






## Pregnancy in the COVID-19 pandemic, prenatal care, and digital technologies: women's experiences

Gestação na pandemia da COVID-19, cuidado pré-natal e tecnologias digitais: experiências de mulheres

### How to cite this article:

Silva CM, Bezerril AV, Martins EL, Mouta RJO, Zveiter M. Pregnancy in the COVID-19 pandemic, prenatal care, and digital technologies: women's experiences. Rev Rene. 2023;24:e83454. DOI: <https://doi.org/10.15253/2175-6783.20232483454>

-  Carla Marins Silva<sup>1</sup>
-  Amanda Vieira Bezerril<sup>2</sup>
-  Elaine Lutz Martins<sup>3</sup>
-  Ricardo José Oliveira Mouta<sup>3</sup>
-  Marcelle Zveiter<sup>3</sup>

<sup>1</sup>Universidade de São Paulo. São Paulo, SP, Brazil.

<sup>2</sup>Hospital Amparo Maternal. São Paulo, SP, Brazil.

<sup>3</sup>Universidade do Estado do Rio de Janeiro. Rio de Janeiro, RJ, Brazil.

### Corresponding author:

Carla Marins Silva

Av. Dr. Enéas Carvalho de Aguiar, 419,  
sala 228 - Cerqueira César, CEP: 05403-000.  
São Paulo, SP, Brazil.

E-mail: [carlamarins@usp.br](mailto:carlamarins@usp.br)

**Conflict of interest:** the authors have declared that there is no conflict of interest.

EDITOR IN CHIEF: Ana Fatima Carvalho Fernandes

ASSOCIATE EDITOR: Francisca Diana da Silva Negreiros

### ABSTRACT

**Objective:** to know the experience of being pregnant and using technologies for gestational care during the COVID-19 pandemic. **Methods:** qualitative study, conducted in a virtual environment. A total of 20 women who used digital technologies in pregnancy care during the pandemic were interviewed by videoconference. The data were submitted to content analysis supported by the Atlas.ti9 program. **Results:** two categories emerged: "Women's feelings on being pregnant during the pandemic of COVID-19", encompassing feelings, expressed by fear, insecurity, and loneliness, related to facing a new disease and social isolation; "Women's experiences with the use of digital technologies in pregnancy care", showing autonomy in the search for online information about pregnancy and groups of pregnant women, in applications or social networks. Furthermore, they remotely experienced bonding and maintenance of prenatal care by health professionals. **Conclusion:** the use of digital technologies in the pandemic was an imposed reality that positively contributed to clarifying doubts, care, and emotional support during pregnancy. **Contributions to practice:** the use of digital technologies showed benefits in the pandemic and can be extended to the daily routine of prenatal care, especially in situations that make it difficult for pregnant women to access services.

**Descriptors:** COVID-19; Pregnant Women; Pandemics; Digital Technology; Prenatal Care.

### RESUMO

**Objetivo:** conhecer a experiência de ser gestante e de usar tecnologias para o cuidado gestacional durante a pandemia da COVID-19. **Métodos:** estudo qualitativo, realizado em ambiente virtual. Foram entrevistadas, por videoconferência, 20 mulheres que utilizaram tecnologias digitais no cuidado gestacional na pandemia. Dados submetidos à análise de conteúdo com suporte do Atlas.ti9. **Resultados:** emergiram duas categorias: "Sentimentos de mulheres em serem gestantes durante a pandemia da COVID-19", englobando sentimentos, expressos por medo, insegurança e solidão, relacionados ao enfrentamento de uma nova doença e isolamento social; "Experiências de mulheres com o uso de tecnologias digitais no cuidado gestacional", evidenciando autonomia na busca de informações *online* sobre gestação e grupos de gestantes, em aplicativos ou redes sociais. Ademais, experienciaram formação de vínculo e manutenção da assistência pré-natal, remotamente, disponibilizadas pelos profissionais de saúde. **Conclusão:** o uso de tecnologias digitais na pandemia foi uma realidade imposta que contribuiu, positivamente, para o esclarecimento de dúvidas, cuidados e suporte emocional no âmbito da gestação. **Contribuições para a prática:** o uso das tecnologias digitais mostrou benefícios na pandemia, e pode ser ampliado para o cotidiano do pré-natal, especialmente, em situações que dificultem o acesso de gestantes aos serviços.

**Descritores:** COVID-19; Gestantes; Pandemias; Tecnologia Digital; Cuidado Pré-Natal.

## Introduction

The new coronavirus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), responsible for Coronavirus Disease 2019 (COVID-19) and associated with other illnesses and complications, was detected for the first time in December 2019, in Wuhan, China. The World Health Organization (WHO) declared an outbreak of the disease on January 30, 2020, subsequently announcing a pandemic on March 11, 2020. The first notification of the disease in Brazil occurred in February 2020, and the first death occurred on March 17 of the same year<sup>(1)</sup>.

