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Pregnancy and Pandemic: Impact of Covid-19 on Maternity Care and Psychosocial Well-Being of Pregnant Women in India

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ABSTRACT:

Background: The COVID-19 pandemic significantly disrupted maternity care and affected the psychosocial well-being of pregnant women in India.

Purpose: This study examines the impact of COVID-19 on access to maternity care services, psychosocial health, and information satisfaction among pregnant women in South India.

Methods: A cross-sectional study was conducted in tertiary hospitals in South India between September 2020 and January 2021 as part of the global COCOON study. A convenience sample of 321 pregnant women receiving antenatal care participated in an online survey available in English and Telugu. Psychosocial well-being was assessed using validated scales: State-Trait Anxiety Inventory (STAI), Edinburgh Postnatal Depression Scale (EPDS), Perceived Stress Scale (PSS-4), and De Jong Gierveld Loneliness Scale (DJGLS).

Results: Despite the pandemic, 87.2% of women continued attending antenatal check-ups. However, 44% reported moderate-to-severe anxiety, 52% experienced depressive symptoms, 91% had high stress levels, and 82% felt lonely. Domestic violence increased by 10%, while 58% of participants reported strengthened family connections. Healthcare

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providers emerged as the most trusted information source (79%). These findings highlight the urgent need and vital opportunity to integrate safe screening and psychosocial support into routine maternity care. **Conclusion:** "Despite continued access to maternity care, the pandemic significantly impacted the psychosocial well-being of pregnant women. Integrating routine mental health screening and support into antenatal care is crucial to improving maternal well-being and ensuring resilient maternity services during public health emergencies."

Key-words: COVID-19, Pregnancy, Maternity Care, Psychosocial Well-being, India.

BACKGROUND

The COVID-19 pandemic, caused by the SARS-CoV-2, has significantly disrupted healthcare systems worldwide. Since its emergence in Wuhan, China, in late 2019, the pandemic has disrupted healthcare infrastructures, economies, and social systems across all regions (WHO, 2020). In March 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic, leading to enforced lockdowns, travel restrictions, and strict public health measures to limit transmission. While these measures were necessary, they resulted in major disruptions to essential healthcare services, disproportionately affecting vulnerable groups, including pregnant and postpartum women (Panda, 2021).

Impact of COVID-19 on Maternal Healthcare

Pregnancy is a critical period requiring continuous access to antenatal care, maternal education, and psychological support for the well-being of both mothers and babies. However, the COVID-19 pandemic severely interrupted these essential services, worsening existing health disparities, especially in low- and middle-income countries (LMICs) like India. Preexisting issues in maternal healthcare, such as limited resources, inadequate healthcare infrastructure, and socioeconomic disparities, exacerbated the effects of the pandemic (Padhye et al., 2022).

Emerging studies from India highlight how the pandemic compounded pre-existing maternal health challenges. Even before COVID-19, maternal health services in India were marked by regional disparities, supply-chain limitations, and gaps in quality of care. During the pandemic, these challenges intensified. Institutional deliveries and antenatal visits declined by up to 30%, while immunization coverage dropped by 25%, particularly in underserved areas (Jain et al., 2024). Transport disruptions were a primary barrier, reported by nearly 40% of pregnant women seeking care (Sharma et al., 2023). Critically, maternal and neonatal outcomes worsened: stillbirth and maternal mortality rates rose

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significantly, correlating strongly with regional COVID-19 related deaths (Jain et al., 2024). On the supply side, healthcare facilities were overwhelmed with COVID-19 cases. Many resources intended for maternal healthcare were redirected to treat infected patients, and numerous healthcare professionals were reassigned to COVID-19 care, resulting in a shortage of trained personnel for pregnant women (Naik et al., 2021). Additionally, essential maternal health supplies, including iron-folic acid (IFA) supplements and vaccines, were also affected due to supply chain disruptions. Restrictions on transportation and hospital restructuring further complicated timely access to antenatal and postnatal care (Bangal, 2021).

