Acceptability and perceived impact of the IMAGINE intervention

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Abstract

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Introduction: Perinatal depression is common, and risk among young parents is elevated. Phone-based Cognitive Behavioral Therapy (CBT) can be one way of offering more accessible mental health care to young parents.

Objective: We examined the acceptability and perceived mental health impacts of a digital adaptation of an evidence-based CBT intervention (IMAGINE) based on 9 in-depth interviews (IDIs) with intervention recipients.

Method: IDIs were analyzed using a mixture of inductive coding driven by themes emerging from the transcripts and deductive coding based on themes from the interview guide. Transcripts were coded using Dedoose software. My analysis focused on perceived acceptability and mental health impact of the IMAGINE pilot as well as recommendations for future programming.

Results: In this qualitative study of interviews with participants exiting the IMAGINE study, we found that several aspects of IMAGE were viewed as helpful. In particular, participants highlighted one-to-one support from the facilitator, connection with other parents, and regular opportunities to reflect on their mood through digital surveys. Several participants reported that IMAGINE increased their openness to mental healthcare in the future, and several noted a better ability to regulate their emotions. Participants appreciated the intervention's flexibility and were appreciative of the changes that were made to message frequency and pace during the pilot itself. Introversion, technology access barriers, and limited time were all barriers to participation; facilitators to participation included social support and information gained from the intervention.

Participants offered several points of important feedback to consider in future iterations. First, they would like changes to the frequency or timing of the synchronous weekly Zoom calls with the facilitator and other participants, noting that having more flexible scheduling options would be helpful, including the ability to have multiple options for Zoom times per week. Several participants recommended having more onboarding at the beginning of the pilot, both to gain clarity about the intervention and also to help learn the technology. Although the program was designed to be implemented virtually, common feedback was that participants would have preferred having at least one or a few in-person meetings throughout the program. Since the sample size was small, low engagement from other program members was a common barrier for further engagement.

Conclusion: The IMAGINE intervention may be useful for offering flexible and accessible CBT in a way that is responsive to the needs of young birthing parents, who are at high risk of perinatal depression. It is paramount that end-user feedback is considered, as programs designed to meet the needs of young parents should be centered around their experiences. Further research is needed to evaluate the IMAGINE program's clinical effectiveness, and further interventions can make improvements based on participant feedback from this research. Young parents deserve to feel safe and supported during pregnancy and postpartum, and to have access to services that can help them thrive.

Keywords: perinatal depression, adolescent parent, mental health access

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Background

Perinatal depression, defined as having prolonged feelings of sadness, anxiety, or despair during pregnancy or up to one year after childbirth (O'Connor et al., 2019), affects upwards of 13.2% (Bauman et al., 2020) of birthing people in the United States, causing profound negative impacts on newborns and new parents, including preterm delivery (Stein et al., 2014), lower birth weight (Hyoung et al., 2019), and impaired infant attachment (Śliwerski et al., 2020). Young parents (aged 15-24) experience elevated risks of perinatal depression (Hodgkinson et al., 2014).

Despite many comprehensive, long-term programs aimed at reducing the incidence of adolescent pregnancy in the United States, nearly 23% of all pregnancies occurred in people aged 15 to 24 in 2020 (Hamilton et al., 2021). Young parents are therefore a key demographic group needing perinatal mental health support.

Young parents are more likely to have neurological, social, and biological risk factors that place them at greater risk for perinatal depression, including high rates of unplanned pregnancy (Laurenzi et al., 2020), low socioeconomic status (Leigh & Milgrom, 2008), and complications during childbirth and postpartum (Cavazos-Rehg et al., 2015). Many barriers to mental health care exist for perinatal youth, including lack of financial resources to pay for counselling with or without health insurance, lack of access to or money for transportation, and the inconvenience of travel, difficulty finding childcare, and need to miss work to attend counseling sessions (Hodgkinson et al., 2014).