Although most pregnant women diagnosed with COVID-19 presented mild to moderate clinical pictures, there was an increased risk of maternal complications, especially in the last trimester of pregnancy and in the postpartum period, with deaths. Therefore, pregnant and postpartum women have been considered part of the risk group since 2020<sup>(2)</sup>.

Moreover, understanding the gestational period as an adaptation process to various physical, psychological, and social changes<sup>(3)</sup>, plus the context of social isolation, concerns and feelings, especially negative ones, were enhanced by pregnant women during the pandemic<sup>(4)</sup>. Even in complex situations like the pandemic, the access to quality information during the gestational period is of utmost importance for the full experience of this process, and autonomy in the choices that involve the pregnancy-puerperal cycle. Moreover, in this context, it is essential to offer individualized care that also values their psychosocial aspects, considering the impacts of the COVID-19 pandemic.

To this end, aiming at comprehensive prenatal care and early identification of risk factors, the WHO recommended eight in-person consultations. At least six consultations are recommended in Brazil; however, this number was reconsidered during the pandemic for the context of usual risk pregnancies. This revision is based on evidence that pregnant women do not need to have all consultations in person to ensure adequate care<sup>(5)</sup>.

In this sense, changes were imposed in the routines of women's care and services reorganized to maintain care remotely (i.e. not in person, but at a distance). Thus, the use of digital technologies in health has been increasing, as they have become an instrument capable of allowing continuous monitoring during natural disasters and public health emergencies<sup>(6)</sup>. In addition, although the use of digital technologies has existed for several decades, it is still little explored in the obstetric environment.

Digital technologies can fulfill a promising role in gestational care by serving as a resource for providing support and information to pregnant women through various modalities. For example, communication applications like WhatsApp<sup>®</sup> enable sending instant messages, images, videos, documents, and voice calls; and platforms like Google Hangouts<sup>®</sup>, a communication channel that allows phone calls and video calls, provided they are used by trained professionals for this means of care<sup>(7)</sup>.

The state of the art evidences the description and potentialities of digital technologies as health care tools, including women's health<sup>(8-16)</sup>. However, there are gaps regarding the views of women who used them during pandemic periods. Thus, this study aimed to know the experience of being pregnant and using technologies for gestational care during the COVID-19 pandemic.

## Methods

This is a qualitative study. The methodology follows the criteria recommended by the Consolidated Criteria for Reporting Qualitative Studies (COREQ) for qualitative research.

A total of 20 Brazilian women who were pregnant during the COVID-19 pandemic, over 18 years of age, who had access to and used at least one digital technology for gestational care, including preparation for labor, participated in the study. The exclusion criteria were women who had speech impairment, disorders that could impede data collection, and who did not have email or did not have access to the internet

or the videoconferencing application for online interviewing. No participants were excluded from the study.

The participants were intentionally recruited by the snowball technique, in which the initial participants (seeds) with the necessary profile for data collection are in the general population. These "seeds" help the researcher with possible contacts, and to explore the group to be studied by recommending other individuals with the desired profile. This process should occur successively, until the recommendations do not add new information to the analysis<sup>(17)</sup>.

The seed participant of the study was captured on the online access social network, Facebook®. As the potential candidates to participate in the study expressed interest in contributing, the researchers contacted them individually, by private message, and scheduled a subsequent online meeting to conduct the interview by recorded videoconference, using the Google Meet® application.

Thus, the study scenario was composed of a remote environment, justified by the pandemic context of COVID-19 during data collection, respecting the recommendations for social isolation proposed by the WHO and the Ministry of Health<sup>(1)</sup>.

A semi-structured interview script composed of two parts was used: the first part was composed of objective questions of characterization of the participants; and the second part presented the guiding questions: "Tell me how was your experience of pregnancy during the pandemic and how was the use of digital technologies in the gestational period", plus seven topics that were introduced in the interview with the purpose of flexibility and exploration of the questions (prenatal consultations in times of pandemic and social distancing; preparation for labor; feelings experienced in relation to prenatal care and preparation for labor in times of pandemic; expectations regarding pregnancy and labor; search for strategies and digital technologies to maintain care in social isolation; use of social networks and groups of pregnant women, messaging apps and digital platforms; access to digital technologies). The first interview served as a

pilot test and resulted in no change in the instrument. Thus, it was used in the analysis.

The interviews were previously scheduled, according to the availability of day and time of the women. The Informed Consent Form was sent by email to each participant before the recording of the interview, being considered consent to participate when they agreed to it. Data collection took place from April to July 2021, with an average duration of 30 minutes per interview. At the time of data collection, only the interviewer and the participant were present. Theoretical saturation was reached when the collected data no longer changed the understanding of the phenomenon, and the addition of new information was no longer necessary<sup>(18)</sup>.

