

Feature Article

Pregnant Through the COVID-19 Chaos

Insights on How Women Use Information in the Perinatal Period During a Pandemic

Lucy C. McNamee, DNP, RNC-OB, CLC ■ Xiaoyu Liu, MBA ■ Kim Phan, BSN, RN ■
Teresa Johnson, PhD, RN ■ AkkeNeel Talsma, PhD, RN, FAAN

Purpose/Aims:

To gain insights in how women use technology to address health information needs during the prenatal and postpartum time frame.

Design:

An exploratory qualitative study recruited pregnant and recent postpartum women to share their perspectives on information they needed and how they obtained it.

Methods:

Women who were pregnant or <90 days postpartum (n = 26) were recruited via social media and invited to share their experiences. Design thinking methodology was used to develop questions to understand information needs in the perinatal period as well as in context of the COVID-19 pandemic. Verbatim transcripts were coded by the research team according to Braun and Clarke's reflexive thematic analysis.

Results:

Five themes explain the experience of seeking information to support the perinatal period. Women explained the need for the following: (1) information and relationships are inseparable, (2) current practices leave needs unmet, (3) the pandemic exposes vulnerability in prenatal care, (4) left to figure it out alone, and (5) bridging the gap through technology.

Conclusions:

Aggregated findings suggest how usual care can be modified to improve support for women through personalized care, improved information support, and use of technology. The study

findings inform innovative strategies using current technologies to improve health promotion in a dynamic health environment.

KEY WORDS:

design thinking, healthcare technology, patient engagement, perinatal care

Women experiencing pregnancy have a need for information to guide their health decision-making. Much of this information is sought over the course of the pregnancy from perinatal caregivers, family, and friends and through various publicly available sources. For the perinatal clinical nurse specialist (CNS), understanding information needs and preferences during the perinatal period is a key component of health promotion. The purpose of this study was to qualitatively explore the needs of women obtaining health information during pregnancy and postpartum.

In the United States, there is emphasis on patient education throughout the course of routine prenatal care in both group and individual settings, formal classes, or through encounters for specific complaints. Women seek additional information as needed, with web-based information being a commonly utilized resource. This study took place during the first year of the developing global COVID-19 pandemic and sociopolitical unrest in the United States. Data collection was completed between August 2020 and October 2020. During this time, the COVID-19 pandemic impacted healthcare delivery systems, sometimes considerably altering the delivery of prenatal care. By August 17, 2020, COVID-19 was the third-leading cause of death in the United States, and the global death tolls surpassed 1 million on September 28.¹ Policies aimed at limiting the spread of COVID-19, such as social distancing, mask wearing, and restricted visitation, were implemented by hospital systems across the country, affecting caregiving practices

Author Affiliations: Clinical Nurse Specialist, Tripler Army Medical Center, Honolulu, Hawaii (Dr McNamee); Doctoral Student (Ms Liu), Associate Professor (Dr Talsma), and Professor at the College of Nursing (Dr Johnson), University of Wisconsin–Milwaukee; Registered Nurse, Northwestern University Hospital, Chicago, Illinois (Ms Phan).

The authors report no conflicts of interest.

Correspondence: AkkeNeel Talsma, PhD, RN, FAAN, University of Wisconsin–Milwaukee, College of Nursing, 1921 E. Hartford, Ave, Milwaukee, WI 53211 (Talsma@uwm.edu).

DOI: 10.1097/NUR.0000000000000705

and systems of care.² Public health efforts across the United States were fraught with polarized political views, generating cultural tension and conflicting information.³ The historical context of the study critically impacted the research methods and the participants' interview responses. Women faced a new gap in information as they sought to understand how COVID-19 may impact themselves and their babies.

In addition to healthcare interactions, technology plays a key role in how women obtain and use health information related to pregnancy. The Health Information National Trends Survey revealed that 70.14% of respondents digitally sought health information in the United States.¹ Studies^{4,5} completed prior to the onset of the COVID-19 pandemic confirmed the need for pregnancy-related information available online. Lu (2022)⁶ conducted a systematic review and found that the most frequent consumer information needs were about labor and delivery (9/20 studies), medication in pregnancy (6/20 studies), newborn care (5/20 studies), and laboratory tests (6/20 studies). Three barriers to information were identified, including the absence of needed information, needed information is not readily accessible, and the needed information cannot be readily interpreted by the users because of jargon or technical language. Many studies (76%) focus on the use of the internet rather than specific digital platforms, needed resources,⁷ or its suitability for capturing the complexity of information-seeking behaviors.^{2,7-9} Ghiasi⁵ reported a need for qualitative studies to better understand the perception of the online information and the ability to use the content available online. Gaps in current research make it difficult for perinatal CNSs to develop innovative solutions that improve the quality of care and empower the health decision-making of childbearing families.

To address the knowledge gap, we ask about women's information needs during pregnancy by studying this question from the perspective of women themselves. To fully comprehend the experiences and processes of these women, we developed a qualitative study with questions following design thinking⁵ methodology. Design thinking is a process used to understand and solve problems by focusing on the challenges of the person dealing with the problem. The process includes 5 steps: empathize by researching the user's needs, define by stating the user's needs and problems, ideate by creating ideas, prototype by to create solutions, and test by trying out the proposed solutions. For this study, we focused on empathize, learning about the health information needs of pregnant women at this time during the pandemic. Women who were pregnant and postpartum were asked to share their unique experiences seeking health information.^{10,11}

METHODS

Design

We conducted this exploratory study using a qualitative design to understand the perceptions and preferences of

women to obtain information during pregnancy and postpartum, including the role of online technology. The University of Wisconsin–Milwaukee institutional review board provided approval for the research study (UWM IRB 20.349). All members of the research team completed Collaborative Institutional Training Initiative training on ethical research practices to protect the rights of participants.

