Barriers and facilitators to mood and confidence in pregnancy and early parenthood during COVID-19 in the UK: A mixed-methods synthesis survey

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Abstract

Background: Parents' well-being during pregnancy and early parenthood is critical for children's development. Environmental stressors can significantly challenge parents' well-being.

Aims: To investigate how COVID-19 and associated restrictions influence mood and parenting confidence of expectant parents and those in early parenthood, identifying barriers and facilitators.

Methods: We used a cross-sectional online survey to collect data from 590 expectant parents and parents of infants (564 females) during the most restrictive phase of the lockdown in the UK. Survey included a mixture of forced-choice and open-ended questions pertaining to mood, perceived social support, media use, online interactions, and parenting expectations. Quantitative data were analysed using multiple linear regression and proportional odds models, while an inductive thematic analysis was employed for qualitative data. Quantitative and qualitative data were qualitatively synthesised.

Results: A decrease in mood and parenting confidence were found. Barriers included practical difficulties (finding essentials, reliable health information), social difficulties (loss of physical contact, decreased support), and uncertainty during pregnancy. Facilitators included support from others and for first-time parents, loss of childcare resulting in greater parenting confidence. While online resources and communication were not preferable to face-to-face interactions, technology was a helpful tool for communicating, getting support, and finding essentials and information during lockdown.

Conclusion: By mid-May 2020, mood and parenting confidence among expectant and parents of newborns in the UK were significantly reduced. Consideration of barriers and facilitators in healthcare and psychological support provided is likely to play an important part in promoting parental mental health and healthy parent-child relationships.

Introduction

Response to prevent and reduce infection of COVID-19 in the UK involved several changes to healthcare settings and people's lives. For expectant parents and parents with a newborn, this included limited access to maternity services. For example, partners not able to attend antenatal or scanning appointments, only one birthing partner able to be present and only for established labour and birth, partners not permitted to join on the postnatal ward,¹ restrictions on births at home and in freestanding midwifery units in certain areas,² a decrease in antenatal and postnatal appointments,³ as well as having some of these appointments via telephone or video instead of face-to-face.¹ Community services, such as breastfeeding support and some health visiting appointments, as well as antenatal and postnatal groups were moved remotely.³ However, these guidelines are continuously under review. From March 23rd to May 11th 2020, UK Government guidance was for people to stay at home, except for very limited purposes (e.g. shopping for basic necessities, one form of exercise a day, medical need, etc.), certain businesses and venues were closed, and gatherings of more than two people in public were stopped.⁴ Pregnant women were defined as a vulnerable group as a precaution by the Chief Medical Officer on 16th March 2020 and were advised to reduce social contact through social distancing measures with increased stringent measures from 28 weeks of pregnancy onwards.¹

Parents' well-being is an important factor for parenting, parent-infant relationships, and children's healthy development. A large body of literature has accumulated strong evidence directly linking parental depression with poor parenting practices, such as hostile or disengaged parenting⁵ and poorer mother-infant quality interactions,⁶ while maternal depressive symptoms and parenting stress of both parents can be risk factors for the socio-emotional, behavioural, and functional development of children.^{7,8} In addition to parents' mood, confidence in parenting has also been found to influence parental care and children's development, with a higher parental self-efficacy influencing capacity to carry out positive parenting practices^{9,10} and child adjustment.^{11,12} Importantly, parental mental health and confidence can be challenged significantly in the face of environmental stressors, such as a health-related threat. Parents' perception of child vulnerability has been found to be associated with postnatal depression and parental stress, which, in turn, affect parent-child relationships,^{13,14} as well as perceptions of themselves as less competent parents.¹⁵ To this end, it seems vital to understand the impact of COVID-19 and associated restrictions on the well-being of expectant parents and parents of newborns, as well as their perception of themselves as parents. This will help inform where attention and priority should be given to address the needs of this population. The aim of this study was, therefore, to investigate how COVID-19 and associated restrictions influence mood and parenting confidence of expectant parents and those in early parenthood, identifying barriers and facilitators.

Method

Participants

Online recruitment included 590 participants (564 females). The inclusion criteria for participation were: a) currently pregnant/have a pregnant partner or have a baby less than 6 months old, b) live in the UK, and c) be above the age of 18 years. Participant characteristics are displayed in Supplement 1. All participants, prior to their participation, were provided with an information sheet and written informed consent was obtained from all participants.

The study was approved by the Ethics Committee of the Research Department of Clinical, Educational and Health Psychology, University College London (Project ID: 7683/003).

Design and Materials

This cross-sectional survey was conducted on UCL Qualtrics (<https://login.qualtrics.com>) and included questions pertaining to: demographic information, mood and general well-being, stress events, perceived support from others, media use, experience of online interactions, sudden loss of physical contact, expectations of parenting, and hardest and most helpful experiences during the crisis. Some of the questions had forced-choice answers on a yes/no basis or a Likert rating scale. The survey also collected qualitative data through three open-ended questions, in order to gain more in-depth information and put the answers into context. The study employed a convergent synthesis design, whereby qualitative and quantitative data were collected and analysed in parallel, before being qualitatively synthesised. For a full version of the survey, please refer to Supplement 2.

Procedure

Data collection took place between 24th April 2020 – 13th May 2020, that is during the first and most severe phase of the nationwide lockdown in the UK. A recruitment flyer, including information about the study, inclusion criteria and the link to the survey, was posted/reposted on social media, as well as on the MQ website and a civil service message board. The survey was anonymous and took no more than 10 minutes to complete. After submitting the answers, a list of links to resources for confidential support and advice was provided.

Data Analysis

Quantitative

Variables of interest were grouped into four themes: support, physical contact, media use, and stress events. Two outcomes were examined: change in mood since COVID-19 and impact of COVID-19 on parenting confidence. Change in mood was examined using multiple linear regression models. Parenting confidence was examined using proportional odds models. Participant characteristics including gender, age, expectant/new parent status, previous parent experience, work situation, income, accommodation, and location in the UK were included as covariates for variable selection. Full details of analysis are reported in Supplement 3.

