainees rotated monthly and annually.

Maternal-fetal medicine fellows managed the virtual list of pregnancy heart team patients within the EHR system, which the participants estimated to include 3 to 4 new cases a month. Consideration of prenatal care location, birth mode, operating room, or childbirth setting within the hospital and anticipation of maternal intensive care and other postpartum needs were components that factored into the coordination of inpatient beds and staffing. A participant offered the following: "It's not just the number of staff, but what is our skill mix on the unit for the timeframe that we think that mom will arrive" (P10). The pregnancy heart team formalized the way clinicians communicated with one another around obstetric-cardiac care at the setting in terms of management approaches, and this structured, routine communication created opportunities for the healthcare team members to identify ways that the system could be strengthened.

Perceptions of benefit through increased clarity in practice and a shift in cardiology culture

A clinician described the pregnancy heart team as thinking creatively together to make sure that their patients are safe, comfortable, and know what to expect. Another clinician stated that establishing a culture of "every patient, every time" encourages improved care coordination. Furthermore, regular meetings among the clinicians to "weigh in" (P01) and "lend expertise" (P02) was viewed as promoting a wider institutional practice in which healthcare team members felt more empowered and

comfortable to speak up. "Clear conversations" (P09) through the pathway was viewed as promoting an "open culture of wanting to hear about concerns" (P06). Pathway engagement led to more familiarity among individuals on the pregnancy heart team and fostered empathy among the members about disciplinary priorities, which they described as spreading through the respective specialty groups. One clinician felt that an additional benefit of the teamwork was that the "patient knows that there are multiple people talking about them," although patients do not participate in the pregnancy heart team meetings, because engagement with multidisciplinary specialists around health assessments and treatment options might be "a little bit frightening" (P04).

The ongoing cardiac, obstetric, anesthesia, and nursing discussions established shared mental models and doing so as early as appropriate during patients' pregnancies was important to the clinicians. Documented care plans with specialty input for clinical resources and management strategies was viewed as substantially better than relying on "one individual's memory" (P07). Healthcare team members described this approach as improving practice standardization by building on experiences of longitudinal care of complex patients together.

Clarity around vetted plans was critical for those on shift at the time of delivery and for team comfort to reduce hesitancy around safety and implementation in a timely manner, "without having to make 20 phone calls" (P09). The pregnancy heart team provided structure for more considerations during pregnancy, "as opposed to being up in the middle of the night and dealing with emergencies" (P02) during labor or engaging in a "guessing game that can delay care" (P09). This planning also allowed for inpatient nursing leadership to have complex patients "on the horizon" (P09), especially given the potential for variable timing of patient presentation for childbirth. The EHR documentation meant that when a patient came into obstetric triage, the charge nurse was able to find the care plan information and coordinate the next steps for care as planned (obstetric-cardiac multidisciplinary plans were accessible in the electronic medical record and in a printed version at the charge nurse station in the labor and delivery ward) (Appendix C).

One clinician highlighted ideologic differences between obstetrical and cardiac specialties. They outlined that all fields of medicine have been male-dominated and cardiology has remained so with a focus on risk-minimization. The individual described the pregnancy heart team as positively influencing the cardiology division at [Anonymized Institution] to be more aware and supportive of making "pregnancy successful and safe" among patients with preexisting cardiovascular disease or among those who developed a cardiovascular complication while pregnant. They reflected on pregnancy in these cases as creating "competing demands":

> "It's a field where, oftentimes, disease is really life-limiting. The attitudes about it, reproductive choice, I would say are driven very much in favor of minimizing cardiovascular risk and not necessarily acknowledging oftentimes the very important place of women desiring pregnancy even in the context of that cardiovascular disease. I think what I have seen at [the Anonymized Institution] is that oftentimes, when there are pregnant women with cardiovascular disease, the perspective of cardiology is oftentimes like, 'Well, why is this person still pregnant?' or, 'Why is this person pregnant to begin with?' because this exposes them to increased risk. We operate under this assumption that risk can be minimized and should be minimized. For the typical cardiovascular patient, the thing on the other side of that risk is not worth the same."

> "In the case, obviously, of pregnancy, you're talking about two oftentimes really competing demands, which is the pregnant person's desire to live and be free of the morbidity and mortalities with cardiovascular disease but also that pregnant person's desire to carry a pregnancy to term. I think that obstetrics, as it has become probably more female-dominated and there's just more appreciation for that challenging balance, women's health, and longevity beyond the pregnancy, there's just a little bit more awareness of the importance for women of bein' able to carry a pregnancy even if it exposes them to some risk" (P08).

Navigating serious health risks was especially challenging for patients who were classified as having modified World Health Organization Class IV criteria for maternal cardiovascular disease, that is patients who carry the highest risk for mortality (Appendix E). They have "a contraindication to continuing their pregnancy, but either have chosen to (remain pregnant) or have been subjected to, because of the limitations of abortion law" (P03).