Population/Sample

The study population included women in the United States who were pregnant or had given birth to a live newborn in the past 90 days. As a function of digital recruitment, participants represented a variety of geographical locations and practice settings, including hospitals, birthing centers, and government facilities in both urban and suburban locations.

The team distributed fliers for recruitment both digitally via social media and physically in clinical and community settings in southeast Milwaukee, Wisconsin. Digital versions of the flier were posted on social media in pregnancy or parenting support groups after administrator permission was obtained. Members were able to “share” or digitally repost the recruitment files to others. Potential participants enrolled by contacting the study team directly via email.

Although there were no criteria for participant diversity, our intention was to make participation accessible to a diverse population of women. During data collection, the study team noted that initial participants were primarily White and of non-Hispanic ethnicity. The recruitment flier was revised to convey diversity and inclusion, was approved by IRB amendment, and redistributed where permitted.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: women who (1) were pregnant or within 90 days (approximately 3 months) postpartum, (2) were 18 years or older, (3) resided in the United States, (4) were able to read and speak English, and (5) intended to receive care from a licensed care provider for their birth. Exclusion criteria were as follows: (1) women who experienced miscarriage, stillbirth, or life-limiting fetal diagnoses with this pregnancy; (2) women who planned to have either a lay-attended or unattended births; and (3) women who were unable to conduct the interview in English. Rationale for inclusion was that the population of interest was women in the United States who were expecting a live-born infant and who interact with formal healthcare systems. We included both multiparous and primiparous women because both shared the new experience of pregnancy during the COVID-19 pandemic. In addition, although these groups differ in experiences, other factors related to personal circumstances may supersede differences related to parity.⁵ Exclusions were also based on the study aims. Women currently experiencing pregnancy loss were a subset of the population with unique information needs beyond the scope of our study.

Women planning an unattended or lay birth were excluded because of a desire to capture the information exchange occurring between providers, health systems, and patients. Finally, the study team did not have access to translation services to support interviews in languages other than English.

Instruments

We applied the premises of design thinking to develop the questions to be used in the study. Design thinking is a creative, analytical, and human-centric process in which the designers iteratively seek opportunities to empathize with the end-user, challenge assumptions, and redefine problems.¹¹ Semistructured interviews focused on understanding the challenges participants faced finding and using health information to guide care for themselves and their infants. Open-ended questions encouraged participants to share experiences that were most meaningful to them, with special emphasis on the pandemic, information needs, and electronic resources. The questions were tested and revised through mock surveys with the research team prior to implementation with the participants. See Table 1 for a subset of the questions used during the interviews.

Data Collection

A perinatal CNS explained the purpose of the study to potential participants, obtained consent, and arranged an interview. Two additional CNSs contributed as expert interviewers, whereas additional study team members served as notetakers. All interviews, study collaboration, and data analyses were conducted virtually using accounts and software with 2-factor authentication processes and additional password protection for sensitive documents. Access to study data was restricted to team members explicitly listed in the IRB protocol. All data were coded, and names were removed so that transcripts could not be linked with participants' names in the database.

Potential participants reached the designated point of contact via official email and completed a brief online screening to confirm eligibility. Eligible participants received a study welcome letter describing risks and benefits of participating in the study. Upon acknowledgement of the welcome letter, participants were scheduled for an interview via Zoom (San Jose, California) using a secure university-associated account and logged in a secure digital database. After the interview was complete, each participant received a "thank you" email with a \$20 Amazon digital gift card code.

Table 1. Interview/Focus Group Questions (Sample)

1. Tell me about your pregnancy experience so far or tell me about your pregnancy and childbirth experience
a. How did you feel about your own health prior to this pregnancy? How would you describe your health?
b. Can you describe any special circumstances or health concerns during your pregnancy or childbirth? Some examples might include preeclampsia, weight gain, or diabetes, or special concerns about the baby.
c. What are some ways you dealt with specific health concerns during your pregnancy?
2. What impact does the COVID-19 pandemic have on how you plan (planned) for your birth?
a. What plans have changed?
b. How do you feel about your pregnancy and delivery during COVID-19?
3. How has the COVID-19 pandemic affected the kinds of information you wanted or needed to make health decisions related to your pregnancy, your baby, or yourself?
a. What resources do you turn to for health information related to COVID-19 when you need it?
b. What information about COVID-19 might you want the hospital/healthcare providers to share with you?
c. How do you feel about the amount of information you are currently getting?
d. What are some COVID-19–related questions that you currently have? Or what would you like more/better information about?
4. How has the COVID-19 pandemic changed the way your doctors and nurses give you information?
a. What is new or different than before?
b. What information was most helpful to you?
c. What challenges have you experienced communicating with your providers?
d. How do you feel about the information you were receiving or not receiving?
5. What might make (have made) it easier for you to make decisions about your care during pregnancy, labor, and postpartum?
a. If there was an application for your phone or computer that could help you, what would you need it to do?
b. Are there any applications related to pregnancy or health that you find especially helpful? What makes them so appealing?
c. What other resources do you wish you had?
6. Thank you for sharing your experiences today! Before we finish, is there anything else that you would like to add before we end the interview?

Our chosen qualitative method acknowledges the interview as a unique human interaction that should reflect a natural social exchange.¹² In accordance with this philosophy, trained interviewers followed the same scripted interview questions but had the liberty to adapt or expand upon questions based on the participants' responses. A dedicated research computer was used to host, record, and transcribe the interviews. Data were secured on this computer as well as on the encrypted collaborative study team page on Microsoft Teams (Redmond, Washington). All interviews were audio-recorded and transcribed verbatim. A preliminary transcription was automatically generated by Zoom and reviewed by the study team members for accuracy. To protect privacy and confidentiality, data were removed from the Zoom account promptly after transcription and audio files were subsequently destroyed. All data were placed in corresponding files on the secure Teams site for use during data analysis.