On the demand side, the fear of contracting the virus discouraged many women from seeking antenatal care (Khatri et al., 2020). Additionally, lockdown measures, transportation barriers, and financial instability contributed to reduced antenatal visits, increased home deliveries without skilled birth attendants, and interruptions in continuity of care (Sinha et al., 2022). Furthermore, hospital restrictions limited partner support during labor and added psychological strain on pregnant women, affecting their birth experiences and overall mental health (Brislane et al., 2021).

Psychosocial Impact of Pandemic on Pregnant Women

Beyond physical challenges, the pandemic significantly increased psychological distress among pregnant women. Fear of infection, economic uncertainty, and concerns about fetal health led to higher levels of anxiety, stress, and depression (Ray et al., 2022). Social distancing measures weakened traditional and usual support networks, leading to feelings of isolation and loneliness (Loughnan et al., 2022).

Studies suggest that maternal anxiety and depression rates during the pandemic exceeded pre-pandemic levels. However, most research has focused on high-income countries, where telehealth services and strong healthcare systems mitigated disruptions (Brislane et al., 2021). In contrast, data from LMICs like India is limited, making it crucial to understand the unique challenges faced by pregnant women in these regions and inform future maternal health policies (Bangal, 2021; Nath et al., 2019).

Significance of the Study

This study, is part of the global COCOON study, a multi-country initiative, exploring psychosocial experiences of COVID-19 on new, expectant, and bereaved parents across fifteen countries (Loughnan et al., 2022). By exploring maternity care disruptions, psychological distress, and information accessibility, this study aims to provide evidence-

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based recommendations for strengthening maternal healthcare resilience during future pandemics and public health emergencies.

Aim and Objectives:

Aim: To assess the impact of the COVID-19 pandemic on access to maternity care, psychosocial well-being, and the quality of information provided to pregnant women in India.

Objectives:

- To explore maternity care practices and challenges faced by pregnant women in South India during the COVID-19 pandemic.
- To measure and understand the psychosocial experiences of pregnant women during the pandemic using validated psychometric scales.
- To assess pregnant women's satisfaction with COVID-19 related information and identify trusted information sources.

METHODS

❖ Study Design and Setting:

This cross-sectional study was conducted from September 2020 to January 2021 in tertiary hospitals across South India. It is part of the global COCOON study, a multicountry survey conducted in fifteen countries to assess the impact of COVID-19 on maternity care, psychological well-being and information access (Loughnan et al., 2022).

❖ Study Population and Sampling:

A convenience sampling method was employed due to pandemic-related constraints on recruitment and the need to minimize in-person contact. A total of 321 pregnant women completed the online survey.

Inclusion Criteria:

- a. Pregnant women (≥ 18 years old) receiving antenatal care during the COVID-19 pandemic.
- b. Access to the internet and willingness to provide informed consent.

Exclusion Criteria:

- a. Women unwilling or unable to provide informed consent.

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b. Women with severe pregnancy complications requiring immediate medical intervention.

❖ Participant Recruitment:

Participants were informed about the study during routine antenatal visits at study hospitals. Healthcare providers introduced the study and distributed information sheets explaining the purpose, procedures, risks, and benefits in English and Telugu. Interested women provided email addresses and phone numbers and received a secure survey link via email and SMS. To address digital literacy barriers, a project coordinator's contact was provided for assistance. No incentives were offered for participation.

❖ Survey Tool and Psychometric Scales Used:

A structured, self-administered online survey was developed, consisting of 45 items covering:

- Perinatal care practices
- Psychosocial well-being
- Satisfaction with COVID-19-related information
- Experiences of domestic violence

Psychometric scales used:

- ✓ **State-Trait Anxiety Inventory (STAI):** The STAI measures both state and trait anxiety and has been validated across various populations. Cronbach's alpha values have ranged from 0.71 to 0.94, indicating strong internal consistency (Guillén-Riquelme & Buéla-Casal, 2024; Stojanović et al., 2020). In this study, the STAI categorized participants into high, moderate, or low/no anxiety.
- ✓ **Edinburgh Postnatal Depression Scale (EPDS):** The EPDS is widely used for screening perinatal depression, with internal consistency values typically ranging from 0.70 to 0.83 (Golzar & Golizadeh, 2015; Marsay et al., 2017; O'Mahen et al., 2013). High sensitivity and specificity have been reported, making it suitable for identifying both clinical and non-clinical levels of postpartum depression (Kheirabadi et al., 2012).
- ✓ **Perceived Stress Scale-4 (PSS-4):** The PSS-4, a brief measure of perceived stress, exhibits slightly lower reliability than its longer versions, with Cronbach's alpha values generally between 0.47 and 0.70 (Andreou et al., 2011; Giraldo-Rodríguez et al., 2023). Despite the reduced item count, it has been shown to

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correlate with other stress and mental health measures, making it appropriate for identifying high-stress individuals.