Qualitative

An inductive thematic analysis was conducted. The researchers initially familiarized themselves with the dataset and coded 35 responses each (two out of three open-ended questions). They discussed their coding and organized lists of codes into a coding framework with inclusion and exclusion criteria for each code. The same two independent raters re-coded 11.8% of the total sample (70 responses; half from pregnant and half from parent group) for two out of three questions, using this coding framework. High inter-rater reliability was established ($\kappa > .85$), so the raters divided and coded the remaining data separately. Ambiguous instances were resolved through discussion and the two raters developed and refined themes together.

Data synthesis

Quantitative and qualitative data were qualitatively synthesised to help understand the directionality of findings, generating a new set themes for barriers and facilitators, in line with best practice when aggregating data from different types of research.¹⁶

Two authors conducted the quantitative analyses and two different authors conducted the qualitative analyses to avoid biases. All authors were involved in data synthesis.

Results

Quantitative Analysis

Full participant characteristics are displayed in Supplement 1. A summary of study highlights is displayed in Supplement 4.

Change in mood since COVID-19

A decrease in mood was associated with: 1) an increase in missing physical contact more generally and an increase in avoiding physical contact with others in the household $F(6, 576) = 55.94$, $p < 0.0001$, $R^2 = 0.37$; 2) not finding reliable health information $F(5, 533) = 57.92$, $p < 0.0001$, $R^2 = 0.35$; and 3) difficulty in accessing medicine, groceries, or other essential items $F(4, 585) = 83.79$, $p < 0.0001$, $R^2 = 0.36$. In models examining physical contact and support, being pregnant was associated with a decrease in mood. An increase in mood was associated with higher levels of current support from partner and friends and an increase in family support $F(8, 553) = 47.00$, $p < 0.0001$, $R^2 = 0.40$. Model summaries appear in Supplement 5.

Change in confidence since COVID-19

A decrease in confidence as a parent was associated with: 1) an increase in missing physical contact more generally (OR = 0.83; 95% CI 0.70 – 0.98); 2) an increase in searching for

reliable health information (OR = 0.69; 95% CI = 0.50 – 0.93); and 3) difficulty in accessing medicine, groceries or other essential items (OR = 0.46; 95% CI = 0.32 – 0.64). An increase in confidence as a parent was associated with loss of access to childcare (OR = 1.52, 95% CI = 1.05 – 2.21) and increase in family support (OR = 1.33; 95% CI = 1.03 – 1.73).

Qualitative Analysis

Three thematic analyses were conducted for the open-ended questions: a) “What has been the hardest part of being pregnant/parent of a new baby during COVID-19?”; b) “What have you found to be most helpful while being pregnant/parent of a new baby during COVID-19?”; and c) “Do you think this experience of COVID-19 will influence your future parenting/parenting? No/Yes. Please tell us below.” Analyses revealed seven themes for question a, five themes for question b, and six themes for question c (see Tables 1-3).

	Theme	Explanation
1	Decreased support	from partner (not being allowed at appointments and full labour), family & friends, healthcare and antenatal groups, and for childcare
2	Loss	of seeing family & friends, missing out on markers of pregnancy and early parenthood, birth choice, enjoying this time, and of baby missing out on normal experience
3	Worry	about contracting Covid-19 (and its effect on pregnancy and baby), birth in these circumstances, the impact of social isolation (on baby’s development and own mental health), financial worries and on family’s health
4	Having to be at home	feeling lonely, isolated and stuck with no change, and not able to see others, exercise or work, and finding being exclusively with baby “intense”
5	Uncertainty during pregnancy	not knowing the risks on pregnancy and baby, on what life will be like, and on birth
6	Practical difficulties	not able to go to shops and find things online
7	Unreliable/inconsistent information	about COVID-19, healthcare arrangements, pregnancy and postnatal care, and birthing

Table 1: Themes for what was “hardest” in order of frequency

	Theme	Explanation
1	Support from others	partner, family & friends, healthcare professionals, antenatal and postnatal groups, employer, and therapy
2	More time	“as a family”, with partner, with baby, ‘me-time’ inside and outside the house, and for planning arrival of baby
3	Technology	availability of online resources, for live communication, social media, apps, shopping, and online information
4	No pressure	feeling less stressed about not having to commute, work, meet people, and rush things
5	Nothing	nothing

Table 2: Themes for what was “most helpful” in order of frequency

	Theme	Explanation
1	Hygiene and restrictions of socialising	worries directly related to virus: restricting own and child’s social interactions; being more hygienic; and feeling over-protective, worried about health and “germophobic”
2	Independent and confident parenting	spending more time with family; being more creative with activities at home; feeling more confident parenting independently as a result of having less support with childcare, more resilient, and more attentive to children’s needs
3	Not taking things for granted	feeling more appreciative; socialising and going out more in the future

4	Decrease in ability to parent	feeling less confident as a parent and physically and mentally exhausted as a result of decreased support
5	Worries about impact on mental health and well-being	worries indirectly related to virus: worried about postnatal depression and mental health, impact of social isolation on child, and of passing own stress to child
6	Slowing down	feeling less pressured to do things, becoming more reflective and patient

Table 3: Themes for “influence on future parenting/parenting” in order of frequency

Overall, half of themes reflected a negative impact on parenting (1, 4 and 5), while the other half reflected a positive impact (2, 3 and 6). For a full list of theme counts for expectant and new parents, please see Supplement 6; for examples of qualitative submissions, please see Supplement 7.