Data Analysis

Qualitative interviews were analyzed according to Braun and Clarke's¹² reflexive thematic analysis (RTA). Use of RTA allows for flexibility in the epistemological orientation of the analysis to best suit the study aim. In this case, we assumed an inductive posture toward the data, allowing codes and themes to remain organic to the statements made by participants.

Three core members of the study team directed by the study's CNS-lead reviewed field notes and transcripts through formal iterations of RTA. First, members completed thorough review of each transcript, recording exemplar quotes, and developing codes to describe the quotes. Subsequently, quotes were grouped according to themes and assessed for interrater reliability. The study team internally validated candidate themes through complete review of all 26 transcripts. Final themes were reviewed with the primary investigator and study team members to verify assumptions, validate findings, and improve clarity.

In accordance with RTA methodology, the study team used memo writing and journaling throughout the process of data collection and analysis to limit possible subjective biases.⁹ Study team members kept a reflective journal of their responses to each participant interaction in real-time field notes. Team members journaled and discussed personal biases, assumptions, or experiences related to the study. The team lead for this study kept an audit trail of team meetings and decisions, whereas individual team members conducted memo writing to chronicle their personal responses. The team discussed potential assumptions and biases during coding meetings to clarify interpretations of interview content.

RESULTS

The cumulative membership for social media groups where recruitment occurred had 9677 group members. Individuals who shared or tagged the advertisement among

personal contacts increased reach. The actual number of potential participants exposed to the invitation is unknown. A total of 26 women responded to study advertisements via email. All (100%) met the inclusion criteria and completed the interview. None of the participants withdrew from the study. No further information was obtained about those who chose not to participate; no comparisons could be made about the experiences of those who did not participate in the study. Table 2 summarizes the demographic characteristics of the study participants. Additional details about the sample were gained through the participants' narratives. The study participants were from diverse locations across the United States including California, Colorado, Connecticut, Kansas, Louisiana, Ohio, North Carolina, Texas, Wisconsin, and Washington. Seven of 26 participants, or 26.9%, described at least 1 previous miscarriage. Two participants identified themselves as first-generation immigrants to the United States. These data points had significant potential to impact the ways women interact with health information.

Thematic Analysis

There were 5 themes that will be summarized from the results of this study: (1) information and relationships are inseparable, (2) current practices leave needs unmet, (3) the pandemic reveals vulnerabilities in prenatal care, (4) left to figure it out alone, and (5) bridging the gap through technology. Through these themes, participants expressed not only the kinds of information they needed, but also the conditions that optimized their sense of trust, security, and autonomy. They explained experiences that were detrimental and ways pregnancy/postpartum information exchange could improve.

Theme 1: Information and Relationships Are Inseparable

The need for information by study participants was intertwined with the need for supportive, caring relationships. Women used information and relationships together to answer their burning questions about pregnancy, their birth experiences, or even about themselves. For our participants, their partner, close family and friends, and the healthcare team represented a spectrum of relationships that influenced information seeking. Positive patient-provider relationships marked by transparency, continuity of care, and shared decision-making provided a powerful combination of expertise and trust. When participants experienced positive patient-provider interactions, they viewed their providers as capable of helping them address informational needs. Participant F shared "I put a lot of stock in what my midwife says because we've developed that trust. . . we seem to very much be on the same page." Similarly, participant K described how empathy from her medical team empowered her to seek information "[my providers] always, you know, made you feel like it was important and not that it was something stupid that

Table 2. Descriptive Results of Demographic Characteristics

Maternal Infant Outcomes Study Maternal Arm Demographics (n = 26)

Variable	n	%
Age		
≤19	0	0.00
20–24	0	0.00
25–29	10	38.46
30–34	8	30.77
35–39	8	30.77
≥40	0	0.00
Ethnicity		
Asian	2	7.69
Black	1	3.85
Black and Hispanic	1	3.85
White/Caucasian	21	80.77
Other	1	3.85
Trimester/postpartum ^a		
1	3	11.54
2	5	19.23
3	9	34.62
4	1	3.85
5	5	19.23
6	3	11.54
No. of pregnancies		
1	7	26.92
2	9	34.62
3	1	3.85
4	5	19.23
5	3	11.54
6	1	3.85
Delivery location		
Hospital	24	92.31
Birthing center attached to a hospital	1	3.85
Other	1	3.85
Entry to care		
1st trimester	23	88.46
2nd trimester	1	3.85
Other: delayed related to COVID concerns; plans to find an obstetrician	1	3.85
Other: pre-prenatal, in vitro fertilization	1	3.85

^a 1 = 1st Trimester; 2 = 2nd trimester; 3 = 3rd trimester; 4 = 1 month postpartum; 5 = 2 months postpartum; 6 = 3 months postpartum.

you were asking.” Providers were viewed as a highly credible, preferred source of pregnancy information.

Women invariably sought information from their social networks and important women in their lives, even when information from the provider was considered adequate. As participant N told us:

I went to basically the women in my life who I know have, you know, given birth themselves multiple times, both my own age and in and in my mom's generation, um, just to get you know their... their insight, what resources, helped them. So, I talked to my friend and reached out to an online community of mothers.

Women sought support to validate their experiences and the information they learned about what to expect during pregnancy, birth, and postpartum. Participants' own mothers and close female family members were especially important because of the trust, empathy, and shared beliefs implicit to these relationships.