- ✓ **De Jong Gierveld Loneliness Scale (DJGLS):** The DJGLS assesses social and emotional loneliness. Cronbach's alpha values typically range from 0.68 to 0.899 across diverse cultural contexts, reflecting good reliability (Cheung et al., 2022; Giraldo-Rodríguez et al., 2023; Kassebaum et al., 2016). The scale has demonstrated good convergent validity with measures of depression, quality of life, and social support.

These validated scales provided a robust framework for quantifying psychosocial distress. Additional custom questionnaires addressed context-specific concerns, domestic violence experiences, and perceived positive effects. Details regarding the development and validation of these surveys are available in the COCOON protocol published in *BMJ Open*.

❖ **Data Collection Procedure:**

- ✓ Participants accessed a SurveyMonkey link, which first led to an information page describing the study.
- ✓ Informed Consent was obtained electronically by selecting "Yes, I consent" before accessing the survey.
- ✓ Anonymity and Confidentiality: The survey was completely anonymous; no personal identifiers (e.g., names, patient IDs, contact details) were collected.
- ✓ Withdrawal Policy: Participants could withdraw at any time by simply exiting the survey.
- ✓ Completion time: Approximately 20–30 minutes.
- ✓ Data Security: All data were securely stored and restricted to the research team.

❖ **Data Analysis:**

Descriptive and inferential statistics were computed using CoGuide software v.1.0 (BDSS Corp, 2020). Categorical variables are presented as frequencies and percentages; continuous variables as means and standard deviations. Normality was assessed via the Shapiro-Wilk test and Q-Q plots. Chi-square tests examined associations between categorical variables, and t-tests or ANOVA were used for continuous variables when appropriate. A p-value <0.05 was considered significant.

❖ **Ethical Considerations:**

The study adhered to ethical guidelines, ensuring voluntary participation and confidentiality. Approval was obtained from the Institutional Ethics Committee of Fernandez Foundation (FF/27/2020). No participant was contacted for follow-up, and all data were reported in aggregate to protect participant identities.

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Results:

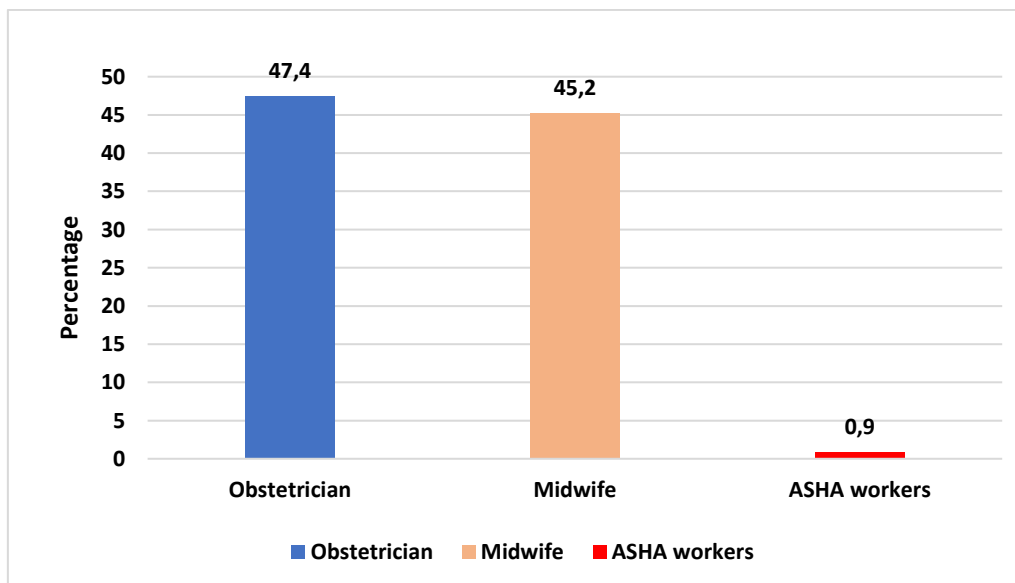
1. Demographic Characteristics

Out of 630 pregnant women invited to participate, 321 (50.9%) responded. Among those who responded, 62.6% were below 25 years of age, indicating a young population of expectant mothers. Additionally, 58.9% of the women were experiencing their first pregnancy, and 74.5% were from metropolitan areas, suggesting that the study population largely consisted of young, urban women. The highest levels of education were class 6-10 and 11-12, each at 37%, indicating limited formal education beyond high school for most participants. A total of 92.2% of the participants were homemakers, and 51.7% lived within 10-50 km of a healthcare facility, reflecting moderate accessibility to healthcare services.

2. Access to Quality Care Services

Most women continued receiving antenatal care despite pandemic challenges. Obstetricians (47.4%) and midwives (45.2%) were the primary care providers, with 96.6% accessing public health facilities. Only 12.8% of women postponed antenatal visits due to COVID-19-related restrictions, indicating strong healthcare system resilience and prioritization of maternity care.

Figure 1: Distribution of Primary Antenatal Care Providers



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Despite financial instability affecting 72.6% of households and increased caregiving responsibilities reported by 76.6%, pregnant women prioritized their health and that of their unborn children. Essential monitoring, including weight (99.1%), blood pressure (98.8%), urine analysis (93.5%), and blood tests (95.3%), continued with minimal disruption. Supplementation with Iron Folic Acid (IFA) (98.8%) and calcium (99.4%) remained consistent.

Table 1: Pattern of Pregnancy Care received during the pandemic (N=321)

Pregnancy Care	Frequency	Percentage
Changed care provider	44	13.7%
Stopped going to antenatal care appointments	34	10.6%
All antenatal care appointments conducted via telephone or online through Tele-consultation (no in-person)	31	9.7%
Reduced in-person antenatal appointments, some conducted via Tele-consultation	39	12.1%
Changed the location of in-person antenatal visits	49	15.3%
Antenatal classes have stopped	42	13.1%
Antenatal classes are being offered online only	32	10.0%

3. Pregnancy Care Practices

Most women continued to receive regular monitoring and treatment during their pregnancy:

- **Regular health monitoring:** Weight (99.1%), blood pressure (98.8%), urine analysis (93.5%), and fetal heart rate via Doppler (84.1%) were routinely checked.
- **Treatment adherence:** Almost all women received IFA (98.8%) and calcium tablets (99.4%).

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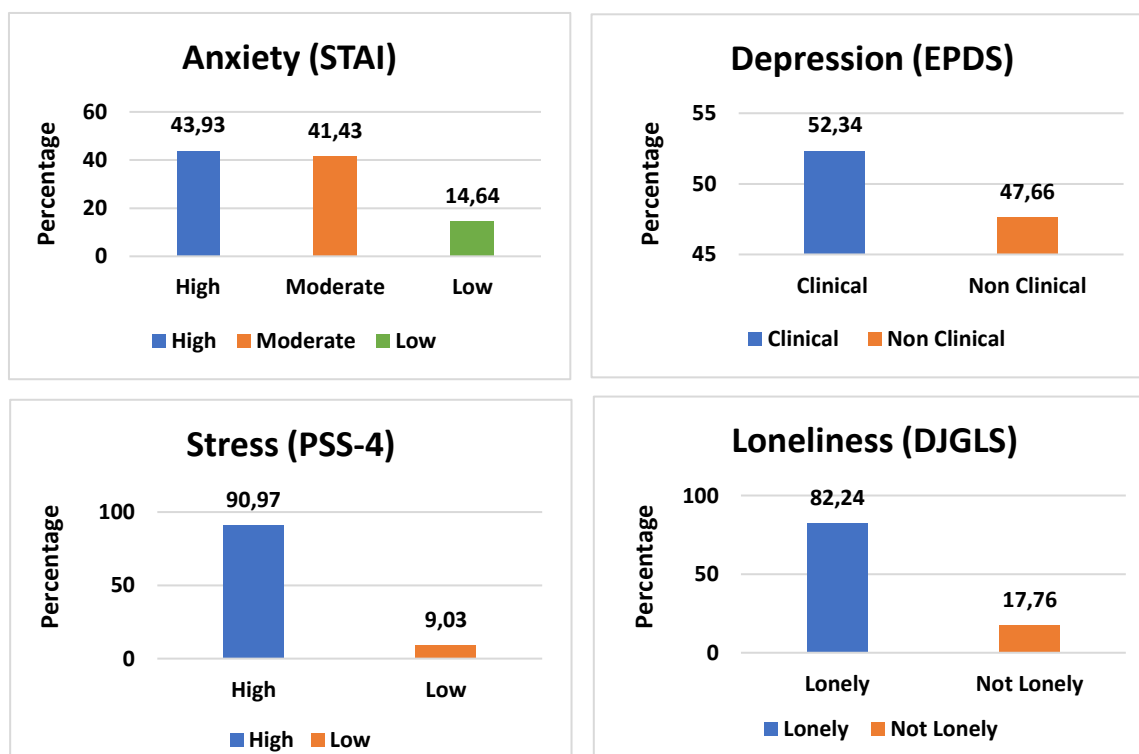
Table 2: Pregnancy Monitoring Practices (N=321)

