





OPEN ACCESS

# Impact of the SARS-CoV-2 pandemic on access to contraception and pregnancy intentions: a national prospective cohort study of the UK population

Neerujah Balachandren <sup>1</sup>, Geraldine Barrett <sup>2</sup>,  
Judith M Stephenson,<sup>2</sup> Ephia Yasmin,<sup>1</sup> Dimitrios Mavrelos,<sup>1</sup>  
Melanie Davies,<sup>1</sup> Anna David,<sup>2</sup> Jennifer Anne Hall<sup>2</sup>

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/bmjsh-2021-201164>).

<sup>1</sup>Reproductive Medicine Unit, University College London Hospitals NHS Foundation Trust, London, UK

<sup>2</sup>EGA Institute for Womens Health, University College London Medical School, London, UK

## Correspondence to

Dr Jennifer Anne Hall, Reproductive Health Research, University College London, London, UK; [jennifer.hall@ucl.ac.uk](mailto:jennifer.hall@ucl.ac.uk)

Received 21 April 2021

Accepted 18 September 2021

Published Online First

21 October 2021



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Balachandren N, Barrett G, Stephenson JM, et al. *BMJ Sex Reprod Health* 2022;**48**:60–65.

## ABSTRACT

**Objective** Evaluate the impact of the COVID-19 pandemic on access to contraception and pregnancy intentions.

**Design** Nationwide prospective cohort study.

**Setting** United Kingdom.

**Participants** Women in the UK who were pregnant between 24 May and 31 December 2020.

**Main outcome measures** Access to contraception and level of pregnancy intentions, using the London Measure of Unplanned Pregnancy (LMUP) in women whose last menstrual period was before or after 1 April 2020. While the official date of the first UK lockdown was 23 March, we used 1 April to ensure that those in the post-lockdown group would have faced restrictions in the month that they conceived.

**Results** A total of 9784 women enrolled in the cohort: 4114 (42.0%) conceived pre-lockdown and 5670 (58.0%) conceived post-lockdown. The proportion of women reporting difficulties accessing contraception was higher in those who conceived after lockdown (n=366, 6.5% vs n=25, 0.6%, p<0.001) and continued to rise from March to September 2020. After adjusting for confounders, women were nine times more likely to report difficulty accessing contraception after lockdown (adjusted odds ratio (aOR) 8.96, 95% CI 5.89 to 13.63, p<0.001). There is a significant difference in the levels of pregnancy planning, with higher proportions of unplanned (n=119, 2.1% vs n=55, 1.3%) and ambivalent pregnancies (n=1163, 20.5% vs n=663, 16.1%) and lower proportions of planned pregnancies (n=4388, 77.4% vs n=3396, 82.5%) in the post-lockdown group (p<0.001). After adjusting for confounders, women who conceived after

## Key messages

- The study provides direct evidence of the impact of the COVID-19 pandemic on access to contraception and unplanned pregnancies in the UK.
- According to the women in our study, access to contraception in the UK has become harder during the COVID-19 pandemic and the proportion of unplanned pregnancies has almost doubled.
- Despite the introduction of new policies and practices by contraception and abortion service providers during the first lockdown, women continued to report ongoing difficulties in accessing contraception, leading to unplanned pregnancies.

lockdown were still significantly less likely to have a planned pregnancy (aOR 0.88, 95% CI 0.79 to 0.98, p=0.025).

**Conclusions** Access to contraception in the UK has become harder during the COVID-19 pandemic and the proportion of unplanned pregnancies has almost doubled.