Parents with low socioeconomic status are nearly twice as likely to report depressive symptoms than high-income parents regardless of race (Evans et al., 2001),(Segre et al., 2007) and the COVID-19 pandemic has exacerbated income inequalities and has placed an increased burden of financial hardship on families and households that were already struggling financially before the pandemic (Root, 2021). Furthermore, healthcare resources were rapidly pivoted to the pandemic response, and most non-emergency care had to shift to virtual settings. To compound those factors, the prevalence of anxiety and depressive symptoms in the US increased dramatically in the months following initial COVID-19-related shutdowns (Dietze et al., 2020), potentially creating an even greater strain on mental health resources.

One way to offer more accessible mental health support to young parents is through mobile health (mHealth) programs that use mobile phones to offer social support and counseling. mHealth can eliminate the need to travel to appointments, and asynchronous mHealth programs allow patients to access care on their terms and within their schedules (Rathbone & Prescott, 2017), which can be especially helpful to parents (Niela-Vilén et al., 2014). It also allows for new parents to connect with and share ideas with peers, which can lower feelings of social isolation and increase mental wellbeing (Niela-Vilén et al., 2014).

mHealth interventions have shown promising results in improving mental and physical health outcomes (Bhat et al., 2018), (Rathbone & Prescott, 2017),(Chory et al., 2021), and young people in the United States are an ideal audience for such programs. Nearly all Americans aged 18-29 own a phone, and 96% of them own a smartphone (*Mobile Fact Sheet*). In 2018, the overwhelming majority (94%) of youth aged 13 – 17 used social media (Anderson & Jiang, 2018), meaning social media- and phone-based mHealth programs can offer mental health and

social support in an accessible way. With the sudden global emergence of the covid-19 pandemic, mHealth interventions, especially those focused on mental health, have become more common, and virtual counseling and therapy have emerged as viable options for accessible mental health care (Moreno C, Wykes T, Galderisi S, 2020).

Much attention and funding has been allocated to naming the physical risks associated with young parenthood, but far less research has been done to address adolescent birthing parents' mental health needs (Felder, 2019). There are few programs centered on the unique neurocognitive demands and experiences of young birthing parents (Field et al., 2020), and there is a dearth of in-depth end-user data where perinatal youth's voices and experiences are used to evaluate the accessibility and usability of programs that are meant to help them (Kaye, 2008).

We developed a social media intervention to prevent perinatal depression in youth, named IMAGINE (Gewali et al., 2021). IMAGINE is a social media-based group cognitive behavioral therapy (CBT) intervention that was adapted from the evidence-based Mothers and Babies (MB) program (Muñoz et al., 2001) to reduce barriers for young parents accessing social support and counseling (Darius Tandon et al., 2018). During the pilot, 10 pregnant or postpartum parents age 16-24 throughout the US participated in a 10-week pilot of the intervention.

In this thesis, we present findings from In-Depth Interviews (IDIs) conducted at study exit to evaluate perceived acceptability and mental health impact of the program, in order to provide recommendations for future similar programs.

Methods

Study setting

The IMAGINE study was piloted virtually via the platform Slack between December 2020 and May 2021. Recruitment for the IMAGINE pilot took place from February to December 2020 through social media posts and virtual outreach.

Study population

Participants in the pilot study were pregnant or up to 180 days postpartum and aged 16- 24, with access to a smartphone and able to read and write messages in English. Participants were excluded if they had elevated depression symptoms (PHQ9 score ≥10).

Ten participants enrolled in the pilot and received the intervention in two groups: group 1 consisted of 7 participants and was active December 2020-March 2021 and group 2 consisted of 3 participants and was active February-May 2021. Upon completion of the pilot study, in-depth interviews (IDI) were conducted by the study team. Nine participants completed IDIs. IDIs were conducted via Zoom videoconference between March and June 2021.

Description of intervention

The IMAGINE intervention was adapted from the evidence-based in-person Mothers and Babies course (Gewali et al., 2021) The intervention was via Slack and incorporated text, graphical, and video messages sent to pilot participants 3-4 times per week. The pilot intervention consisted

mostly of asynchronous resources and messaging, with an optional weekly synchronous Zoom session with the pilot facilitator. The IMAGINE intervention lasted 10-14 weeks depending on the group, and was designed to promote both individual reflection as well as social connection with other group members.

Data collection/procedures

Data for this qualitative study consisted of in-depth interviews (IDIs) obtained upon the completion of the IMAGINE pilot intervention. Nine individual IDIs were conducted virtually over Zoom using a semi-structured interview guide designed by the study team.