The data were analyzed according to the stages of thematic content analysis<sup>(19)</sup>. We also used the Atlas.ti 9 software for qualitative data analysis, selecting the speech excerpts (quotations), creating codes (codes) and grouping codes (groups) according to thematic affinity and subsequent categorization.

The study respected and followed all ethical aspects for its realization, according to resolutions 466/2012 and 510/2016 of the National Health Council, being approved by the Research Ethics Committee, under opinion numbers 4,578,961/2021 and Certificate of Presentation for Ethics Appreciation: 42808521,8,0000,5392. To maintain the confidentiality and anonymity of the participants, the statements were presented by the word "participant", numbered in ascending order as the data collection progressed.

## Results

The profile of the participants reveals that the age of the participants ranged from 23 to 40 years old. The predominant marital status was married, corresponding to 55% of the participants. As for schooling: 35% had completed post-graduate studies; 30% had completed higher education; 25% had completed high school; and 10% had incomplete higher education. Regarding income, 40% had family income between 6-9 minimum wages, 20% between 3-6 minimum

wages, and, in the same proportion, 20% had income between 1-3 minimum wages, 5% had income between 12-15 minimum wages, and 5% had more than 15 minimum wages. All participants lived in the southeastern region.

Regarding the reproductive history in terms of number of pregnancies, 45% of the participants were pregnant women in the second pregnancy, 40% were in the first pregnancy, and 15% had two or more pregnancies. Regarding the health system through which they had their prenatal care, 70% of the participants reported having had prenatal care in the private network, 20% in both the public and private networks, and 10% of the participants were exclusively in the public network. Concerning the number of prenatal consultations, most participants (90%) reported having had more than 10 consultations, considering the distance of consultations.

The results of this study were described in two categories: Women's feelings on being pregnant during the pandemic of COVID-19, and Women's experiences with the use of digital technologies in gestational care.

### **Women's feelings about being pregnant during the pandemic of COVID-19**

This category highlights the ambiguous feelings experienced by women as pregnant women during the pandemic, ranging from happiness to apprehension and anxiety: *So, being at home was not bad, on the contrary. It was a blessing. And, when I got this [pregnancy diagnosis] it was that mixed relief that I was home away. So, I have this gratitude inside me for this moment (Participant 05). I experienced apprehension, joy, anxiety, friendship, connection with people (Participant 13). There was happiness too. I cannot forget that there was also a lot of happiness (Participant 18).*

However, the feelings experienced by women were mostly negative, such as fear, anxiety, anguish, sadness, and loneliness for needing to be away from family members: *It was terrible, especially the emotional part. I think that the restriction of being with my mother and sister was heavy (Participant 20). Look, psychologically, it was a lot of anxiety, I had*

*to talk far away with the other pregnant women in the group. So, it was anguish, sadness, and a lot of anxiety (Participant 07). I, honestly, was fearful (Participant 01). So, it was a mix of feelings, especially, I was fearful (Participant 19).*

Still, related to the feeling of loneliness, there was a report that the gestational period was an invisible phase for having face-to-face contact with few people, including friends who were pregnant during the same period. In summary, the participants experienced pregnancy during the pandemic of COVID-19 as a frightening, frightening, and frustrating phase: *Being pregnant during the pandemic was scary. I was distressed because we started to see several cases of pregnant women having premature labor due to complications from the COVID, needing to terminate the pregnancy and being intubated (Participant 13). Look, very frustrating, frightening, when the due date for labor started to arrive, it was very lonely (Participant 20). Strange, a little frustrating; the good thing is that I was already over 30 weeks when the isolation started. So, it was more peaceful to stay at home (Participant 15). I had a coworker who became pregnant. We were still working and had not closed the laboratory (Participant 04). I read on the internet a phrase that I thought defined me well and said that we were having an invisible pregnancy. And that was precisely how I felt (Participant 14).*

About the fears, the participants specify causes ranging from fear of personal death or death of a family member, of contracting the virus that causes COVID-19 or of losing the baby. Another cause of fear mentioned by the participants is not having the presence of a companion now of labor, because of the restrictions to avoid the agglomeration of people in the labor and delivery room: *Fear of catching it and causing some harm to the baby and end up transmitting it too. So, the fear itself was this (Participant 03). Because I was also terrified of not having the right to be accompanied at the time of labor. My fear was to get there, at the time, and they would say "no, you won't come in and that's it" (Participant 16). But many women didn't know this and ended up giving birth without any escort. So, that was my fear too! (Participant 19).*

Some women had to make important decisions for the moment of labor, such as the decision for home labor or the choice of accompaniment during the labor due to this pandemic context: *I had never thought and was always afraid of having the labor at home. But during the pandemic,*