## INTRODUCTION

Predictions have been made about higher rates of unintended pregnancy, unsafe abortion, short inter-pregnancy intervals, and untreated sexually transmitted infections as indirect consequences of the COVID-19 pandemic.<sup>1 2</sup> Previous public health emergencies have shown that the impact of a pandemic on sexual and

reproductive health (SRH) often goes unrecognised.<sup>3</sup> The strain that the outbreak imposes on health systems will undoubtedly impact the provision of many services. However, a well-organised, well-resourced and prepared health system should be able to balance the demands of responding directly to the pandemic, while simultaneously providing equitable access to essential services.<sup>3</sup>

Policymakers, commissioners and service providers need reliable information about the impact of the pandemic on reproductive health outcomes, so that decisions regarding these essential services are underpinned by knowledge and scientific evidence. In March 2020, the UK Government implemented a national lockdown which stipulated severe restrictions on social contact.<sup>4</sup> Staff redeployment and sickness led to some SRH clinics being closed and face-to-face appointments being reduced.<sup>5</sup> The consequent reduction in access to services, in addition to fear, misinformation and limitations to movement, are likely to have had an impact on women's access to SRH services.<sup>5–8</sup>

To understand the impact of the COVID-19 pandemic on women's access to contraception in the UK, levels of unplanned pregnancy and pregnancy outcomes we undertook a prospective national community-based survey of pregnant women. In this article we present our analysis of the effect of the pandemic on UK women's access to contraception and level of pregnancy intention using data collected at baseline.

## METHODOLOGY

### Study design and settings

The COVID-19 Contraception and Pregnancy Study (CAP-COVID) is an ongoing longitudinal cohort study of pregnant women in the UK which began in May 2020. Eligible participants were aged 18 years or over and were pregnant at the time of registration. They could be at any stage in their pregnancy, even if they were undecided about continuing the pregnancy.

Women were invited to take part in the study through social media advertising which ensured that we recruited participants from across the UK. Those interested in participating were directed to the study website (<https://cap-covid.uk>). Study participants provided informed consent and completed an online baseline registration questionnaire (see online supplementary 1) followed by further online surveys at the end of each trimester of their pregnancy. In this analysis we included all women who completed the registration survey regardless of whether or not they completed any of the follow-up surveys.

### Clinical and sociodemographic data

Demographic data, including age, ethnicity and postcode, were collected in the baseline registration survey along with information regarding the women's current and previous pregnancy outcomes and medical history. We grouped participants based

on whether they conceived before or after lockdown using their last menstrual period (LMP) date where available. Those with LMP before 1 April 2020 were classified as 'pre-lockdown' and those with LMP on/after 1 April 2020 were classified as 'post-lockdown'. While the first national lockdown in the UK officially started on 23 March 2020, there were limits to movement and access to general practitioner (GP) services were restricted from 16 March. Therefore, we used an LMP of 1 April 2020 to ensure that those in the post-lockdown group would have faced restrictions in the month that they conceived. For participants who were unsure about their LMP, we calculated it using their expected due date or using their approximate gestational age in weeks.

### Access to contraception and pregnancy intentions

To understand the impact of the COVID-19 pandemic on access to contraception in the UK we asked participants if they had tried to access contraception in the 3 months before conception and, if so, whether they had found it more or less difficult to access contraception than usual, or whether they found no difference.

We used the London Measure of Unplanned Pregnancy (LMUP) to assess the degree of intention of their current pregnancy. The LMUP is a psychometrically validated measure of the degree of intention/planning of a current or recent pregnancy.<sup>9 10</sup> The All Party Parliamentary Group on SRH in the UK stated "the best outcome measure to assess access to contraception would consider unintended pregnancy", and that "the LMUP provides a more accurate understanding of pregnancies and pregnancy intentions".<sup>6</sup> The LMUP comprises six questions covering contraceptive use, pregnancy timing, intentions, desire, partner influence, and preparation.<sup>11</sup> Each question is scored 0, 1 or 2, which is summed to create a score of 0–12, with higher scores reflecting higher levels of pregnancy intention. For population level estimates, pregnancies scoring 0–3 are considered unplanned, 4–9 are considered ambivalent and 10–12 are considered planned.<sup>10</sup>

### Sample size

The sample size calculation was powered for the primary outcomes of the CAP-COVID study (miscarriage and preterm birth rates). We calculated that we would need to recruit 1400 women in the first trimester to detect a 5% increase in the rate of early miscarriage (25% vs 20%) and 3800 women in the second trimester to detect a 2% increase in the rate of preterm labour (9% vs 7%) at a two-sided alpha level of 0.05% and 90% power. We expected 20% loss to follow-up leading to a minimum sample size of 6240.