Monitoring Type	Regularly (%)	Occasionally (%)	Not Checked (%)
Weight	99.1	0.9	0.0
Blood Pressure	98.8	8.4	3.7
Urine Analysis	93.5	6.5	0.0
Baby's Heart Rate (Doppler)	84.1	6.5	9.3

4. Psychosocial Experiences During COVID-19

The psychosocial impact of the COVID-19 pandemic on pregnant women was substantial.

Figure-2: Psychosocial Impact on Pregnant Women During COVID-19



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- **Anxiety (STAI):** The mean score was 44.7 ± 9.3 , with 43.93% of women experiencing moderate to high anxiety.
- **Depression (EPDS):** The mean score was 11.8 ± 6.6 , with 52.3% of respondents having scores indicative of clinical depression.
- **Stress (PSS-4):** The mean score was 7.6 ± 1.6 , with 90.97% of women reporting high levels of stress.
- **Loneliness (DJGLS):** The mean score was 2.7 ± 1.4 , with 82.24% of women reporting feeling lonely.

These findings emphasize the widespread mental health impact of the pandemic, underlining the need for routine mental health screening in antenatal care.

5. Concerns and Insecurities

Beyond general psychosocial distress, participants expressed a range of concerns regarding their personal and baby's health, maternity care changes and social support disruptions. The study recorded concerns and insecurities of women using Likert scales. Between 30-50% of women reported concerns, while 50-75% of women reported feeling insecure.

Concerns Regarding Health and Wellbeing During COVID-19:

- ❖ **Baby's Health:** The highest level of apprehension centered on the baby's health, with 38.9% of respondents reporting they were "extremely concerned."
- ❖ **Maternal Health:** Nearly one-third (29%) were "extremely concerned" about their own health.
- ❖ **Future Uncertainties:** Longer-term worries were also prominent. 34.3% were "extremely concerned" about their baby's future, and 36.1% reported extreme concern about breastfeeding, suggesting that uncertainties extended well beyond immediate antenatal care.
- ❖ **Changes to Care and Support:** Concerns about changes to antenatal, labor, and postnatal care were generally not as intense as worries about health. Only around 11.5% to 18% of participants were 'extremely concerned' about these care-related changes. However, many still reported being at least moderately worried. Similarly, while participants did have concerns about reduced support from family and friends, fewer expressed these worries at the 'extreme' level compared to their concerns about health-related issues.

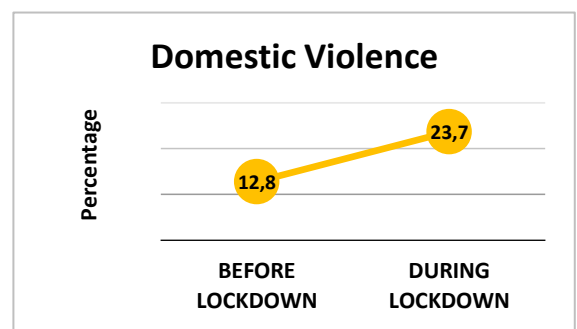


Participants also displayed substantial insecurities specifically tied to COVID-19 itself. The majority reported feeling fearful or uneasy when thinking about the virus.