*I changed my mind. Anyway, with the loss of rights, which occurred in the pandemic, inside the hospitals, I sought home labor (Participant 07). I wanted to have the assistance of a doula, but I knew that the hospital was not allowed at the time. So, I had to choose between the obstetric nurse or the doula. So, I preferred to opt for the obstetric nurse for technical knowledge even (Participant 20).*

This context of the COVID-19 pandemic and the need for social isolation also generated a scenario of insecurity to leaving home and attending prenatal care. In addition, some women mentioned the institutional adaptations aimed at prenatal safety: *I did my prenatal care through the private network. Therefore, they didn't have that many people. Even so, I had anxiety about leaving home. I started to be a little averse to leaving home (Participant 18). I was afraid to go to the doctor's office, but there was no way, there was no escape (Participant 04). It was very well organized so as not to have crowds of people. The space where the doctor's offices are is huge. So, I felt very safe to go to the consultations (Participant 13). In the Basic Health Unit, everything was organized. They were seeing two mothers only in the morning and at intervals of half an hour, one hour. Like, so the mother could leave, she wouldn't be there anymore, and they would clean up and the other mother would go. So, it made me safer, in this point, of the consultations in the pandemic (Participant 01).*

The women also reported missing the support network due to the face-to-face activities that no longer occurred in this period, such as the group of pregnant women and postpartum meetings: *I really missed the support network and having participated in the group meetings, which the public network itself offers (Participant 18). So, going through the first postpartum, with the other mothers, was much easier. Although we have the WhatsApp® group, and they always say, "it's so good to have you". But, in the first one, we saw each other, we met each other (Participant 07).*

### **Women's experiences with the use of digital technologies in pregnancy care**

The participants reported that they used digital technologies to access information about pregnancy, either through applications, following lives, social networks such as Instagram® or through websites and platforms. It is worth mentioning the concern of women in seeking reliable information offered by

health professionals, generating greater security for them in this period: *I researched in sources that were medical. And a lot of Instagram® of maternity, of pediatricians, of people in the area. I researched a lot of knowledge that gave me a lot of security (Participant 06). I liked it a lot! So much so that I followed this Baby Center® application during the pregnancy of my first child. Now for the second, and even after the baby is born, I keep up with it (Participant 03).*

The women participated in groups composed of other pregnant women, organized by them, in chat applications or other social networks. This experience was driven by curiosity and was perceived positively, providing opportunities for new friendships, emotional support, exchange of experiences and acquisition of information: *I joined a group for pregnant women, and I have several friends that I met in the group, and we exchange several conversations (Participant 17). We became companions. This support group was essential for sharing experience. So, this emotional support was significant (Participant 18). So, we exchanged experiences and shared doubts, information (Participant 16). So, in prenatal I used the apps for monitoring and curiosity, exchanging experiences with other pregnant women (Participant 08).*

The experience of women with some care routines in prenatal care remotely and with the use of digital technologies by health professionals ranged from the use of telemedicine in health insurance application to the participation in screening, prenatal consultations, care with physiotherapy and nutritional support: *I have an application, from my health plan, in which I have telemedicine. And I used this telemedicine at least three times during the pregnancy. So, I felt something in the early morning hours, I needed a doctor, I needed a medication now, I called the telemedicine (Participant 04). I had an online triage from the labor and delivery center. They [health professionals] asked me for some information, to see if I was suitable to start doing the consultations there (Participant 19). And I had I think one or two online consultations there [labor and delivery center]. Where they asked me everything about my exams (Participant 09). So, during pregnancy I had consultations with the nutritionist and with physiotherapy, both attended to me only online (Participant 05).*

The participants positively evaluated their experiences with the use of digital technologies in online consultations, generating emotional well-being and



*bonding with health professionals: I went to a psychologist during the pandemic, and it helped me a lot. So, to open my mind and be calmer (Participant 01). So, all the emotional support and doubts were online. But it was very calm (Participant 15). And, besides that, the availability to use WhatsApp®. So, we ended up creating a bond that also helped (Participant 05).*

The women discuss the participation in groups in online communication channels with other pregnant women that were offered and mediated by health professionals remotely: *And, when you join a WhatsApp® group, they [professionals of the collective] put you in contact with other mothers who are in the same age group of pregnancy as you (Participant 09). We also had the meetings with the doulas, which were via zoom (Participant 12). For any doubt I had, I had the contact of the obstetrician on duty to talk to. And, we had a group for pregnant women in September (Participant 13).*