Analysis

All 9 IDIs were analyzed using a mixture of inductive coding driven by themes emerging from the transcripts and deductive coding based on themes from the interview guide. Transcripts were coded using Dedoose software. My analysis focused on perceived acceptability and mental health impact of the IMAGINE pilot as well as recommendations for future programming.

Myself, my thesis chair, and another member of the IMAGINE study team read all 9 IDI transcripts to separately develop initial codebooks based on themes that emerged inductively from the transcripts as well as deductively including themes explored in the interview guide. Once we each had an initial codebook, we compared the codes and discussed any discrepancies before creating an agreed-upon combined codebook. The other IMAGINE study team member (second coder) and I then separately coded one of the transcripts and discussed to reach consensus on application of codes.

Then, the remaining transcripts were double coded by me and the second coder. I was the primary coder for 5 of the remaining IDIs, and the second coder was the primary coder for the other 2. Secondary coding was then conducted by the opposite coder. If any disagreement in coding occurred between the two coders, we discussed together until an agreement was reached. If there were any discrepancies, we discussed with the thesis committee the best course of action.

Once transcripts were all coded, I identified themes based on frequency of code application. I uplifted any particularly poignant quotes, and summarized themes.

Results

Perceived Mental Health Impact

Table 1 summarizes themes in the mental health impact participants reported. Several participants stated that they would be more open to therapy in the future after they completed the IMAGINE pilot program. Some common feedback from participants related to this was that it helped them realize they needed to return to counseling or therapy if they've been in the past, or for those without prior experience, IMAGINE helped normalize some of the unknown or potentially scary aspects of mental health care. It became more familiar, more routine, to discuss moods and feelings with others, which increased their openness to seeking care.

Several participants also noted that they had gained skills in regulating their emotions through completing the program. Many participants stated that they still use some of the mood monitoring techniques discussed in the program, even after having completed the program. Participants highlighted that they had few opportunities to reflect on their mood, and that there was value and ease in reflecting "for yourself" through the online platform, rather than to another person who may not understand their feelings. Further, other participants commented that they learned to pay closer attention to emotions in the middle of the spectrum (i.e. not crisis or elation), and that helped them monitor when their mood changed.

Perceived Acceptability of IMAGINE pilot

Several aspects of the intervention were highlighted as being especially acceptable and well-received (Table 1). Both one-on-one support from the program facilitator and social support from other participants were highlighted as impactful. Most participants reported valuing the connection with the facilitator and feeling that they could go to them for guidance and support, as well as any feedback they had about intervention delivery. Participants highlighted that support from other young parents in the program normalized and validated their experiences; several participants spoke about the value of connecting with others in similar situations to them. Many noted that they didn't have very many friends who were parents before the IMAGINE pilot, and several stated that they planned to keep in touch with other participants after the program.

Mood polls were frequently mentioned as an impactful component of the intervention. Mood polls were automatic scheduled surveys sent to participants three times per week, in a Slack channel visible only to the participant and facilitator. The polls asked participants to reflect on their mood, activities, thoughts, and contact with others that day. All participants said that the mood polls were useful to them, and some participants even mentioned that they still reflect on the mood polls and use them even after the program had ended.

The final key aspect of the intervention highlighted by participants was the flexible nature of the program. This can be further broken into two subthemes: people appreciated the fact that the facilitator made changes to better meet their needs during the pilot, as well as the flexible nature of the program itself - being able to access information and read through content at a time and pace that worked best for them.

Table 1 Acceptability and Perceived Mental Health Impact

Theme	**Quote**
Mental Health Impacts	
1. **More open to therapy in the future**	"It helped me like open up a little more, and realize that I'm not the only person suffering, and that there's more people like me that I can talk about it with. I don't have to, you know, suffer by myself." – Participant 17, age 17, pregnant