Finally, the participants' birth partner (typically a spouse or romantic partner in this sample) represented a critical supportive relationship. Although birth partners did not typically provide comprehensive information about pregnancy, they enabled information exchanges: “It's important that my husband's involved... So just a support system.” Partners shared in curiosity about the pregnancy and helped participants advocate for themselves, serving as sources of reassurance when participants had concerns during the perinatal period. Participant C shared her husbands' presence eased her worry: “I've had 2 miscarriages [...] My husband was able to come with me. My doctor's office is allowing spouses the entire time.” She explained, “I was nervous I was just gonna be me by myself, which I didn't want to do.” In summary, relationships characterized by trust and social support enhanced participants' information seeking and receptiveness. Even relationships that did not provide substantial added information about pregnancy gave women in our study a way to share experiences and validate their knowledge.

Theme 2: Current Practices Leave Needs Unmet

Women in our study encountered structures and processes in their healthcare systems that made information seeking more difficult. The problems women identified represent the status quo for perinatal care rather than problems brought about by the COVID-19 pandemic. Structural issues related to systems that impeded care continuity, limited time with the provider, or made it difficult to reach out to the care team to ask questions. When women saw multiple different providers, they were not able to build trusting relationships. I feel like maybe if you have one [provider] that you really build up that rapport with and you know, maybe then it'd be a little easier to communicate and get those questions answered,” participant D

explained. Some worried that important aspects of their care would be missed and felt they had to censor or shorten their questions. Participant M shared:

I felt like when I actually went in for my appointments that I had to really... I had to limit my time first off, like, I felt like we were always in a rush and I, like, always had to, I don't know, like, rephrase [my questions] in a way where I wouldn't be judged.

Care continuity enabled proactive information sharing, but most participants did not have this experience. Many women interacted with a different provider with each appointment. Additional system barriers included poor patient-provider rapport, education on limited topics during prenatal care, and general need for anticipatory guidance. Both first-time mothers and experienced mothers expressed their hope that obstetric providers would bring up or provide more detailed information on difficult subjects. As one first-time mother told us, "I find what I'm most worried about and the information that I'm trying to find the most is just sort of... it's hard to ask for because I don't know what I need to know." A mother of two told us while her providers gave her basic information:

It felt like I had to kind of dig deeper, and people don't always [know] the right questions to ask, or think they need to. So, I feel like if you hadn't asked them, you could be blind sighted by something you weren't expecting.

Women also named topics that were important to them but inadequately discussed in their care (Table 3). Finally, women who experienced health conditions that impacted their pregnancy frequently reported unclear information from their providers. Participant F, a mother with gestational diabetes, told us, "Providers treat [diabetic patients] very differently, and it seems like there's not a ton of consensus out there on it." Similarly, participant Q described her experience as providers diagnosed a complication in her pregnancy:

Table 3. Top 10 Information Needs	
Information Need as Expressed by Participants	
1.	Mental health
2.	Medical conditions/complications (eg, gestational diabetes; Rh-negative blood type, molar pregnancy)
3.	Self-care
4.	Nutrition
5.	Exercise/physical fitness
6.	Pelvic floor health
7.	Lactation and pumping
8.	Newborn care
9.	Postpartum recovery (the first year)
10.	Information specific to life context (eg, job, family, living situation)
<i>Participants discussed topics they wished they understood better or about which they needed more information. Order does not imply a level of importance.</i>	

When I had my appointment just kind of seemed like "oh okay" and then the second [provider] was like, "Okay, we're running this test, and that test. And let's make sure you don't have it," you know. So, I almost felt like sometimes it was confusing and somewhat inconsistent.

Systemic barriers to information sharing from the health system left participants feeling lost, disempowered, and dismissed. Participant M summarized, "I honestly don't feel like I had the option to make a lot of decisions, but a lot of my decisions were made for me."

Theme 3: COVID-19 Pandemic Creates New Challenges and Tests the System

The COVID-19 pandemic taxed the healthcare systems, highlighted existing weaknesses, and created new challenges for participants. "I don't recommend having a baby during a pandemic," participant E quipped, "it just created different hurdles you don't usually encounter." There was intense need for credible information about the pandemic and pregnancy, but this information was simultaneously more difficult to ascertain. Participants described how changes in society as well as healthcare systems left them feeling vulnerable. For the individual, the global collective trauma of the pandemic increased experiences of stress and anxiety and increased the need for social support. After visiting with a relative who was subsequently diagnosed with COVID-19, participant S recalled, "Oh, I know I just cried like it was pure panic. So, I don't know. It was very emotional." All participants discussed increased worry, and some reported seeking or returning to a behavioral health provider for care. Participant K was among several who required behavioral health support. She shared, "I did end up taking my anxiety medicine again because with um, like, the virus going on and then I was working from home, I had my kids at home, trying to work with a kindergartener, um, and then by husband had to go back to work and I was just, I was literally losing my mind." Profound loss of experience and isolation from family significantly disrupted key relationships. Participant L shared:

I cried a few times. Um, my, what I pictured my whole life when I gave birth was having my mom there, my dad there, my little brother, my husband, and his family. Um, 'cause this is the first grandchild, the first great-grandchild, the first of everything. Then COVID happened, my husband, at one point they were considering not letting him in.

At the hospital level, women in our study described how "constant changes" to policy and lack of transparency left them worried about their safety. Participant V shared, "I feel like it changes like things change so much that it's hard to kind of anticipate what things will be like." Participant L stressed that she "would prefer the honesty, like 'yeah we treat people here.' Or 'oh yeah, this person had it,' or any

type of information but that number is so concealed.” They feared exposure to the virus in the clinical setting and simultaneously struggled with policy changes that decreased their options. Most informative parenting programs such as childbirth education, group prenatal care, or special events for expectant families were canceled. Commonly, the birth partner was excluded from prenatal care visits, which caused distress for our participants. Participant S described her experience:

My husband wasn't already allowed to go to those appointments with me, so if I was rejected by asking those questions, I wasn't able to like, look around and feel comforted. So, it made me feel kind of like... like a loser I guess.