The participants also mention an ambiguity of feelings, both positive and negative, when participating in courses/lectures and online groups. This mix of feelings was justified by the women due to their empathy with each other and by associating the reports of other pregnant women with their own experiences: *We were the first ones, during the pandemic, who were having access to this course in the remote model. Before the course was given in person. In relation to the course, it was positive, this exchange between pregnant women and being able to listen to them, somehow feeling this empathy of "You know what I'm feeling" (Participant 10). The group, sometimes, gave me a little bit of fear because it combined the fear of the mothers with my own and I became even more insecure. But they also calmed me down with some reports (Participant 01).*

It is noteworthy that the subjects addressed in the courses and lectures were mostly mediated by health professionals. The issues permeated the maternity and pregnancy, ranging from the phases of labor, care of the newborn, breastfeeding, contraceptive methods to the care related to the contagion by the coronavirus: *There was a round on breastfeeding, a round on the phases of labor and first care of the baby (Participant 12). There were about six or seven lectures that they [health professionals] gave about induction, about breastfeeding, care with the newborn, and care with coronavirus. All the lectures that they [health professionals] gave I think added to pregnancy, from how to breastfeed, what is the best handle, when you are going to give a bath (Participant 17). Any*

*theme related to maternity. There was even a contraceptive method, I had never even heard of it is the Billings method (Participant 03).*

## Discussion

The negative repercussions related to the pandemic of COVID-19 and arising from social isolation encompass many personal, relational, and emotional aspects. The latter, with emphasis on the experience of negative feelings such as fear, anxiety, and stress were more frequent in the female population compared to the male population<sup>(4,20)</sup>. Especially, in a context of many biopsychosocial changes<sup>(3)</sup> and insecurities facing the unknown, making the experience of pregnancy during the pandemic of COVID-19 a difficult phase<sup>(21)</sup>.

Corroborating the results of the present manuscript, it was observed that the feeling of fear was related to the possible infection by the coronavirus and its transmission to the fetus. Similar data were found in a study with Brazilian pregnant and postpartum women<sup>(22)</sup>, in which most patients (73%) reported fear of transmitting the coronavirus to the baby still inside the uterus, and 88% mentioned fear of contracting COVID-19 and going to the Intensive Care Unit. Spanish pregnant women also report the fear of contamination by coronavirus<sup>(4)</sup>. These results highlighted the importance of welcoming and emotional accompaniment of pregnant women during the pandemic period.

Another influencing reason of fear, evidenced in this study, is the loss of rights of pregnant women to have a companion at the time of labor due to the restriction of the stay in the labor room<sup>(22)</sup>. However, it is known of the numerous benefits of the companion at the time of labor and birth, highlighting the emotional support, strengthening family ties and change in professional conduct, helping pregnant women to be calmer, calmer, more confident, safer, alleviating pain, and feelings of loneliness, in addition to assisting in the physiological evolution of labor<sup>(23)</sup>.

The participants of the current study also mentioned the feeling of loneliness because of confinement and changes in the activities they used to per-

form. The lack of face-to-face contact, especially with friends, family, and other pregnant women, is described as one of the major difficulties of living a pregnancy during the need for social isolation during the pandemic<sup>(21)</sup>. Social support is recognized as a protective mechanism for pregnant women, and connecting with people is a strategy in reducing stress during the pandemic, which reinforces the importance of social interactions<sup>(24-25)</sup>.

Thus, the context of the COVID-19 pandemic created insecurity, impairing social interactions. Likewise, it hindered the movement from home to health services, directly impacting the performance of prenatal consultations. However, with the institutional adjustments aimed at minimizing the risk of contagion from the coronavirus, it was noted that it was safe to go to the health service for prenatal care. This duality of feelings is experienced sometimes with difficulty in being assisted in the Unified Health System and in the performance of tests, and sometimes with praise for the care during prenatal care<sup>(26)</sup>.

Adjusting their expectations to the current scenario, some participants opted for planned home labor, since at home the woman can ensure the presence of a companion, besides the risk of contamination by coronavirus being significantly lower. In this sense, corroborating our findings, it was noticed that planning home labor became more frequent during the pandemic<sup>(27)</sup>, with an increased feeling of safety in the home environment<sup>(28)</sup>.

The pandemic caused a series of changes in women's experience of pregnancy, besides stimulating adjustments in the model of care and in professional practices. In this scenario, before the reality imposed by the pandemic and the social distance, digital technologies were tools that enabled the replacement of routine face-to-face care with remote monitoring of women.

The implementation of digital technologies has been encouraged by the WHO for at least a decade, to improve access to health care and services<sup>(29)</sup>. Around the world, these technologies already played a growing role in connecting users with health care

and health services, even before the pandemic of COVID-19<sup>(8)</sup>, and they have proven increasingly effective in increasing the comprehensiveness of health care with management, care, teaching, and research<sup>(9)</sup>.