	"I like to bottle up my anger or my problems and they explode on the wrong person at the wrong time so that being in a group kind of made me realize like I need to go back to counseling, I was already in counseling but I don't feel like I was taking it as serious but when I sat back and realize you know right. No, I do need to get it together that's when I was like, I'm just go back to counseling." - Participant 14, age 18, pregnant
2. **Better at regulating their emotions after completing the program**	"I had a pregnancy before that and it was also a preterm birth. And so, that baby passed away. And so it was really hard for me. I was really depressed, and so I know that if I would have had like the imagine group it like it would help it would have helped me to manage my, my emotions and stuff." – Participant 5, age 21, postpartum "I definitely added a handful more like tools to my arsenal to be able to calm myself down, stay calm, or not become overwhelmed with everything that's going on. The past couple weeks I've been kind of stagnant and monotony like I haven't been depressed but I know I'm not happy. Okay something's going on. And I've been using these - to me they're like lower tier ways of coping, so it's like when I'm not at a ten, I'm at like a five, I can use these and I've been using them, so I know like okay I'm having some type of progression towards positivity or something, so I do feel better. I don't feel the best, but I do feel better and be like everything that I wanted to – IMAGINE has been helping." - Participant 9, age 23, postpartum
Acceptability	
3. **1:1 support from the study facilitator**	"When I had something come up or just anything, like, I would just talk to her, or if I had a question, I would talk to her. I asked her the question, and she would like answer the best way that she could or stuff. And I was just like, that's really helpful." - Participant 5, age 21, postpartum "I had a kind of Facetime with her one time, just us, because the other girls weren't able to make it. But that was very - I really appreciated that. It was kind of something that I didn't know that I needed, but she willing to like, hear me out and ask the right questions for me. So I think that was pretty awesome of her." - Participant 7, age 23, pregnant
4. **Connection with other moms**	"Seeing other women, not necessarily the facilitator, but being around the women that are going through the same things that you're going through, like that are also pregnant and just had babies, that makes a difference. That allows the connections that you form are a lot stronger and a lot tighter"

	- Participant 9, age 23, postpartum "We all went through this together and I felt like we all kind of grew together and, you know, they could, we could all relate to each other. And I didn't really have many mom friends I guess before this." – Participant 17, age 17, pregnant
5. **Particularly useful: Mood Polls**	"Normally you don't really reflect on your day unless you have a bad day. So I just like the way how it got me thinking, 'Oh, well, I did have a good day but I didn't notice it because it wasn't a bad day' if that makes sense." – Participant 12, age 23, postpartum "I think they were helpful just because it was like a second to self-reflect, maybe look in the real world. Sometimes they ask you how you doing but it's kind of difficult to explain to someone, but when you're doing it for yourself, I think it can be a little bit more honest." - Participant 7, age 23, pregnant
6. **Adaptations that happened in the pilot – message frequency and pace**	"Yeah, so, at the beginning I think it started off slow and then she was sending a lot of messages, every day, so I wouldn't get time to read them. I have to go back a lot, and then that's something that I told her, and so she, you know, she slowed down on the number of messages, so she sent them every other day, instead of every single day." - Participant 17, age 17, pregnant "Yeah, so I think she would send them out almost every day, which was, at first there was not every day but maybe twice, or I don't know how many times but like a couple of days a week, and she would send out a lot of information. And I think that was a little bit too much information at once. So then she started sending them out, I think every single day and I think that was a little bit better and easier to kind of digest and read, rather than like a whole bunch in, at one go." - Participant 7, age 23, pregnant
7. **Flexibility of programming**	"Having lots of interactions in written form gave everyone an opportunity to share their perspective and their experiences and what works for them, and we didn't all have to be right then and there, like I could look at it at two o'clock in the morning and another girl could look at it, two o'clock in the afternoon." - Participant 9, age 23, postpartum "Personally, I'm not a person to ask a lot of questions, especially in school. I was a 4.0 student but if I didn't know it, I would just learn by myself. I didn't want to ask for the rest of class. But in the

	group, I felt comfortable enough to ask questions for clarification and stuff like that. I'm not used to doing that, so I kind of stepped out of my comfort zone." - Participant 14, age 18, pregnant

We further identified some barriers and facilitators to engagement in the IMAGINE program, paying special attention to the unique needs of busy young parents (Table 2).