Women emphasized both stress and loss of experience as they looked for ways to include their partner in their care. Participant N exemplified the impact of excluding the partner in her subsequent decision to delay important care:

My husband and I have not yet done the 20-week anatomy scan, and we're now like 33 weeks, um, and the reason for that is just that [...] we haven't been able to get into a place that uh that would let my husband actually come to an ultrasound.

Problems with continuity and length of appointments increased as hospitals struggled to keep pace with the pandemic. A shift to telemedicine for some prenatal appointments was met with mixed responses from our participants. Although most were neutral about telemedicine, some expressed fears that something important would be missed. Participant M shared her concerns with us:

They're saying now that they're only going to have like an 8-week follow-up, and even that is going to be over the phone and I'm like, “Well, how can you actually look at me and assess my condition?”

Obtaining specific information about COVID-19 was a new challenge for the women in our study. Information about the pandemic itself was characterized by mixed messages, constantly changing recommendations, and political strife. Local and national news became a source of anxiety for participants. Women experienced distress after looking for information about COVID-19, which prompted several participants to subsequently avoid searching for information on their own. Participant C summarized the collective sentiment: “At this point, I've limited a lot of it just because it gets very overwhelming, and mixing in the politics with all of it because it can't really separate... it gets very exhausting.” Other participants restricted searches to identify local hospital policies and practices, but information was rarely easy to access or clearly communicated by clinical staff. Participant H tried to research on her own but was unsatisfied: “I feel like hospital websites could do a better job at really laying out what they have available, but that's like, because I did peruse one of the hospitals websites, in the area, and they're very vague.”

The pandemic added to their burdens to find pregnancy and postpartum information, which simultaneously disrupted important relationships in study participants' lives. Participant H summarized her feelings: “I've had to deal with, like, a lot of those, those issues, and those nerves and then just kind of day to day, you know, thinking like what would happen if I was to get this virus?”

Theme 4: Left to Figure It Out Alone

When our participants had unmet information needs, they did their best to research topics on their own using a range of resources. All used the internet or mobile applications (apps) to search for information and connect with others. Information sought was typically specific to their unique health conditions, values, or life context. In general, participants noted information gaps related to the postpartum period, including lactation concerns, newborn care, nutrition, and fitness. Participant I reflected on her own searching and sharing, “I think it'd be great to hear my provider like just ask early on, how are you preparing for postpartum like these are some things that, like, you should probably think about like support system wise or the first 3 weeks are going to be really hard” or information from other moms who have struggled with pelvic floor issues that may have recommendations about what worked for them. Mental health information was a salient topic, especially related to the pandemic. Participant V emphasized “I almost feel like mental health needs are more pressing like during all of this.” Sometimes the vastness of online resources was challenging. As participant W noted, “I felt like that was really difficult to navigate as a new mom and from other moms who have struggled with postpartum depression, I've heard similar feedback.” Women in our study viewed “postpartum” as much longer than the 6 to 8 weeks recommended between birth and the postpartum follow-up appointment.

Search engines such as Google were seen as a starting place for web-based information seeking but regarded with caution. As participant E told us, “I know you shouldn't Google everything, but that still is an option to look at.” Credibility remained important to our participants. Participant O emphasized her value of evidence-based sources sharing that “When I needed information, what was the most important for me to know I guess where to find that information.” Many acknowledged professional or academic organizations as reliable, including American College of Obstetricians and Gynecologists, Centers for Disease Control and Prevention, and the World Health Organization. Participant I told us, “I really like research studies and kind of like to know more detailed so like for the induction, or whatever I like to know, like, which med we're going to use.” Social media and web forums remained an important source of social interaction especially for specific topics, life experiences, or personal interests.

Participant T enjoyed interacting with women who were “in the same boat”; participant J explained how she “[didn’t] feel so alone (laughs) that I’m not the only one having this problem. That there are other women and, like, it’s nice to see what [sic] worked for them to maybe see like, oh, that’s something I didn’t think of and maybe I could try that and see if that works for me too.” In contrast, participant D was concerned about the quality of information online: “I’ve been trying to stay off of social media because that information, it’s just all biased and doesn’t do anything other than make you worried, upset and anxious.”

Regardless of source, women struggled to reconcile conflicting, incomplete, or decontextualized information. In addition to fact finding, women in our study sought to integrate the “official” answers with the lived experiences of others, especially regarding COVID-19. Participant A took matters into her own hands when she did not trust her healthcare team would give her adequate information or reassurance during the pandemic. She told us:

I’ve created that [online] network of friends you know those work in the hospital those who are L&D [labor and delivery] nurses to reach out to and just get the inside scoop (laugh) um I don’t think that it’s something that (sigh) you know my doctor’s office will update me, “oh by the way this is what it’s going to look like”; it’s definitely something that I have to seek out for myself.

Although acknowledged to be less credible, lay advice and personal stories remained a common source of information across our sample.

Theme 5: Bridging the Gap Through Technology

Aligned with our study aim, we intentionally designed a set of questions concerning the use of technology to find pregnancy and postpartum information. Participants shared opinions on how well technology-based solutions met their pregnancy needs as well as what they wish they had in the future.