Data synthesis

To identify barriers and facilitators to participants’ change in mood, as well as parenting confidence, the quantitative and qualitative data were synthesised. The quantitative analysis revealed factors that were associated with a decrease in mood and a decrease in confidence. However, the associations could be reversed, meaning that it is not possible to know whether each of these factors is a barrier or (if reversed) a facilitator. For this reason, the qualitative data were used to reveal more about the directionality of the associations.

The first step of data synthesis was to interpret the data, matching the quantitative findings (i.e. factors associated with decrease in mood and confidence irrespective of direction) with the themes that arose from the qualitative analysis of the three open-ended questions. See tables in Supplement 8.

The second step of data synthesis was to identify barriers and facilitators to mood and confidence based on the matching done in the first step.

Mood		Parenting confidence	
Barriers	Facilitators	Barriers	Facilitators
Loss of physical contact	Support from others	Loss of physical contact	Support from others
Unreliable/inconsistent health information	..	Unreliable/inconsistent health information	Loss of childcare
Difficulty in finding essentials	..	Difficulty in finding essentials	..
Uncertainty during pregnancy	..	Uncertainty during pregnancy	..
Decreased support	..	Decreased support	..

Table 4: Barriers and facilitators to mood and parenting confidence

Given that loss of childcare was identified as both a barrier (i.e. decreased support) and facilitator, we ran an exploratory post-hoc analysis to examine group differences between those who found it a barrier and those who found it a facilitator. The results indicated no demographic differences between groups, although those who found it a barrier were more

likely to be pregnant (OR = 5.09, $p = 0.0019$), and already had a child (OR = 7.05, $p = 0.0001$). See Supplement 9.

Discussion

This study found that COVID-19 and associated restrictions during the most restrictive phase of lockdown had a detrimental impact on the well-being of expectant parents and those in early parenthood, more specifically, a decrease in their mood and parenting confidence. This is consistent with recent findings of increased prenatal and postnatal anxiety,^{17,18} as well as increased mental distress in the wider population¹⁹ during COVID-19. Our study also identified barriers and facilitators to well-being during this period.

Barriers

Practical, social support and psychological difficulties were identified as barriers to both mood and parenting confidence. Practical difficulties included struggles to find essential items and reliable health information. Social support difficulties included not having a partner at appointments and full labour, losing childcare, and restricted access to healthcare support. This is in agreement with previous research showing that perceived low social support is a risk factor to postnatal depression in both parents,²⁰ as well as to anxiety and antenatal and postnatal depression in women.^{21,22} Another important social barrier to mood and parenting confidence was the loss of physical contact (missing and/or avoiding it). Previous research has shown that touch may not only have a unique contribution to the formation of social bonds,²³ conveying social support, but also act as a stress buffer, playing a critical regulatory role in the body's responses to acute life stressors.²⁴ Another finding of this study was that being pregnant, in itself, was associated with a decrease in mood during this period. Expectant parents reported that one of the hardest experiences was “not knowing” the risks of COVID-19 for pregnant women, for the unborn and newborn child, the birth conditions during lockdown, as well as what the future would entail. Uncertainty reduces our capacity to prepare for future threats and therefore contributes to anxiety.²⁵ For example, anxiety levels in pregnant women, who reported abdominal pain and/or vaginal bleeding, decreased over time when they were given a certain diagnosis, even if this was negative, while anxiety levels increased in those who received uncertain diagnoses.²⁶ During pregnancy, expectant parents face several anxiety triggers: medical investigations into their and their unborn child's health, waiting for results, and some may receive uncertain diagnoses. The added uncertainty of risks brought by COVID-19 may have negatively impacted expectant parents' mood more than that of parents as the former typically experience more uncertainty and anxiety while pregnant.

Facilitators

The pandemic inevitably brought about difficulties in social support for expectant parents and those in early parenthood. However, support from others was identified as the greatest facilitator to mood and parenting confidence. Support was multidimensional, ranging from practical support with childcare and pregnancy to emotional and psychological support. The

quantitative analysis revealed that high levels of current support from partner and friends, as well as increased family support were associated with an increase in mood, while the latter was also associated with an increase in parenting confidence. However, the qualitative analysis revealed additional sources of support, mainly from healthcare professionals (e.g. midwives) and ante/postnatal groups. Perceived social support has been previously identified in the literature as a protective factor for parents' emotional well-being.²⁷ Interestingly, results from both quantitative and qualitative analyses indicated that loss of childcare was experienced positively in relation to parenting confidence. Those who had to parent independently as a result of the loss of childcare support due to COVID-19 restrictions reported feeling more confident in their ability to parent. However, loss of childcare was also reported as one of the hardest aspects of lockdown. When looking at differences between groups, those who experienced loss of childcare as a barrier were more likely to be pregnant but not with their first child and those who found it a facilitator were most likely to be first-time parents. These findings suggest that the uncertainty of being pregnant in combination with living with young children in the household presented a barrier to parents' confidence. This is in line with recent research showing that parents with young children had higher levels of mental distress.¹⁹ While there is evidence linking parenting confidence to children's later behaviour,¹² there is little research focusing on which factors contribute to the development of parenting confidence.²⁸ Our findings suggest that for first-time parents, not relying on childcare had the positive effect of increasing their confidence in parenting. Qualitative submissions suggest first-time parents found this experience helped them trust their instinct and judgement (see Supplement 7).

The role of technology

The findings on participants' views on technology are complex. While the quantitative analysis revealed that the majority of participants found online interactions were less preferable than face-to-face interactions, the qualitative analysis showed that many participants named online resources and communication as being most helpful during lockdown. These findings suggest that technology can be a valuable tool to provide much needed practical, social, healthcare, and psychological support in situations where these are not available face-to-face.