- ❖ **Fear and Discomfort:** More than 70% either strongly agreed or agreed that they were afraid of Corona, and over half noted feeling uncomfortable or anxious when exposed to COVID-19 news and information.
- ❖ **Physical and Emotional Responses:** Approximately half of the participants reported experiencing physical symptoms—such as clammy hands (50.2%) and heart palpitations (51.4%)—when thinking about COVID-19. Difficulty sleeping (50.2%) and a fear of losing their life to the virus (53.3%) were also frequently endorsed.

6. Domestic Violence

The proportion of women experiencing domestic violence increased by 10%, from 12.8% before lockdown to 23.7% during lockdown. This highlights a concerning rise in domestic violence during the pandemic, which may be linked to increased stress and isolation.



7. Positive Social Changes during Covid-19.

Despite the challenges, some positive psychological impacts were observed. More than half of the women surveyed (58.3%) reported feeling more connected to their families, and 30.8% felt more connected with friends.

8. Availability and Satisfaction with Information on COVID-19

The evaluation of trusted sources of information revealed that 78.5% of women considered healthcare providers to be the most reliable source of information, followed by television and friends/family (30.2%). This highlights the importance of healthcare providers in disseminating reliable information during health crises.

- ❖ **Satisfaction with Information:** 80.1% of women were satisfied with the information provided to them by healthcare providers regarding COVID-19, indicating that the majority felt well-informed about the pandemic and related health measures.

The findings reveal not only the continuity of maternity care but also a concerning rise in psychosocial challenges, including high levels of anxiety (44%), depression (52%), stress (91%), and loneliness (82%), alongside a 10% increase in domestic violence. These

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outcomes highlight an urgent need for healthcare systems to proactively integrate mental health screening and support into routine antenatal services. In addition, the rise in domestic violence highlights the necessity of equipping healthcare providers with training and referral pathways to identify and address gender-based violence effectively, particularly during crises.

Discussion:

This study assessed the impact of COVID-19 on maternity care access, psychosocial well-being, and information satisfaction among pregnant women in South India. While the majority (80–99%) continued attending antenatal check-ups and receiving essential interventions, a subset of women faced care disruptions, including changes in healthcare providers, reduced in-person visits, and temporary cessation of antenatal classes. These findings highlight the resilience of the public healthcare system in maintaining maternity services despite pandemic-related constraints, contrasting with reports from other low and middle-income countries (LMICs), where maternal care access was severely compromised (Farrel et al., 2020; Goyal et al., 2021).

However, psychosocial distress levels were alarmingly high. More than 90% of women reported stress, while over 50% experienced symptoms of anxiety and depression, surpassing pre-pandemic norms documented in the literature (Chen et al., 2021). Multiple contributing factors have exacerbated these conditions, including heightened concerns over maternal and fetal health, economic instability (72.6% affected financially), and social isolation. In India, extended family networks play a crucial role in providing emotional and logistical support during pregnancy; the pandemic disrupted these traditional support systems, amplifying the feelings of loneliness and distress. Additionally, cultural stigma around mental health may have prevented women from seeking professional help (Farrell et al., 2020).

The study also identified a notable increase in domestic violence, with reported cases rising from 12.8% pre-pandemic to 23.7% during the lockdown. This trend aligns with global reports of increased intimate partner violence during lockdowns, economic hardships and heightened stress (Borghini et al., 2018; Gourounti et al., 2013). Addressing this requires a collaborative healthcare response. Antenatal care settings can serve as critical and feasible points of contact for identifying abuse by integrating routine, confidential and consented screening for domestic violence into maternal health check-ups. Healthcare workers across all levels of care must be trained to recognize warning signs, provide nonjudgmental support, and ensure safe, reliable referral pathways to social workers, counselors, and legal aid services. Establishing intersectoral collaborations

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between health systems, women helplines, and protection services is essential for a sustained, systems-level approach, especially during public health emergencies.