In our sample, popular pregnancy apps included Ovia, What to Expect, and The Bump, but the extent of their use varied. Most women who used apps at minimum described tracking their pregnancy progress. Participant Y shared how tracking was meaningful to her: “It brings it a little bit of joy into my day... seeing those weekly updates like, oh, this week she has hair or eyebrows... helped me to feel a little more connected [to my baby].” Quick and relevant references were also described as helpful. As participant P told us, “You can look up something real quick. And you don’t have to do a whole Google search. You can just type it in. Click on the app and see if it’s safe or not.” Women who could connect to their health system through their apps expressed higher satisfaction and reassurance that the information was both relevant and credible. Participant R explained the relief and ease of being able to contact her care team:

So, you know, I could be at work; have a question... Like, “this is what’s happening.” And they’re like, “okay,” so you know they respond within a couple hours or 45 minutes [sic] you don’t need to necessarily take that time to okay now I need to go in and they can at least put your mind at ease over technology.

Applications and web-based information were not preferred by all participants. A few women expressed their dislike of mobile apps in general and did not seek any information this way. Experienced mothers frequently downloaded apps to use the tracking feature but relied on their past experiences to guide their information needs. As participant K told us, “...it’s the same. So (for) every pregnancy it’s not like anything changes for you.” For some, content was considered too generic, commercialized, or generally untrustworthy. Participant Z told us apps fell short of answering her critical questions. She told us she might look to an app, “I like to be in person with a doctor if I’m, you know, trying to make a critical decision. And, you know, see factual data in front of me. Sometimes I think an app will be a little impersonal for that.” Participants were wary of information from mobile apps as they were from information across the internet in general.

Improving technological solutions for the future

To fully understand the perspectives of participants, we asked, “If there was an application for your phone or computer that could help you, what would you need it to do?” and “What other resources do you wish you had?” Participants responded with ideas on how technology could be better used to meet their needs.

Many participants wanted an app that connected women with their care team. Few of the participants had access to this technology already. In addition to secure messages, participants wanted guidance from their care team or hospital. As participant H told us, supporting women could be as simple as improving content on websites the hospitals already maintain. She told us, “I turned more toward Facebook and people’s personal experiences because I don’t feel like the hospital websites really laid things out for you.” Participant Y similarly expressed, “It would have been nice if they put a link in just like here’s this website [about my pregnancy complication], um, because I kind of felt a little bit left in the dark.” Participant A suggested hospitals use “something like Instagram or Facebook where they just have videos and it’s super easy to access videos, and you can just click on one if you are interested in you know, what does the procedure look like when you come into the hospital now?”

Overall, participants desired information delivered in an appealing, straightforward, easily digestible fashion. Participant L further elaborated that she would like to see consolidated information from various sources, whereas participant G would prefer having the choice of setting

information density. She suggested “a quick, like, summary almost or like a starting point. And then maybe linking further articles and explanations, but not necessarily having all that clutter.” Participants' ideas revolved around developing an all-in-one app incorporating multiple trackers and means of getting support in the same platform. Participant C explained:

I had the cycle tracking up, and you have the pregnancy app. Then you have your healthcare provider app. If it was somehow kind of all-in-one through your healthcare provider app, then I could submit my questions and see my history of questions during the different parts of my pregnancy.

Multiple participants indicated their need for a more transparent, trusted channel to stay updated with COVID-19 infection risk, guidelines, and care practice in their hospitals during the pandemic. Large-scale information was publicly available, but women wanted a better sense of what was happening in their own hospitals. Many women explicitly pointed out that they wish to have a virtual walk-through of the labor and delivery unit or access to virtual childbirth classes to enhance their confidence

OUTLIER DATA

Although aligned with the themes, the experiences of women with a history of pregnancy loss and women who identified as naturalized citizens demonstrated nuanced expressions of need. Women who had a history of loss at any gestation described a more intense need for supportive, informational care. Participant Y detailed her negative experiences after her first loss where poor caring relationships left her anxious and alone. She told us, “I felt like my previous OB was a little useless with trying to help me. They're like, oh yeah, it's just something you have to deal with.” Her providers during the current pregnancy provide a higher level of support than in response to her concerns: “They were like, honey, you just dropped in whatever you want. We'll check baby's heartbeat; we'll make sure everything's fine. I was like ‘okay,’ so they have been outstanding.” Finding a sense of safety, trust, and relief from anxiety about a subsequent loss were notable properties for these participants.

Two participants identified themselves as first-generation naturalized citizens: one from Asia and one from Eastern Europe. Like many participants, they viewed their provider as highly credible but also described defaulting to the doctor's recommendations as authoritative. Participant W shared, “Um well, I trust doctors. I always look at them as they went to school, they know they know what to do, this is their specialty,” noting that doctors' advice may trump personal opinion. These participants shared the same relational and informational needs as other women in our study; however, they voiced an additional desire to validate conventional wisdom. Participant U told us, “I like to compare,

sometimes I asked moms on both continents. You know, I asked a mom like in my country, and I asked an American mom like, ‘What would she do?’” These participants brought out a need to compare American practices with the practices of their culture and country of origin.

DISCUSSION

This study adds to what is known about how and why women obtain information about the perinatal period. Qualitative interviews provided insights about the women's experience, their challenges, and gaps related to seeking health information both in person and through technology. The historical context of data collection also provided critical information about how women navigated the global pandemic. Participants highlighted conventional clinical practices and COVID-19-related practices that both helped and hindered information exchange. The information they sought was not strictly for the purpose of health decision-making, but also to ease worries and create a sense of validation. Women in our study brought out a profoundly social component to information exchange that may impact future approaches to patient education. The perspectives shared provide valuable insight to perinatal CNSs speaking to address population health needs at the patient, nursing, and system/organization spheres of impact.