Strengths and Limitations

To the best of our knowledge, this is the first study to explore barriers and facilitators to mood and parenting confidence during pregnancy and early parenthood as a result of COVID-19 and its associated restrictions in the UK. Strengths of the study include, but are not limited to, a mixed-methods synthesis approach, integrating quantitative and qualitative data, the focus on the first and most restrictive phase of the lockdown, the representation of all locations within the UK and a range of incomes, as well as the anonymity of the data, which helped reduce response biases. Given the evidence of the disproportionate impact of COVID-19 on BAME groups,²⁹ a major limitation was being unable to examine the role of ethnicity in our study (discussed in Supplement 1). Further limitations were convenience sampling which resulted in an underrepresentation of male participants and may have resulted in an underrepresentation of hard-to-reach populations.

Conclusions and Implications

This study, as well as recent findings,^{17,18} have demonstrated the negative impact of COVID-19 and associated restrictions on expectant parents and those in early parenthood, raising concern given the association between parental well-being and parenting behaviour^{5,6} and children's outcomes.^{7,8} While worries increase, mood and confidence in one's ability to parent decrease and this was found after two months in lockdown. These psychological difficulties are likely to increase as the socioeconomic impact of this period unfolds.

Moreover, some restrictions continue whilst other restrictions are imminent as COVID-19 cases increase. This study also identified facilitators to mood and parenting confidence which can help inform where resources should be focused. Despite the decline in social support, when this was received, it was much valued, confirming the importance of making partner, family, peer, and healthcare support available, even if only remotely. It seems vital to investigate ways technology can reach those in most need and find better ways to provide support (e.g. technology that is user friendly, valued, and creatively used). For example, healthcare professionals could include partners in full labour and face-to-face appointments with pregnant women and mothers through video or phone calls. However, pre-existing inequalities have been exacerbated with the pandemic³⁰ and special attention should be given to locations and groups of people who have little access to support and reliable health information, as well as access to technology. This will have benefits beyond the pandemic, given the potential of technology. Moreover, given the importance of touch for people's emotional well-being and for conveying social support, especially at a time of heightened stress, information on the importance of touch for adults and for infants could be more widely considered with risks of transmission, to identify and clarify whether there are safe forms of physical contact. Finally, the inevitable uncertainty of the pandemic seems to impact expectant parents more severely so ante/postnatal healthcare and psychological support providers should be aware of this. Providing reassurance and guidance in managing anxiety during uncertain times could improve their well-being. We hope this research will be informative for individuals and organisations, who are now working with expectant parents and parents of infants, including, but not limited to, medical, mental health, and social care professionals, to consider the psychological impact of this period, to anticipate further repercussions, and to help offer best course of practice given the particular limitations at any period of this pandemic.

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Data Availability

The data that support the findings of this study are available from the corresponding author, AP, upon reasonable request. Following guidance from UCL's Ethics Committee, we included the following in the Participant Information Sheet: only UCL researchers will have access to the anonymous data which will be deleted after 10 years. If you require access to the raw data, we can request approval from the Ethics

Committee as we cannot seek retrospective approval from participants as data was collected anonymously.

Author's Contributions

Formulating the research question(s): E. Panagiotopoulou, A. Perez, and R. Roberts

Designing the study: E. Panagiotopoulou, A. Perez, and R. Roberts

Carrying it out: P. Curtis, E. Panagiotopoulou, A. Perez, and R. Roberts

Analysing the data: P. Curtis, E. Panagiotopoulou, A. Perez, and R. Roberts

Writing the article: P. Curtis, E. Panagiotopoulou, A. Perez, and R. Roberts

Verification of the data: P. Curtis, E. Panagiotopoulou, A. Perez, and R. Roberts

Approval of the version of the manuscript to be published: P. Curtis, E. Panagiotopoulou, A. Perez, and R. Roberts

Declaration of Interest

None

Role of Funding Source

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Ethics Committee Approval

The study was approved by the Ethics Committee of the Research Department of Clinical, Educational and Health Psychology, University College London (Project ID: 7683/003).

Supplement 1. Participant characteristics

		n (% of total sample)		
		Expectant parent	New parent	Total
Gender	Female	355 (60.2)	209 (35.4)	564 (95.6)
	Male	10 (1.7)	15 (2.5)	25 (4.2)
	Specify	0 (0.0)	1 (0.2)	1 (0.2)
Age	18-24	31 (5.3)	7 (1.2)	38 (6.4)
	25-34	235 (39.8)	143 (24.2)	378 (64.1)
	35-44	99 (16.8)	75 (12.7)	174 (29.5)
	45+*	0 (0.0)	0 (0.0)	0 (0.0)
Previous parent experience	First	161 (27.3)	142 (24.1)	303 (51.4)
	Not first	204 (34.6)	83 (14.1)	287 (48.6)
Work situation	Working in the NHS or as a care worker	63 (10.7)	23 (3.9)	86 (14.6)
	Working in public facing role (not NHS or care worker)	53 (9.0)	31 (5.3)	84 (14.2)
	Not working with public, NHS or care worker	249 (42.2)	171 (29.0)	420 (71.2)
Income	Not supplied	7 (1.2)	2 (0.3)	9 (1.5)
	Up to £20,000	42 (7.1)	14 (2.4)	56 (9.5)
	£21,000-£40,000	71 (12.0)	39 (6.6)	110 (18.6)
	£41,000 - £60,000	92 (15.6)	52 (8.8)	144 (24.4)
	£61,000 - £80,000	72 (12.2)	47 (8.0)	119 (20.2)
	£81,000 - £100,000	34 (5.8)	35 (5.9)	69 (11.7)
	£100,000+	47 (8.0)	36 (6.1)	83 (14.1)
Accommodation	Not supplied	2 (0.3)	1 (0.2)	3 (0.5)
	Flat with no view	17 (2.9)	8 (1.4)	25 (4.2)
	Flat with view / balcony	22 (3.7)	19 (3.2)	41 (7.0)