Despite these challenges, some positive psychological shifts emerged. Over half of the women (58.3%) reported feeling more connected to their families, while 30.8% felt closer to their friends. This suggests that while some households experienced heightened stress, others developed stronger support networks that may have mitigated the psychological burden. Understanding these dynamics can inform strategies to enhance coping mechanisms and resilience among expectant mothers in future crises.

Another key finding was the crucial role of healthcare providers in disseminating information about COVID-19. Nearly 80% of pregnant women trusted their healthcare providers as the most reliable source of information, while 30.2% relied on television and family networks. However, the existence of potentially unreliable sources of information highlights the need for strengthening healthcare-based communication channels to ensure that accurate, evidence-based guidance reaches all pregnant women, particularly those in underserved communities.

Policy and Practice Implications

Issue Identified	Recommended Strategy	Practical Actions for Indian Healthcare System
High levels of anxiety, depression, and stress	Integrate mental health screening into antenatal care	<ul style="list-style-type: none"> a. Incorporate validated mental health screening tools such as the EPDS, STAI, PSS-4 and DJGLS into routine antenatal visits. b. Use brief screeners like PHQ-4 at PHC/CHC levels for quick triage. c. Train ANMs and staff nurses under NHM to administer these tools, interpret results and follow-ups with women. d. Integrate screening modules to capture data into digital health platforms and establish referral pathways for psychological support services.
Disruptions in antenatal	Ensure continuity through outreach and	<ul style="list-style-type: none"> a. Strengthen telemedicine services and community outreach for antenatal care by deploying mobile health units.

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access during emergencies	alternative service delivery	<p>b. Ensure continued provision of maternal supplements and diagnostics through ASHAs and frontline workers.</p> <p>c. Develop district-level emergency preparedness plans for maternal services, including transport access through strengthening JSSK transport.</p>
Rise in domestic violence among pregnant women	Routine screening and referral during antenatal visits	<p>a. Integrate routine, confidential screening for domestic violence into ANC visits.</p> <p>b. Train healthcare providers to recognize abuse, provide nonjudgmental support, and refer to appropriate counselors or legal services.</p> <p>c. Create intersectoral collaboration with helplines, social workers, support organizations such as NIMHANS and protection officers for comprehensive support.</p>
Misinformation and low-quality sources of health information	Strengthen healthcare-based communication channels	<p>a. Train frontline workers to provide clear, consistent information on maternal care during public health emergencies.</p> <p>b. Utilize mHealth tools like Kilkari and government apps to send verified health updates to pregnant women.</p> <p>c. Use Mother and Child Protection Cards for community education about pandemics.</p> <p>d. Monitor and counter misinformation by partnering with local media.</p>

Limitations and Future Research

This study has a few limitations. The online surveys may have excluded women with limited digital access, potentially affecting the representativeness of the findings. Future studies should adopt longitudinal designs to track the evolving impact of pandemics on maternal health, incorporate qualitative insights to explore lived experiences in greater depth, and include more diverse populations to strengthen generalizability.

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Despite these limitations, our findings highlight the critical need for comprehensive maternal healthcare strategies that incorporate mental health support, accurate information dissemination, and protections against domestic violence. Policymakers and healthcare providers should leverage these insights to enhance the resilience of maternal healthcare systems in current and future public health emergencies.

Conclusion

This study highlights the significant impact of the COVID-19 pandemic on pregnant women in South India, particularly with respect to disruptions in antenatal care, elevated levels of stress, anxiety, and depression, and a concerning rise in domestic violence. While most women continued to access essential maternity services, the psychosocial burden was substantial and highlighting the need for integrated support.

Going forward, coordinated efforts between healthcare providers and policymakers are crucial. Routine mental health screening tools and domestic violence assessments should be embedded within antenatal care. Frontline health workers need to be trained and supported to deliver these services, with clear referral pathways to mental health, legal, and social support systems. At the same time, policymakers must strengthen digital tools, ensure continuity of essential services, and invest in intersectoral partnerships that can respond effectively during public health emergencies.

This study strongly recommends that a collaborative, systems level approach is essential to ensure that maternal healthcare remains inclusive, accessible and reliable both in times of health emergencies and beyond.

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