Technology and Information

Participants unanimously used online technology to support their information needs, although practices and preferences varied. Women in our study often expressed reticence use apps as a primary source for health information or questioned credibility of online resources. Quality and safety are important considerations when integrating apps or online resources into clinical care.¹³ Participants' concerns aligned to previous research. Akbar and colleagues¹⁴ evaluated 74 studies that reported safety concerns with mobile health. Content quality concerns were reported in 84% of apps evaluated. Women's health-related information and communication technology innovations were funded for more than US \$1 billion in the past 6 years.¹⁵ Popularity increased the quantity of apps available but did not guarantee quality. Women in our study frequently discussed a preference to use online resources to communicate with their care provider and to connect with other parents with similar concerns. Our qualitative findings echoed the results of a survey of women's use of pregnancy apps and their levels of distress during pregnancy. Results indicated 77.9% of respondents used pregnancy apps. Of these, 97.9% wanted to communicate with their care team, and 91% wanted to connect with other women with similar circumstances.¹⁶ There are opportunities for perinatal CNSs to lead integration of health technology into medical systems or to reimagine mobile apps to address gaps in perinatal health education.

Pandemic, Policy, and Perinatal Care

This study extended what is known about women's experience of perinatal care during the pandemic. The COVID-19 pandemic disturbed the fragile balance between information and supportive relationships necessary to promote a positive pregnancy experience. Participants felt less confident in the quality of their care as normal prenatal visit schedules were truncated, policies restricted visitation, and telehealth became more common. The upheaval created a sense of powerlessness and anxiety for women in our sample. Our findings are like a quantitative study of the experiences of women who gave birth during the COVID-19 pandemic between June and November 2020.¹⁷ Survey data revealed a significant decrease in quality of perinatal care, defined by patient autonomy and decision-making, as COVID-19 cases increased. In the survey, the decrease in care quality was even more significant for Black, Indigenous, and people of color. In addition, responses hinted at potential disparities in telemedicine. Although we were not able to capture this disparity in our limited sample, we did find experiences varied widely, depending on access to technology. Although technology can be a potent extension of the care environment, issues such as access, health literacy, and infrastructure are a threat to health equity.^{18,19} Innovations in health information technologies must be conscientiously developed to avoid unintended harm.

Exclusion of the birth partner and limited support in the labor room had major implications for our participants. Birth partner presence was critical to preserving feelings of safety and self-efficacy, but they were conspicuously absent in prenatal care because of COVID-19–related hospital policies. Several women also talked about having to choose between their partner and having a doula. Although 100% chose their partner, they lamented losing the option of doula support. Paternal/partner involvement is an emerging area of interest among fetal/infant mortality review teams across the United States because of its association with reduced infant mortality.²⁰ Furthermore, continuous labor support is shown to significantly decrease the risk of adverse outcomes during childbirth.²¹ Restrictive visitation policies are intended to reduce disease exposure; however, further assessment and intervention are needed to mitigate secondary harms. Telehealth might be used to include partners in patients' face-to-face visits. Additional solutions warrant further exploration given the level of distress expressed by our participants. Among our demographic, 2 populations emerged whose perspectives appeared to be unique. First, women who experienced a previous loss at any gestation or loss of a neonate seemed to give greater emphasis to specific informational needs and relational support compared with peers. Second, women who identified as naturalized citizens demonstrated unique regard for the authority of medical professionals as well as a need to reach back to their culture of origin for validation.

Further study is needed to understand the unique pregnancy information needs of immigrant families and families with a history of loss. The perinatal CNS should remain conscious that these participants may need additional or more personalized support from the healthcare system.

Limitations

This study has several limitations. As qualitative descriptive studies do not provide generalizable information, our sample cannot be considered representative of all women despite representation from multiple states. In addition, there is concern for selection bias as our recruitment relied on social media groups granting permission to advertise on their pages. Although we attempted to target a variety of large pregnancy or motherhood groups, many were private or semiprivate platforms that prohibited recruiting. Consequently, advertisements may have reached like-minded women and homogenized the sample. Because of the format of our advertising both in person and online, there is no way to confirm how many women came in contact with the study fliers. Although we achieved a geographically diverse sample, our participants were not racially or ethnically diverse. Approximately 81% of participants identified as White. The perspectives of Black, Indigenous, and people of color or other unique demographics warrant further exploration. Another limitation was the purposeful questioning about technology to inform innovation. While responses shape a deeper understanding of participants' information-seeking experiences in general, direct questioning about media use or apps may have influenced how participants framed their responses.

Implications for Practice

The perinatal CNS has unique competencies for identifying complex issues, exploring the depth of the issue, envisioning innovating solutions, and leading change. The findings confirm the leading role of the CNS to improve access to pertinent information, clarify pressing questions, ensure care quality, and conduct research to identify gaps. The information in our study can be applied to improve the information sharing between expectant families, their communities, and their healthcare teams. The meaningfulness of the caring relationship must remain central to the art of nursing and medical care. Virtual environments should be considered an extension of real-world connections in the community and clinical settings. Clinical nurse specialists in hospital systems that do not have an integrated patient-facing app may still leverage opportunities in health information technology. Our participants suggested simply maintaining an up-to-date and transparent webpage would be effective. During the height of pandemic conditions, we observed rapid emergence and urgency of new information needs. The perinatal CNS plays an important role in a health system's responsiveness to their unique population focus.

Participants wanted timely, up-to-date data, clinical guidelines, and practices at their hospitals; however, many current healthcare systems are not responsive enough to address this issue. Future health crises are likely to arise. Clinical nurse specialists can learn from the distressing experiences of our participants and anticipate the needed response within their healthcare setting for the future. In addition, the CNS must help to implement health-related information and communication technology and telehealth with attentiveness to risk and potential disparities. Action steps based on feedback from our participants include the following:

- Provide anticipatory guidance. Engage patients throughout the perinatal course with stage-appropriate content.
- Recommend vetted electronic information sources for patient use.
- Evaluate and enhance institution's online presence.
- Prioritize transparency, user-friendliness, and accessibility.
- Consciously include birth partner or other significant support persons.
- Apply design thinking to explore needs within local patient populations

Existing information technology apps failed to align to actual relationship and information needs during pregnancy. Moreover, they do not provide adaptive, in-depth, reliable content. Future technology should bridge the information gap, enabling mothers to make better-informed decisions anytime, even during a pandemic.