	Flat with garden / terrace / outside space	28 (4·8)	21 (3·6)	49 (8·3)
	House with garden / terrace / outside space	296 (50·2)	176 (29·8)	472 (80·0)
Location in the UK	Not supplied / indeterminate**	12 (2·0)	16 (2·7)	28 (4·8)
	North East	13 (2·2)	4 (0·7)	17 (2·9)
	North West	22 (3·7)	11 (1·9)	33 (5·6)
	South East	65 (11·0)	26 (4·4)	91 (15·4)
	South West	27 (4·6)	34 (5·8)	61 (10·3)
	East Midlands	22 (3·7)	6 (1·0)	28 (4·8)
	East of England	40 (6·8)	17 (2·9)	57 (9·7)
	West Midlands	19 (3·2)	8 (1·4)	27 (4·6)
	Yorkshire and The Humber	28 (4·7)	19 (3·2)	47 (8·0)
	London	81 (13·7)	69 (11·7)	150 (25·4)
	Scotland	22 (3·7)	9 (1·5)	31 (5·3)
	Wales	7 (1·2)	5 (0·8)	12 (2·0)
	Northern Ireland	7 (1·2)	1 (0·2)	8 (1·4)

Table 1.1: Participant characteristics

*The option of 45+ was provided but no participant selected this option

**12 participants did not provide location information and 14 participants' location could not be determined from the information provided (e.g. 'rural village'; it could not be determined if 'Richmond' was in London or Yorkshire). Two participants indicated that they were not living in the UK and were removed from all analyses.

***Ethnicity: Owing to a technical issue with data collection, ethnicity was not obtained for the majority of participants. This error was corrected as soon as it was identified. In the sample that followed 47 participants were Caucasian, 2 participants were of Mixed ethnicity, and 1 participant was Asian.

Supplement 2. Participant information sheet and survey

Information sheet

Information sheet for participants

UCL Research Ethics Committee Approval ID Number: **7683/003**

Learning about pregnancy and early parenting experiences during Coronavirus (COVID-19)

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Why are we carrying out this study?

The research team from the Anna Freud National Centre for Children and Families (AFNCCF) are seeking to learn about how pregnancy and early parenting experiences are uniquely affected by changes and restrictions due to Coronavirus (COVID-19). We are asking people who are currently pregnant or their partner is pregnant or who have become a parent in the last 6 months to take part in this study. *This study is open to men and women who are residents of the UK and who are 18 years of age or older.*

What will happen if I take part?

If you decide to take part, you will be asked to complete a short online survey asking about different experiences you may have had during pregnancy or early parenthood during COVID-19. The survey should not take longer than 10 minutes to complete. We will not ask you to provide any individually identifying information (such as your name or email address).

Do I have to take part?

There is no obligation for you to take part and your decision will not disadvantage you in any way. Importantly, even if you do decide to take part, you can stop at any time without needing to give a reason. If you exit the survey without clicking on the submit button, we will understand that you would like to withdraw your participation and your data will be securely deleted.

What are the possible disadvantages to taking part?

We do not anticipate any risk of taking part in this study, however, sometimes it can feel difficult to share your experiences. You do not have to share anything that makes you uncomfortable and you are free to skip any questions that you do not wish to answer. You are free to exit the survey at any time. A list of mental health resources will be provided at the end of the survey should you wish to access confidential support.

What are the possible benefits of taking part?

Your participation will help us learn about how pregnancy and early parenthood is experienced during times of change and uncertainty and understand how we can best support new parents and those who were expecting a baby during COVID-19.

What will happen to the information you collect?

The information may be used for scientific presentations and publications. Your information will be kept private and confidential.

The information you provide will be stored securely for up to a maximum of 10 years. Due to the anonymous nature of the questionnaire, it will not be possible to withdraw your data after you click the submit button.

Ask questions!

If you have any questions, please feel free to email the research team at the details above.

If you decide to take part and feel, either during or after your participation, that you have been treated unfairly or would like to raise a complaint you can contact the study's Principal Investigator, Dr Alejandra Perez (alejandra.perez@annafreud.org).

Should you feel that your complaint has not been handled to your satisfaction, please contact the Chair of the UCL Research Ethics Committee (ethics@ucl.ac.uk).

Data Protection Privacy Notice:

The data controller for this project will be University College London (UCL). The UCL Data Protection Office provides oversight of UCL activities involving the processing of personal data, and UCL's Data Protection Officer can be contacted at data-protection@ucl.ac.uk.

If you are concerned about how your personal data is being processed, please contact UCL in the first instance at data-protection@ucl.ac.uk. If you remain unsatisfied, you may wish to contact the Information Commissioner's Office (ICO).

Supplement 3. Details of quantitative analysis

Quantitative study variables.

Participant characteristics including gender, age, expectant/new parent status, previous parent experience, work situation, income, accommodation, and location in the UK were included as candidate covariates for variable selection. Details of participant characteristics are included in Supplement 1. A summary of study highlights is included in Supplement 4.

Statistical modelling.

Variables of interest were grouped into 4 different themes:

- 1) Support – models for this theme included the following variables: current support from partners, friends and family, the change in support from partners, friends and family since COVID-19. Change in support is calculated by scoring the ordered categories in the current and prior support variables from 1 to 4, with 1 indicating no support and 4 indicating highly supported, and deducting prior from current support, giving a number between -3 to 3, with negative values indicating a decrease in support.
- 2) Physical contact – models for this theme included the following variables: worries about having physical contact with others in the household, avoiding contact with others in the household, and missing physical contact more generally.
- 3) Use of media – models for this theme included the following variables: preference of connecting with others online, frequency of looking at social media, frequency of looking at news, frequency of searching for reliable health information, and finding a reliable source of health information.
- 4) Stress events – models for this theme included a cumulative number of stress events experienced (out of a total of 11) and the four most frequently reported stress events: having to isolate from friends / family members, having to attend hospital / GP appointments on their own, having difficulty accessing medicine, groceries or other essential items, and losing access to childcare.