Barriers to Participation

Frequently identified barriers to participation included issues with technology, introversion, and being too busy to participate. The technology issues were mostly related to the mobile app Slack itself or issues with the participant's cell phone that kept them from seeing or responding to messages. One participant claimed that the messages they sent on Slack weren't going through and that they weren't able to respond to messages they received from the facilitator until they restarted the app. Another participant changed cell phones and didn't have access to the Slack app because they were briefly unable to download new apps on the phone.

Introversion was mentioned by a few participants, and one participant stated that a main reason that they didn't participate more in the group was the thought that the program facilitator expected them to be on camera, which they weren't comfortable with. Several participants reported their participation was limited by being busy and not having enough time. Participants mentioned being unable to read all of the content or join Zoom meetings because they were working, in school, at doctor appointments, or just busy with the responsibilities of having a newborn.

Motivators to Participation

Initially, several participants mentioned that they joined the IMAGINE pilot study because they wanted to get to know more young parents and learn new information, either about perinatal depression or parenting in general. Participants noted that receiving social support from other participants made it easier for them to join Zoom calls and respond to messages in the larger group. Those who spoke up on Zoom calls said they felt comfortable doing so because the other young parents in the group were welcoming and relatable. Other participants joined and engaged with the program because of the expectation that they were going to learn new information. Some mentioned that they expected to learn about postpartum depression specifically and one participant wanted to learn new information about how to be a better parent.

Table 2 Barriers and Facilitators to Engagement

Theme	**Quote**
Barriers to participation	
1. Being busy/having no time	"I couldn't read or join in on the calls, because I had started back working." - Participant 24, age 16, pregnant

	"I started working like right after I got into [the study], and I didn't know when I was actually going to be available, but like some of the polls or some of the Zooms I wasn't even able to join, because I work." - Participant 18, age 19, pregnant
2. Shyness	"I'm a shy person. So that's what, I just want to push myself more to be able to, you know, do more things like this because this is like out of my comfort zone." - Participant 17, age 17, pregnant "Being on video is just not for me, I'm just not gonna keep with this." - Participant 12, age 23, postpartum
3. Issues with technology	"My phone like we started and it kind of deleted the app so I was just like, whoa. Okay." - Participant 5, age 21, postpartum "I had to switch [cell phones], so I had turned in a phone that I was leasing for Sprint and then I had an old phone, but I couldn't do certain things on it. Like I couldn't download a lot of apps because I didn't have the latest iOS and then, when I got the new phone, I had to wait to switch carriers. It was a lot going on, when I was trying to get a new phone." - Participant 12, age 23, postpartum
Motivators to participation	
4. Social support	"I wanted to join because we're in the whole quarantine time and I thought it was a really good idea to have some kind of interaction with people that I might not be able to talk to if it wasn't for this group, and I wanted to have some sort of like support group that I could talk to, or like, just have a little distraction." – Participant 7, age 23, pregnant "It gave me something to kind of look forward to. It gave me a sense of community in the zoom call. It was, it was really nice." - Participant 7, age 23, pregnant
5. Learning new information	"It actually was very informative. Some of the stuff was repetition, but, you know, sometimes it's good to hear stuff over and over so it stays in your head." - Participant 14, age 18, postpartum "You guys were doing a study and I wanted to like learn about postpartum depression. Not that I have dealt with it, but I know a lot of people that deal with it, like Facebook friends."

	- Participant 12, age 23, postpartum

Design recommendations

Participants shared specific suggestions to improve future programming (Table 3). Several participants recommended changes to the frequency and timing of the Zoom calls. A few participants advocated for having multiple options for Zoom calls each week, with the option to join one or multiple on a weekly basis, depending on their schedules. Overwhelmingly, participants stated that they would have enjoyed joining the calls and getting to know the facilitator and other participants more, but that they were busy with work, school, or doctor appointments and would have appreciated alternative times for the calls. Zoom calls were scheduled each week, and polls conducted with the group to identify the optimal time. Participants suggested that offering Zoom calls in the evenings, during the weekends, or announcing the schedule for all the Zoom times at the start of the program could be beneficial for future programming. A few participants suggested the idea of offering multiple times for Zoom calls each week.

While IMAGINE was designed to be virtual, a common piece of feedback was to have at least one in-person meeting or offer a hybrid version of IMAGINE. Participants typically shared this feedback as a means to build relationship with other group members.