CONCLUSION

The findings of this study provide a meaningful contribution to what is known about women's health information needs during the perinatal period, especially during a pandemic crisis where healthcare resources are undergoing rapid changes. The COVID-19 pandemic accentuated the struggles women already face about finding pertinent and trustworthy information in the maternity care system while also creating new challenging information needs related to the pandemic. Regardless of the evolution of future pandemics, the findings of this study provide important insights in the central role the perinatal CNS plays improving the distribution of information within the healthcare system. The perinatal CNS is well equipped to lead interdisciplinary partnerships and create innovative solutions supportive of women and families' health information needs. All settings must strive to build capacity to provide information and support relationships with our patients during times of uncertainty. Health information needs are specific to the family's situation—regardless of the pandemic—creating complexity for a person- and family-centered experience. The importance of social and relational components requires a person-centered approach the perinatal CNS is prepared to provide.

References

1. American Journal of Managed Care. A timeline of COVID-19 developments in 2020. *Am J Manag Care*. 2021. <https://www.ajmc.com/view/a-timeline-of-covid19-developments-in-2020>. Accessed May 6, 2021.
2. Chasiotis A, Wedderhoff O, Rosman T, Mayer A-K. Why do we want health information? The Goals Associated With Health Information Seeking (GAINS) questionnaire. *Psychol Health*. 2020; 35(3):255–274. doi:10.1080/08870446.2019.1644336.
3. Lei M-K, Klopach ET. Social and psychological consequences of the COVID-19 outbreak: the experiences of Taiwan and Hong Kong. *Psychol Trauma Theory Res Pract Policy*. 2020;12(S1): S35–S37. doi:10.1037/tra0000633.
4. Loh J, Harms C, Harman B. Effects of parental stress, optimism, and health-promoting behaviors on the quality of life of primiparous and multiparous mothers. *Nurs Res*. 2017;66(3):231–239.
5. Ghiasi A. Health information needs, sources of information among pregnant women: a systematic review of research. *J Matern Fetal Neonatal Med*. 34(8):1320–1330.
6. Lu Y, Barrett LA, Lin RZ, Amith M, Tao C, He Z. Understanding information needs and barriers to accessing health information across all stages of pregnancy: systematic review. *JMIR Pediatrics and Parenting*. 2022;5(1). doi:10.2196/32235
7. Wang X, Shi J, Kong H. Online health information seeking: a review and meta-analysis. *Health Commun*. 2021;36(10):1163–1175. doi: 10.1080/10410236.2020.1748829.
8. Ratcliff CL, Krakow M, Greenberg-Worisek A, Hesse BW. Digital health engagement in the US population: insights from the 2018 Health Information National Trends Survey. *Am J Public Health*. 2021;111(7):1348–1351. doi:10.2105/AJPH.2021.306282.
9. Bert F, Gualano MR, Brusafferro S, et al. Pregnancy e-health: a multicenter Italian cross-sectional study on internet use and decision-making among pregnant women. *J Epidemiol Community Health*. 2013;67(12):1013–1018. doi:10.1136/jech-2013-202584.
10. Ideo.com. Design thinking 101—basics of design thinking. <https://cantwait.ideo.com>. Accessed June 8, 2022.
11. Johansson-Skolberg U, Woodilla J, Centinkaya M. Design thinking: past, present, and possible futures. *Creat Innov Manag*. 2013; 22(2):121–146.
12. Braun V, Clarke V. *Successful Qualitative Research: A Practical Guide for Beginners*. 1st ed. London, UK: Sage Publications Ltd; 2013.
13. Nelson RP, Stagers N. *Health Informatics: An Interprofessional Approach*. 2nd ed. Mosby; 2017.
14. Akbar S, Coiera E, Magrabi F. Safety concerns with consumer-facing mobile health applications and their consequences: a scoping review. *J Am Med Inform Assoc*. 2020;27(2):330–340. doi:10.1093/jamia/ocz175.
15. Kronemyer B. Female health technology takes center stage. *Contemp Ob/Gyn*. 2018;63(10):26–27.
16. Ozkan Sat S, Yaman Sozbir S. Use of mobile applications by pregnant women and levels of pregnancy distress during the COVID-19 (coronavirus) pandemic. *Matern Child Health J*. 2021;25:1057–1068.
17. Basile Ibrahim B, Kennedy HP, Combellick J. Experiences of quality perinatal care during the US COVID-19 pandemic. *J Midwifery Womens Health*. 2021;66(5):579–588. doi:10.1111/jmwh.13269.
18. Makri A. Bridging the digital divide in health care. *Lancet*. 2019;1: e204–e205.
19. Ray R, Sewell AA, Gilbert KL, Roberts JD. Missed opportunity? Leveraging mobile technology to reduce racial health disparities. *J Health Polit Policy Law*. 2017;42(5):901–924. doi:10.1215/03616878-3940477.
20. American College of Obstetricians and Gynecologists. Incorporating life course theory into the fetal and infant mortality review: report of strategies from local FIMR programs. 2017. <https://www.acog.org/-/media/Departments/National-Fetal-and-Infant-Mortality-Review/Incorporating-Life-Course-Theory-into-the-Fetal-and-Infant-Mortality-Review.pdf?dmc=1&ts=20200222T0303134967>. Accessed June 2, 2022.
21. National Partnership for Women & Families. Continuous support for women during childbirth: 2017 Cochrane Review update key takeaways. *J Perinat Educ*. 2018;27(4):193–197. doi:10.1891/1058-1243.27.4.193.