Two outcomes were examined: change in mood since COVID-19 and impact of COVID-19 on confidence in parenting. Change in mood is calculated by scoring the ordered categories in the current and prior mood variables from 1 to 5, with 1 indicating very sad and 5 indicating very happy, and deducting prior from current mood, giving a number between -4 to 4, with negative values indicating a decrease in mood. Mood prior to COVID-19 was included as a covariate when modelling change in mood as it is correlated and therefore needs to be controlled for.

Models were fit using linear regression or proportional odds modelling depending on whether the outcome was continuous or ordinal respectively.

For each outcome, a model was fit using just covariates, to identify possible associations with demographic variables.

Models were then fit including a single themed group of factors, controlling for the covariates. Variable selection used stepwise methods, minimizing Akaike information criteria (AIC). As this analysis was based on a convenience sample and was exploratory in nature, we did not use any post hoc correction as the additional rigor is disproportionate.

Change of mood since COVID-19.

All models of mood changes were multiple linear regression models, with mood change coded as a scale variable taking values between -4 and 4. This was calculated by scoring both previous and current mood from 1 to 5 (with 1 indicating “Very sad” and 5 indicating “Very happy”), and deducting previous mood from current mood.

Effect sizes were interpreted as the average change in mood associated with changes in the appropriate variable of interest. A positive effect means an increase in the average change in mood as the variable increases. A negative effect is a decrease in the average change in mood as the variable increases. For example, a change of mood of one level could indicate an increase from 1 to 2 (a stronger increase in happiness) or from -2 to -1 (remaining sad, but less so).

Only 24 responses indicated an improvement in mood since COVID-19, so in general, positive associations most often relate to participants remaining sad, but less so.

All models of mood changes included the happiness before COVID-19 as a covariate because this was highly correlated with mood change (for example, consider that your mood cannot worsen if it is already poor).

Confidence in parenting since COVID-19.

All models of confidence in parenting were proportional odds models and effect sizes indicated the change in odds associated with the variable of interest. In models where previous parenting experience was a variable selected in the model, the proportional odds assumption was violated (as determined using the Brant test). Partial proportional odds models were fit when this occurred. Since we were seeking potential associations and not inferring effects, and the conclusions did not change, we reported the proportional odds conclusions, since they were robust to the violation.

Supplement 4. Study highlights

% of total respondents (n)	
53.5 (312/583)	Reported that the experience of COVID-19 will influence their (future) parenting
74.8 (439/587)	Reported missing physical contact with others 'a lot' or 'a great deal' since COVID-19
87.6 (517/590)	Reported feeling more worried about going to hospital/medical appointments or home visit since COVID-19
73.9 (434/587)	Reported feeling more worried about baby's health since COVID-19
69.3 (409/590)	Reported feeling more worried about their own health since COVID-19
84.1 (481/572)	Found connecting with others online less preferable than face-to-face since COVID-19
75.0 (439/585)	Reported looking at social media more often since COVID-19
69.5 (408/587)	Reported looking at the news more often since COVID-19
64.9 (377/581)	Reported searching for reliable health information more often since COVID-19
61.2 (334/546)	Indicated that they had found a reliable source of health information (majority reported NHS)
91.2 (538/590)	Reported isolating from friends / family members
78.1 (461/590)	Reported attending hospital / GP appointments on their own*
50.5 (298/590)	Reported having difficulty accessing medicine, groceries or other essential items*
33.4 (197/590)	Reported losing access to childcare*
68.0 (401/590)	Reported a drop in mood since COVID-19*
72.9 (422/579)	Reported feeling highly supported by partner since COVID-19
11.6 (67/577)	Reported a reduction in partner support since COVID-19
35.4 (208/588)	Reported feeling highly supported by family since COVID-19
43.5 (254/584)	Reported a reduction in family support since COVID-19
21.6 (126/584)	Reported feeling highly supported by friends since COVID-19
49.6 (287/579)	Reported a reduction in support from friends since COVID-19

Table 4.1: Study highlights

* Four most commonly reported stress events

Supplement 5. Model summaries

Model summaries for change in mood since COVID-19 are presented below. Mood prior to COVID-19 was highly associated with mood change in all models since it is obviously correlated (e.g. your mood cannot decrease if your prior mood is at the lowest point of the measure). Of the demographic covariates, positive associations with income and accommodation and negative associations with being pregnant were detected in some models.

Coefficients	Estimate	Std error	T value	<i>p</i>
Missing physical contact	-0.15	0.03	-4.40	< 0.0001
Avoiding physical contact	-0.22	0.09	-2.39	0.017
Income	0.04	0.02	1.71	0.088
accommodation	0.07	0.04	1.52	0.13
Pregnant	-0.14	0.07	-1.93	0.054
Mood prior to COVID-19	-0.75	0.04	-16.81	< 0.0001

Table 5.1: Model of change in mood since COVID-19 and physical contact
Overall model fit $F(6, 576) = 55.94$, $p < 0.0001$, $R^2 = 0.37$

Coefficients	Estimate	Std error	T value	<i>p</i>
Frequency of searching for reliable health information	-0.12	0.07	-1.76	0.079
Not finding reliable health information	-0.30	0.08	-3.92	< 0.0001
No previous parenting experience	-0.10	0.07	-1.30	0.19
Income	0.05	0.02	1.97	0.050
Mood prior to COVID-19	-0.78	0.05	-16.58	< 0.0001

Table 5.2: Model of change in mood since COVID-19 and use of media
Overall model fit $F(5, 533) = 57.92$, $p < 0.0001$, $R^2 = 0.35$

Coefficients	Estimate	Std error	T value	<i>p</i>
Total stress events experienced	-0.06	0.04	-1.56	0.12
Difficulty finding essentials	-0.27	0.08	-3.25	0.0012
Income	0.05	0.02	2.40	0.017
Mood prior to COVID-19	-0.79	0.04	-17.93	< 0.0001