Social media have penetrated all cycles of humanity, including pregnancy and prenatal care, constituting alternative sources of access to information, and important tools for sharing experiences and feelings among pregnant women<sup>(10)</sup>. In this sense, the provision of educational information based on the use of computers and cell phones can contribute positively to gestational care<sup>(9)</sup>.

During the pandemic, it became evident the effectiveness of the use of digital technologies in health through a virtual space made available for pregnant women by nurses, aiming at sharing experiences, information, clarification of doubts and uncertainties generated by the pandemic<sup>(9,21)</sup>. The participation in a group for pregnant women, mediated by professionals, is a moment of shared experiences, which provided pleasure and good feelings, besides welcoming and learning<sup>(26)</sup>. Pregnant women's groups contribute to the formation of a support network and a feeling of belonging to a group, bringing comfort at this moment of tension, also enabling a redefinition of pregnancy, and strengthening their protagonist<sup>(21)</sup>.

Moreover, the potential use of cell phone chat applications helps support the pregnancy-puerperal cycle through health education actions, which contributed to the development of autonomy and accountability of women<sup>(11)</sup>.

And it is known that women seek information, on their own, about their current pregnancy, or even before, when they make plans to get pregnant, driven both by inexperience and by the desire to share experiences with others, accessing from pregnancy apps to websites and platforms<sup>(12-13)</sup>. On average, pregnant women acquire three to four apps containing information about pregnancy during the gestational period<sup>(14)</sup>. Among the most searched subjects, fetal development stands out, followed by nutrition during pregnancy<sup>(15)</sup>. Other frequently researched topics include labor baby care, and breastfeeding<sup>(12)</sup>.

The concern about the origin of the information obtained through searches on social media is another aspect highlighted in this study, since women state that they make sure that the content is reliable and provided by a health professional. Similarly, pregnant women have concerns about the reliability of information<sup>(15)</sup> and seek confirmation with health professionals<sup>(16)</sup>.

Prenatal care can be strengthened by the strategic use of digital technologies as complementary tools of care, mediated, and supervised by nurses, constituting an important instrument of health education. The association of chat apps allied to nursing consultations has a positive impact both on prenatal care coverage and on the development of autonomy and self-care of pregnant women<sup>(9,26)</sup>.

It is important to reinforce that the health team faces numerous barriers to the establishment of an effective care, especially in pandemic scenarios. Therefore, it is necessary to promote investments aimed at the reliability of information provided to the population, to be used as tools for prenatal care, monitoring and promotion of self-care and autonomy of women.

Despite the high use of digital devices globally, such as computers, notebooks, tablets and smartphones, low income is still a factor of global digital exclusion, especially in developing countries<sup>(30)</sup>. Therefore, considering the insertion and impact of the use of digital technologies during prenatal care, it is necessary that new studies be conducted, aiming to approach women in different contexts and realities. Thus, it will be possible to gather strategies and/or complementary tools that will contribute to the establishment of an adequate gestational care, safe and able to overcome the limits imposed by adverse scenarios such as the pandemic of COVID-19.

## Study limitations

Due to the pandemic scenario of COVID-19, the research needed some adjustments. Thus, the remote interviews conducted in a virtual environment suffered some losses due to audio failures, connection

drops, and the difficulty of capturing the non-verbal language of the participants. Furthermore, the recruitment method used (snowball) presented limitations because only women from the southeastern region of Brazil were captured, and few of them had low family income, making it impossible to generalize the data. Evidencing that the capacity to access digital technologies in Brazil is still not satisfactory.

## Contributions to practice

The reality experienced in the pandemic has transformed habits and routines, requiring that the understanding of the assistance to women exceed biological aspects and update the assistance in prenatal care. The study presented here intends to contribute to the reorganization of prenatal care beyond situations such as the pandemic and can be extended to the daily routine of prenatal care, especially in situations that make it difficult for pregnant women to access services. In this sense, some practices directed to the professionals who help are discussed, so that pregnant women are cared for properly and according to their needs, based on scientific evidence.

It is worth mentioning that, since nursing is a relational profession, face-to-face meetings are fundamental for pregnancy care. For this reason, we advocate the use of digital technologies as complementary tools for nursing care, which do not replace face-to-face consultations.

## Conclusion

It was evidenced that being pregnant in a context of the pandemic of COVID-19 encompassed ambiguous feelings, most of the time negative, expressed by fear, insecurity, and loneliness, related mainly to facing the unknown before a new disease, plus social isolation. In this way, the use of digital technologies was an imposed reality, which contributed positively both to the clarification of doubts about pregnancy and to the emotional support of the participants, independently of being made available by health profes-



sionals or by their own search.

The experiences of women who used digital technologies for gestational and prenatal care were perceived positively, and involved participation in telemedicine care, screening, online prenatal consultation, and participation in groups for pregnant women. The results were emotional well-being, bonding with health professionals, and exchange of experiences.