Participants also wanted more onboarding, including program expectations and logistics. A few participants stated that they didn't know if the program was real at the time that they started, and that expectations were unclear. Many didn't know about the different Slack channels or the frequency or pacing of scheduled content from the facilitator, and they would have appreciated that in order to manage their time. Participants recommended that onboarding include tips for navigating technology like Slack or Zoom. Slack was new to several participants, and upon program completion, several participants were not even aware of some of the specific Slack channels. Another participant did not want to join Zoom calls because she couldn't be on camera, so walking through the process of calling in to a Zoom meeting could have been beneficial.

Participants also recommended that onboarding include more icebreakers or getting-to-know-you activities, especially at the beginning of the program, to foster familiarity and connection. A common barrier participants highlighted was low engagement from other members. Participants reported that they were comfortable connecting with the facilitator during Zoom calls, but several participants indicated frustration that they were the only one or one of a few participants that joined in on the weekly phone calls. Some felt that they were the only ones posting things on Slack, and that they had to carry the conversation because no other participants were posting things or joining in on the weekly calls. Some specific ideas to increase engagement were to include more icebreakers or some initial bonding exercises to allow for group cohesion.

Table 3: End-User Feedback

Specific Feedback	Quote
1. More flexibility for Zoom calls	"I didn't really get to join any of the zoom meetings because I was usually busy. And I was just like, I wish I could have." – Participant 5, age 21, postpartum "If we had more zoom calls like twice a week, that would be really great for me." - Participant 7, age 23, pregnant
2. Hybrid or in-person meetings	"I think that if we have more in person, it would have been better because it's more something that you can engage in more than just being online." - Participant 20, age 18, postpartum "I feel if you were to go in person and meet everyone, I think that'd be great. You get to interact." - Participant 5, age 21, postpartum
3. More onboarding	"At the very end, it was really nice because we were kind of more comfortable with each other, but at the beginning it was, understandably, a little bit awkward. We don't know each other, but I think we could have benefited with some more icebreakers or some more like getting to know each other, rather than just kind of jumping in and expecting [us] to be open to each other. Because not everybody is willing to, you know, put themselves in that situation where they kind of have to be vulnerable." - Participant 7, age 23, pregnant "Me personally I didn't like the Slack platform just because I'm not really tech savvy I guess you could say, and it was a lot of different components to the app, so it's kinda like I'm still trying to learn how to use it." - Participant 14, age 18, postpartum
4. Low engagement from other study participants	"It would have been better if everybody, you know, responded in and reacted. But it was a good thing to still be able to have somebody there talking to us, even though we weren't always responding."

	- Participant 20, age 18, postpartum "I just wish more people participated, because even in the zoom calls like sometimes I would be the only person that would join, or it would just be one or two other moms." - Participant 17, age 17, pregnant

Discussion

In this qualitative study of interviews with participants exiting the IMAGINE study, we found that several aspects of IMAGE were viewed as helpful. In particular, participants highlighted one-to-one support from the facilitator, connection with other parents, and regular opportunities to reflect on their mood through mood polls. Several participants reported participating in IMAGINE increased their openness to mental healthcare in the future, and several noted a better ability to regulate their emotions. Participants appreciated the intervention's flexibility and were appreciative of the changes that were made to message frequency and pace during the pilot itself. Shyness, issues with technology, and having no time were all barriers to participation; facilitators to participation included social support and information gained from the intervention.

Participants offered several points of important feedback to consider in future interventions. First, they would like changes to the frequency or timing of the synchronous weekly Zoom calls with the facilitator and other participants. Several participants recommended having more onboarding at the beginning of the pilot, both to gain clarity about the intervention and also to help learn the technology. Although the program was designed to be implemented virtually, common feedback was that participants would have preferred having at least one or a few in-person meetings throughout the program. Since the sample size was small, low engagement from other program members was a common barrier for further engagement.

A unifying idea connected to many of the themes in the feedback was the importance of social support throughout the program. This is consistent with literature highlighting that lack of social support can be a risk factor for perinatal depression, while social support from a partner, family member, or peers, can be a significant protective factor against perinatal depression regardless of race or ethnicity (Pao et al., 2019). Connection with other parents was a key component of the pilot's design. Many of the recommended improvements participants shared related to wanting more opportunities to connect with and get to know other program participants.