Table 5.3: Model of change in mood since C-19 and stress events
Overall model fit $F(4, 585) = 83.79$, $p < 0.0001$, $R^2 = 0.36$

Coefficients	Estimate	Std error	T value	<i>p</i>
Support from partner since COVID-19	0.16	0.06	2.66	0.0076
Support from friends since COVID-19	0.16	0.06	2.73	0.0065
Change in support from friends since COVID-19	-0.09	0.06	-1.45	0.15
Support from family since COVID-19	0.23	0.05	4.24	< 0.0001
Income	0.05	0.02	2.22	0.027
Accommodation	0.08	0.04	1.84	0.067
Pregnant	-0.21	0.07	-2.88	0.0041
Mood prior to COVID-19	-0.83	0.05	-17.31	< 0.0001

Table 5.4: Model of change in mood since COVID-19 and support
Overall model fit $F(8, 553) = 47.00$, $p < 0.0001$, $R^2 = 0.40$

Supplement 6. Counts for qualitative themes

Theme	Count
1. Decreased support	
Pregnant group	252
Parent group	181
Both groups	433
2. Loss	
Pregnant group	150
Parent group	132
Both groups	282
3. Worry	
Pregnant group	79
Parent group	59
Both groups	138
4. Having to be at home	
Pregnant group	80
Parent group	51
Both groups	131
5. Uncertainty during pregnancy	
Pregnant group	45
Parent group	3
Both groups	48
6. Practical difficulties	
Pregnant group	19
Parent group	5
Both groups	24
7. Unreliable information	
Pregnant group	10
Parent group	1
Both groups	11

Table 6.1: Theme counts for what was “hardest” during lockdown

Theme	Count
1. Support from others	
Pregnant group	137
Parent group	67
Both groups	204
2. More time	
Pregnant group	83
Parent group	102
Both groups	185
3. Technology	
Pregnant group	59
Parent group	44
Both groups	103
4. No pressure	
Pregnant group	45
Parent group	38
Both groups	83
5. Nothing	
Pregnant group	42
Parent group	11
Both groups	53

Table 6.2: Theme counts for what was “most helpful” during lockdown

Theme	Count
1. Hygiene and restrictions of socialising	
Pregnant group	117
Parent group	52
Both groups	169
2. Independent and confident parenting	
Pregnant group	30
Parent group	45

Both groups	75
3. Not taking things for granted	
Pregnant group	27
Parent group	21
Both groups	48
4. Decrease in ability to parent	
Pregnant group	31
Parent group	10
Both groups	41
5. Worries about impact on mental health and well-being	
Pregnant group	13
Parent group	9
Both groups	22
6. Slowing down	
Pregnant group	12
Parent group	8
Both groups	20

Table 6.3: Theme counts for “influence on future parenting/parenting”

Supplement 7. Qualitative submissions

Theme	Examples of submissions assigned to each theme
1. Decreased support	
Pregnant group	<p><i>from partner:</i> “I have my 12-week scan next week and my husband can't come with me (due to hospitals Covid instructions) and this made me very anxious. If something is not right at the scan, I won't have anyone there with me to support me. This has made me really anxious and since I'm working from home and am deprived of normal social interactions and distractions, it has played on my mind constantly.”</p> <p><i>from healthcare:</i> “Fewer antenatal appointments, 36 week scan was cancelled - so worried about quality of care and whether issues with my pregnancy may be being missed.”</p> <p><i>for childcare:</i> “We live far away from family and have no one to look after our 2 year old when I have the new baby. The original plan was for family to stay and support us. Also having to look after my toddler whilst working remotely as a teacher whilst my husband also works from home has been extremely tiring and I have felt a lot of guilt about the amount of TV she has watched...”</p>
Parent group	<p><i>from family:</i> “Not having the extra support of having family here to help with our toddler and to be able to come and see the baby.”</p> <p><i>from healthcare:</i> “Lack of midwife/medical support, to be able to ask questions when you aren't certain of things. Baby having a medical condition, but not having the medical support. Having specialist appointments cancelled without being told. Having to chase for appointments to be made, where they would usually be made automatically. Not being able to attend clinics for reassurance.”</p> <p><i>from postnatal groups:</i> “Not being able to meet up with other parents and go to baby groups - a lot of anecdotal knowledge is shared in these situations, which I'm definitely missing.”</p>
2. Loss	
Pregnant group	<p><i>missing out on markers:</i> “Being alone, missing out on first time mum things, like seeing friends, enjoying last weeks of pregnancy, no baby shower/celebrations, not getting to ‘show off’ bump. Have some family members that I haven't seen whilst being visibly pregnant, going out to choose baby items.”</p> <p><i>birth choice:</i> “Have lost my midwife and am no longer able to have a home birth - now will be in hospital.”</p> <p><i>of seeing friends and family:</i> “It's really hard to get excited about pregnancy when all the special moments that you want to share with your friends and partner can't really happen. I imagined holding his hand looking at our first scan together. Doing it alone just feels lonely and sad.”</p>
Parent group	<p><i>of seeing friends and family:</i> “Not seeing family - neither set of grandparents have met their grandchild.”</p>
3. Worry	
Pregnant group	<p><i>about contracting COVID-19:</i> “Very lonely, rather than enjoying your pregnancy you're worried the entire time because the thought of getting it takes over, especially when there isn't enough research to show how it affects pregnant women and their babies.”</p>
Parent group	<p><i>about contracting COVID-19:</i> “Worrying about what will happen to our children if my husband and I get COVID-19 and will need to be in hospital at the same time. We have no immediate family nearby and who is going to take in a couple of children who might carry Coronavirus? This thought fills me with dread.”</p> <p><i>impact of social isolation on baby's development:</i> “Lack of social interactions with family, friends and wider community, which, besides being important for my baby's social development, is affecting my mood (and my mood might affect my motherhood).”</p> <p><i>financial worries:</i> “My partner has been furloughed and I am on maternity pay so our income has decreased dramatically and we are struggling.”</p>
4. Having to be at home	
Pregnant group	<p>“Not being able to go places in the car that lift my spirits, such as the beach, for lunches out, etc as I can't walk far from my house being so heavily pregnant with sciatica.”</p>