### Authors' contribution

Conception and design; responsibility for all aspects of the text in ensuring the accuracy and integrity of any part of the manuscript; final approval of the version to be published: Silva CM.

Writing of the manuscript; data analysis and interpretation: Bezerril AV.

Relevant critical review of the intellectual content: Martins EL, Mouta RJO, Zveiter M.

### References

1. Ministério da Saúde (BR). Lei nº. 13.979, de 06 de fevereiro de 2020. Dispõe sobre as medidas para enfrentamento da emergência de saúde pública de importância internacional decorrente do coronavírus responsável pelo surto de 2019 [Internet]. 2020 [cited Feb 5, 2023]. Available from: [https://www.planalto.gov.br/ccivil\\_03/\\_ato2019-2022/2020/lei/113979.htm](https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/113979.htm)
2. Sutton D, Fuchs K, D'Alton M, Goffman D. Universal screening for SARS-CoV-2 in women admitted for delivery. *N Engl J Med.* 2020;382(22):2163-4. doi: <https://doi.org/10.1056/NEJMc2009316>
3. Yan H, Ding Y, Guo W. Mental health of pregnant and postpartum women during the coronavirus disease 2019 pandemic: a systematic review and meta-analysis. *Front Psychol.* 2020;11:617001. doi: <https://doi.org/10.3389/fpsyg.2020.617001>
4. Puertas-Gonzalez JA, Mariño-Narvaez C, Peralta-Ramirez MI, Romero-Gonzalez B. The psychological impact of the COVID-19 pandemic on pregnant women. *Psychiatry Res.* 2021;301:113978. doi: <https://doi.org/10.1016/j.psychres.2021.113978>
5. Balk EM, Konnyu KJ, Cao W, Reddy Bhuma M, Danilack VA, Adam GP, et al. Schedule of visits and televisits for routine antenatal care: a systematic review. *AHRQ.* 2022;(22-EHC031):1-71. doi: <https://www.doi.org/10.23970/AHRQEPCCER257>
6. Hollander JE, Carr BG. Virtually perfect? Telemedicine for COVID-19. *N Engl J Med.* 2020;382(18):1679-81. doi: <https://dx.doi.org/10.1056/NEJMp2003539>
7. Marko KI, Ganju N, Krapf JM, Gaba ND, Brown JA, Benham JJ, et al. A mobile prenatal care app to reduce in-person visits: prospective controlled trial. *JMIR Mhealth Uhealth.* 2019;7(5):e10520. doi: <https://doi.org/10.2196/10520>
8. Kunonga TP, Spiers GF, Beyer FR, Hanratty B, Boulton E, Hall A, et al. Effects of digital technologies on older people's access to health and social care: umbrella review. *J Med Internet Res.* 2021;23(11):e25887. doi: <https://doi.org/10.2196/25887>
9. Oliveira SC, Costa DG, Cintra AM, Freitas MP, Jordão CN, Barros JF, et al. Telenursing in COVID-19 times and maternal health: WhatsApp® as a support tool. *Acta Paul Enferm.* 2021;34:eAPE02893. doi: <https://dx.doi.org/10.37689/actape/2021A002893>
10. Kingod N, Cleal B, Wahlberg A, Husted GR. Online peer-to-peer communities in the daily lives of people with chronic illness: a qualitative systematic review. *Qual Health Res.* 2017;27(1):89-99. doi: <https://doi.org/10.1177/1049732316680203>
11. Nóbrega VCF, Melo RHV, Diniz ALTM, Vilar RLA. Social support networks for Breastfeeding: an action-research. *Saúde Debate.* 2019;43(121):429-40. doi: <https://dx.doi.org/10.1590/0103-1104201912111>
12. Vasconcelos PP, Andrade BBF, Araújo KEAS, Me-deiros HHA, Costa MSO, Correia MB, et al. Social media as a source of knowledge for the process of normal delivery. *Cogitare Enferm.* 2020;25:e70061. doi: <https://doi.org/10.5380/ce.v25i0.70061>
13. Silva RM, Brasil CCP, Bezerra IC, Queiroz FFSN. Mobile health technology for gestational care: evaluation of the GestAção's app. *Rev Bras Enferm.* 2019;72(Suppl 3):266-73. doi: <https://dx.doi.org/10.1590/0034-7167-2018-0641>