A similar study was completed recently that used a longitudinal design to examine a 12-week virtual program for pregnant adolescent parents that included educational modules, text messaging, individual support, and group support in Kansas (Wambach et al., 2021). While the sample size for this study was also small, much of the end-user feedback was similar to what the participants in IMAGINE stated, with a major found barrier being "busy or hectic lives" and a useful component of the intervention relating to learning new information (Wambach et al., 2021). This study, however, reported that participants ranked the peer support meetings as the

least useful portion of the intervention, which is the opposite to what participants said of IMAGINE. Differences in findings between the two small studies highlight that there may be heterogeneity in youth's preferences, which warrants investigation in a larger study.

Another study with a larger sample size (n=138) evaluated the acceptability and ease of use of a web site intervention for adolescent parents to prevent postpartum depression (Logsdon et al., 2018). They found that attitudes related to depression and mental health treatment improved after engaging with the web-based programming, that mental healthcare access improved, and that participants found the site easy to use (Logsdon et al., 2018). This intervention was individually delivered did not include any social support components, but did follow a similar structure for conveying new information to participants, using pictures, stories, and resources (Logsdon et al., 2018).

Our findings indicate that mHealth interventions that use either social media or web-based means of conveying information to young parents with the goal of preventing perinatal depression are acceptable and easy to use. Our findings suggest that IMAGINE holds promise in improving social support, decreasing feelings of isolation, learning new information, and promoting engagement with counseling or mental health care in the future. Clinical effect of the intervention will require rigorous evaluation on a larger scale, and future iterations should be adapted to meet the specific needs of young parents, including offering flexible meeting times that take into account the workload and disruption of new parenthood, more onboarding, more opportunities for participants to get to know each other, and at least one in-person meeting. This in-person meeting could be focused on onboarding and logistics to clarify program expectations and pacing, as well as learning technology, and building relationship with other group members.

It is important to note that this study was conducted during the first year of the COVID-19 pandemic. At that time, services had suddenly moved to virtual delivery; in future programming, we may find that participants are more familiar with and comfortable using social media-based or virtual means of interventions. Young parents (and the global population as a whole) have faced heightened anxiety and stress during the pandemic, with adverse consequences for mental health (Dietze et al., 2020). A program similar to IMAGINE could be especially useful in a world with the continued possibility of pandemic-related movement restrictions. As the world begins to slowly shift back to in-person activities, having meetings virtually or in a hybrid manner could offer more flexibility because the meetings would be chosen to be virtual, not because of pandemic-related lockdowns or stay-at-home orders.

Strengths and Limitations

Our study is strengthened by our focus on the personal experiences of young parents, whose often-marginalized perspectives are critical to program design and planning. Feedback from our participants about what worked well for them, what didn't work well, what they liked about IMAGINE, and what might not be beneficial to them in future programming will enable refinement of the intervention to maximize clinical impact. This study's findings are limited by its small sample size, which allows us to identify themes and recommendations for further research, but may not be generalizable to a larger sample. Additionally, this thesis focuses on

participants' perceived impact and acceptability, not on clinical outcomes data. These data therefore shed light on participants' experiences, but not the IMAGINE intervention's effectiveness in preventing perinatal depression, which will require larger studies.

The study team was also limited in recruitment due to the COVID-19 pandemic and its global impacts. While the IMAGINE program was designed to be implemented virtually, recruitment efforts were initially in-person and needed to suddenly shift to online, which contributed to the small sample size, and meant hybrid or in-person programming was not possible.

Conclusion

The IMAGINE intervention may be useful for offering flexible and accessible Cognitive Behavioral Therapy (CBT) in a way that is responsive to the needs of young birthing parents, who are at high risk of perinatal depression. It is paramount that end-user feedback is considered, as programs designed to meet the needs of young parents should be centered around their experiences. Further research is needed to evaluate IMAGINE's clinical effectiveness, and further interventions can make improvements based on participant feedback from this research. Young parents deserve to feel safe and supported during pregnancy and postpartum, and to have access to services that can help them thrive.

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