Navigation of healthcare system constraints

For inpatient postpartum care, there was tension among the clinicians with regards to the use of maternal intensive care unit beds vs recovery in the postpartum ward. A clinician described the challenge of coordinating care in relation to nurse staffing ratios:

> "I think the biggest issue we run into is that our routine postpartum floor is where a lot of our uncomplicated patients go, and there's a much higher ratio of patients to nursing. They're also taking care of babies as well as the moms, and so, for a lot of our patients where their highest risk period is actually in that initial 24 to 48 hours postpartum, that when we wanna make sure that they're having close monitoring, but maybe they're not as sick as needing to be in an ICU and then tryin' to figure out what's the best way to get them the care that they need without utilizing extra resources that then take up space for another patient that might need them?" (P05)

Location of recovery is further complicated by the intensive care unit being consistently at capacity, which participants described as being the case in many intensive care units. A clinician expressed concern that the patients are really sick and need a lot of nursing care, but the institution was short staffed, especially during the COVID-19 pandemic. A clinician also expressed concern about "what's really appropriate or safe based on the patient ratios that end up happening" (P05), which is significant for this specialized patient population and all patient care. Overall, "the hospital and the whole world is kind of in a staffing crisis" (P09). Success may include advancing staffing and bed challenges among the healthcare team so that the clinicians are all aware of the challenges, on the same plan, and clear about the appropriate timing and acuity to ensure that the appropriate level of care is available throughout hospitalization.

Short staffing was a barrier to the pathway establishment and sustainability. Funded administrative support was requested for sustainability with long-term coordination success described as contingent on this institutional support.

> "It would be great to have a point person, like an admin person who was regularly scheduling the meetings, who was keeping track of the patient list and taking some of the burden off the providers that are currently doing it. It's not me. . .but I feel for those people that I know are doing 1,000 other things." (P02)

Staffing challenges also contributed to clinical stress around labor and delivery coordination. Some patients required that childbirth occur outside the labor and delivery unit with specialized equipment and "staffing up" to include scrub technicians, anesthesia staffing, and environmental services. Rearranging work schedules to accommodate this acuity could cause disruptions in other patients' care. Sometimes, because of the many moving parts, patients could not be delivered because "we aren't able to staff the case like it needs to be" (P09), so the pathway care plans included contingency strategies (which may include backup intensive care unit resources, a call-tree for specialists, and/or delivery plans or recommendations in the event of an unscheduled delivery).

Discussion

Principal findings

This study revealed that the formation and use of a pregnancy heart team was a positive experience for the involved healthcare team members. Themes that were identified from the interviews included opportunities to strengthen the system of care, key components of the pathway, facilitators of and barriers to implementation, positive impacts of the pathway, and future directions. To our knowledge, no previous qualitative study has examined the formation of a pregnancy heart team.

Results

This study documented the perspectives of healthcare team members involved in the development and implementation of a multidisciplinary pregnancy heart care team at [Anonymized Institution] during 2022. Formation of multidisciplinary teams to help manage patients with PAS, and their success in reducing maternal mortality parallels the template for heart teams.[10,17] Previous work has suggested that these pregnancy heart teams may ultimately improve care and decrease complications.[2,3,7,14,18,19] In addition, patient satisfaction has been shown to increase with the use of multidisciplinary teams when addressing complex comorbidities.[3,20]

Clinical implications

The pregnancy heart team offers several clinical benefits. It fosters a unified approach among clinicians and prioritizes the safety of pregnancy and delivery for mothers with complex health risks. Clear, vetted plans minimize hesitancy and facilitate safe care, whereas a proactive specialist approach positively influences a culture of open communication. Multidisciplinary discussions reduce biases and enhance collective expertise in managing high-risk cardio-obstetrical patients. Streamlining care through structured meetings eases the burden of implementing expert opinions and allows for institutional data collection and collaborative experiences in caring for maternal cardiac patients over time.

Research implications

Challenges to the successful creation and implementation of the pregnancy heart team were presented in the healthcare provider interviews. Barriers to the short- and long-term success of the pathway from the healthcare provider perspective include unmet administrative needs and a concern for teammate turnover within a context of short staffing and the high workload required for the monthly committee meeting. The findings may inform ongoing strengthening of multidisciplinary and coordinated maternal cardiac care and the formation of other specialized care pathways for high-risk parturients in terms of nursing staffing ratios and bed coordination considerations. The creation of this multidisciplinary team also highlights an opportunity for institutional leadership to support proactive efforts in initiating such pathways for high-risk parturients and not just in response to adverse events.

Strengths and limitations

The strengths of this study include the varied representation of team members and that the timing of the study was proximal to the team creation. This study does not include the patients' experience. Gaining insight into the patient experience is essential for improving clinical care. In addition, this study is a single-center experience and inclusion of other sites could add additional insights.

Conclusion

This study highlights the healthcare perspectives of one institution's initiation and implementation of a pregnancy heart team. The reflections may serve to inform future directions of multidisciplinary care for maternal cardiac

patients at our own institution and may be informative for others who are developing similar care pathways. Clinical experience gained by creating multidisciplinary teams for the care of high-risk maternal cardiac patients can contribute to collective learning on how to effectively break down communication barriers and best manage complex patients. Future directions may further incorporate both patient outcomes and participation in their own multidisciplinary planning. ■

CRediT authorship contribution statement

William Michael Hart: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Ben Cobb:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Johanna Quist-Nelson:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization. **Kristin P. Tully:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Data curation, Conceptualization. ■

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.ajogmf.2024.101336.

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