14. McKay FH, Cheng C, Wright A, Shill J, Stephens H, Uccellini M. Evaluating mobile phone applications for health behaviour change: a systematic review. *J Telemed Telecare*. 2018;24(1):22-30. doi: <https://doi.org/10.1177/1357633X16673538>
15. Wang N, Deng Z, Wen LM, Ding Y, He G. Understanding the use of smartphone apps for health information among pregnant Chinese women: mixed methods study. *JMIR Mhealth Uhealth*. 2019;7(6):e12631. doi: <https://dx.doi.org/10.2196/12631>
16. Webber CG, Ferreira PC, Falavigna A, Koff MA, Lisboa N. Apreensibilidade da informação online em saúde: comparando percepções humanas e computacionais. *Rev Educ Interdisciplinar [Internet]*. 2022 [cited Feb 14, 2023];11(2):15-31. Available from: <http://seer.faccat.br/index.php/redin/article/view/2649>
17. Vinuto J. A amostragem em bola de neve na pesquisa qualitativa: um debate em aberto. *Temát*. 2014;22(44):203-20. doi: <https://dx.doi.org/10.20396/tematicas.v22i44.10977>
18. Nascimento LCN, Souza TV, Oliveira ICS, Moraes JRMM, Aguiar RCB, Silva LF. Theoretical saturation in qualitative research: an experience report in interview with schoolchildren. *Rev Bras Enferm*. 2018;71(1):228-33. doi: <https://dx.doi.org/10.1590/0034-7167-2016-0616>
19. Bardin L. *Análise de conteúdo*. São Paulo: Edições 70; 2016.
20. Barbosa LNF, Melo MCB, Cunha MCV, Albuquerque EM, Costa JM, Silva EFS. Brazilian's frequency of anxiety, depression and stress symptoms in the COVID19 pandemic. *Rev Bras Saúde Matern Infant*. 2021;21(Supl.2):413-9. doi: <https://doi.org/10.1590/1806-9304202100S200005>
21. Lima MM, Leal CA, Costa R, Zampieri MFM, Roque ATF, Custódio ZA. Gestação em tempos de pandemia: percepção de mulheres. *Rev Recien*. 2021;11(33):107-16. doi: <https://dx.doi.org/10.24276/rrecien2021.11.33.107-116>
22. Arrais A, Amorim B, Rocha L, Haidar AC. Impacto psicológico da pandemia em gestantes e puérperas brasileiras. *Diaphora*. 2021;10(1):24-30. doi: <https://doi.org/10.29327/217869.10.1-4>
23. Gomes IEM, Padoin SMM, Langendorf TF, Paula CC, Gomes CA, Ribeiro AC. Benefits of the presence of a companion during the process of labor and delivery: integrative review. *Rev Enferm UFSM*. 2019;9(e61):1-18. doi: <https://dx.doi.org/10.5902/2179769234170>
24. Matvienko-Sikar K, Pope J, Cremin A, Carr H, Leitao S, Olander EK, et al. Differences in levels of stress, social support, health behaviours, and stress-reduction strategies for women pregnant before and during the COVID-19 pandemic, and based on phases of pandemic restrictions, in Ireland. *Women Birth*. 2021;34(5):447-54. doi: <https://doi.org/10.1016/j.wombi.2020.10.010>
25. Pechinim I, Barbosa GAS, Werneck AL. Ansiedade e depressão no contexto da pandemia COVID -19 e a relação com os mecanismos de defesa das gestantes. *Res Soc Dev*. 2021;10(10):e93101018489. doi: <https://doi.org/10.33448/rsd-v10i10.18489>
26. Rossetto M, Souza JB, Fonsêca GS, Kerkhoff VV, Moura JRA. Flowers and thorns in pregnancy: experiences during the COVID-19 pandemic. *Rev Gaúcha Enferm*. 2021;42:e20200468. doi: <https://doi.org/10.1590/1983-1447.2021.20200468>
27. Lélis BDB, Corrêa JMC, Marinho GP, Alves KM, Duarte JVB, Marinho IP. O sofrimento mental de gestantes em meio à pandemia do novo coronavírus no Brasil. *Id on Line Rev M Psic*. 2020;14(52):442-51. doi: <https://doi.org/10.14295/online.v14i52.2676>
28. Santana NM. As gestantes em meio à pandemia de Covid-19 [Internet]. 2020 [cited Feb 5, 2023]. Available from: <https://diplomatie.org.br/as-gestantes-em-meio-a-pandemia-de-covid-19/>
29. World Health Organization (WHO). Draft global strategy on digital health 2020-2024 [Internet]. 2019 [cited Feb 5, 2023]. Available from: [https://www.who.int/docs/defaultsource/documents/g4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf?sfvrsn=f112ede5\\_42](https://www.who.int/docs/defaultsource/documents/g4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf?sfvrsn=f112ede5_42)
30. Elena-Bucea A, Cruz-Jesus F, Oliveira T, Coelho PS. Assessing the role of age, education, gender and income on the digital divide: evidence for the European Union. *Inf Syst Front*. 2021;23(4):1007-21. doi: <https://dx.doi.org/10.1007/s10796-020-10012-9>



This is an Open Access article distributed under the terms of the Creative Commons