Parent group	"Socially isolated from everyone and therefore feeling overwhelmed with the responsibility of looking after my baby."
5. Uncertainty during pregnancy	
Pregnant group	"Not knowing what's happening, will I have to give birth alone? Will we be ok?"
Parent group	"Not seeing my parents and the uncertainty about when we will be seeing them (they live abroad) when they will finally meet their granddaughter."
6. Practical difficulties	
Pregnant group	"Difficulty getting baby supplies, organising what will happen when I go into labour."
Parent group	"Initially buying formula as everyone went crazy bulk buying and there was none in the shops."
7. Unreliable information	
Pregnant group	"Conflicting information and news reporting is extremely confusing and health professionals are often only able to cite the basic government advice which doesn't feel substantial."
Parent group	"It was difficult finding good information at first. For example, we weren't sure whether to go ahead with her 16 week vaccinations and I couldn't find any information online. However, that has now changed."

Table 7.1: Examples of submissions assigned to "hardest part" themes

Theme	Examples of submissions assigned to each theme
1. Support from others	
Pregnant group	<i>from partner:</i> "Talking to my partner." <i>from healthcare:</i> "My partner and all the telephone appointments from doctors/midwives. Never felt let down by them."
Parent group	<i>from partner:</i> "Having my partner at home more during the day to help with the baby." <i>from healthcare:</i> "Having healthcare professionals still engaging and checking we're ok via phone calls."
2. More time	
Pregnant group	"Being at home & having time to prepare for baby."
Parent group	"More attention on baby and being able to get into a good routine with no interruptions. Also dad not missing out on any developmental stages as working from home."
3. Technology	
Pregnant group	<i>availability of online resources:</i> "How many things have gone online." <i>online information:</i> "RCOG guidelines are clear and have evidence written in a clear way to support, have helped reassure me and I used these to insist on a risk assessment for work." <i>social media:</i> "Technology and Wi-Fi! Being able to send updates. Being able to create a group to network with local mums to be."
Parent group	<i>live communication:</i> "Access to digital technology (Skype, Zoom, WhatsApp etc) that have enabled me to keep in touch with family, particularly video calls so that they can see how our baby is growing even if they can't see her in person."
4. No pressure	
Pregnant group	"Not feeling pressured to go outside/do things."
Parent group	"Not having the pressure to be anywhere or see people is fairly helpful when you've not slept, feel exhausted and can't manage to get dressed!"
5. Nothing	
Pregnant group	"nothing"
Parent group	"nothing"

Table 7.2: Examples of submissions assigned to "most helpful" themes

Theme	Examples of submissions assigned to each theme
1. Hygiene and restrictions of socialising	
Pregnant group	"Unlikely to allow people to touch my newborn."
Parent group	"It will make me more paranoid of others holding my baby. I am also more of a germaphobe."
2. Independent and confident parenting	

Pregnant group	"Having to trust my instincts in the absence of additional support, so think it will make me more confident and resilient."
Parent group	"I think it has made me feel more capable. I've had to learn to trust my own judgment and instincts."
3. Not taking things for granted	
Pregnant group	"It has really shown me not to take things for granted whereas before I may have not met up with family enough etc. We will be making a great point to ensure that all family connections are high, and this is passed to baby."
Parent group	"I'll never take for granted having help with the baby from family again."
4. Decrease in ability to parent	
Pregnant group	"Scared to go out. Panic attacks."
Parent group	"I'm terrified to bring baby anywhere. I feel like a terrible parent."
5. Worries about impact on mental health and well-being	
Pregnant group	"I think I'll be quite anxious when the baby is born. My stress does impact on my parenting and I feel less patient."
Parent group	"I am a more anxious parent so may be more overprotective."
6. Slowing down	
Pregnant group	"Potentially move house and to a slower pace of life more family time orientated instead of making money to do expensive holidays to get that time."
Parent group	"It has helped me slow down and bond with my children."

Table 7.3: Examples of submissions assigned to "influence on future parenting/parenting" themes

Supplement 8. Data synthesis for parental mood and confidence

Quantitative Findings	Qualitative Themes
Missing physical contact	Loss
Avoiding physical contact	Loss
Not finding reliable health information	Unreliable/inconsistent information
Difficulty in finding essentials	Practical difficulties
Being pregnant	Uncertainty during pregnancy
High current partner support	Support from others/Decreased support
High current friends' support	Support from others/Decreased support
Increase in family support	Support from others/Decreased support

Table 8.1: Matching quantitative findings for mood with qualitative themes

Quantitative Findings	Qualitative Themes
Missing physical contact	Loss
Increase in searching for reliable health information	Unreliable/inconsistent information
Difficulty in finding essentials	Practical difficulties
Losing childcare	Independent and confident parenting
Increase in family support	Support from others/decreased support
Being pregnant	Uncertainty during pregnancy

Table 8.2: Matching quantitative findings for confidence in parenting with qualitative themes

Supplement 9. Fisher's exact test and counts for loss of childcare

	First baby/pregnancy	Not first baby/pregnancy
Facilitator	20	11
Barrier	9	36

Table 9.1: Previous parent experience counts for loss of childcare as a barrier or facilitator

Fisher's exact test OR = 7.05, 95% CI 2.31 – 23.45, $p = 0.0001$

	Parent	Expectant parent (pregnant)
Facilitator	25	6
Barrier	20	25

Table 9.2: Parent and expectant parent counts for loss of childcare as a barrier or facilitator

Fisher's exact test OR = 5.09, 95% CI 1.63 – 18.24, $p = 0.0020$