### Statistical analysis

We used the Chi-squared and Mann–Whitney U tests to compare baseline demographics and contraception access between the pre- and post-lockdown groups.

For variables with missing data, we used case-wise deletion. We compared median LMUP scores using the Mann–Whitney U test and used the Kruskal–Wallis test to compare median LMUP scores by reported level of difficulty accessing contraception.

We created two multivariable logistic regression models, one for reporting difficulty in accessing contraception as a binary outcome (yes/no) by conception pre/post lockdown, and the second for having a planned pregnancy as binary outcome (LMUP score  $>9/\leq 9$ ) by reported difficulty accessing contraception. Both models were adjusted for age, parity and ethnicity, as these are factors known to influence pregnancy intention. We used Stata version 15 and IBM SPSS Statistics for Windows version 27.0. for all analyses.

### Patient and public involvement

The CAP-COVID study occurred under tight financial and time constraints in response to a perceived sense of urgency after concerns were raised by women and health professionals regarding access to SRH services, so we were unable to launch the study with the benefit of a patient and public involvement process.

## RESULTS

### Study participants

Between 24 May 2020 and 31 December 2020, 10 530 women consented and 9784 women completed the registration survey. Of these women, 4114 (42.0%) conceived pre-lockdown and 5670 (58.0%) conceived post-lockdown. Demographic and baseline characteristics are shown in [table 1](#).

Participants in the post-lockdown group were younger (median age 32 (IQR 29–35) vs 33 (IQR 30–35) years,  $p<0.001$ ). The proportion of pregnant women who had had previous pregnancies was higher in the post-lockdown group ( $n=3520$ , 62.1% vs  $n=2284$ , 55.5%,  $p<0.001$ ) and the proportion of women from Black, Asian and minority ethnic (BAME) groups was lower ( $n=335$ , 5.9% vs  $n=343$ , 8.3%,  $p<0.001$ ).

### Outcomes

#### Access to contraception

The percentage of women who reported difficulty in accessing contraception was higher in the post-lockdown group than the pre-lockdown group ( $n=366$ , 6.5% vs  $n=25$ , 0.6%,  $p<0.001$ ) ([table 1](#)). [Figure 1](#) illustrates the trend in the percentage of women reporting difficulty accessing contraception by the month of LMP, with a steep, statistically significant rise from April 2020.

In the unadjusted analysis, women were eleven times more likely to report difficulty accessing contraception after lockdown compared with pre-lockdown (odds ratio (OR) 11.29, 95% CI 7.51 to 16.96,  $p<0.001$ ). Adjusting for age, previous pregnancy status, ethnicity and pregnancy intention showed that women were

**Table 1** Demographic details, access to contraception and London Measure of Unplanned Pregnancy scores

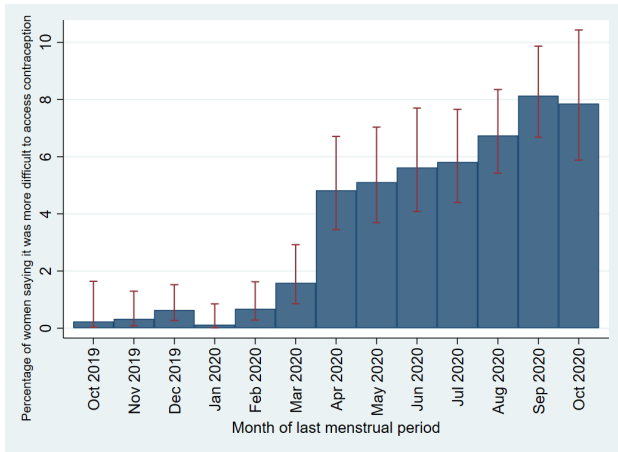
Characteristic	Pre-lockdown (n=4114) (n (%))	Post-lockdown (n=5670) (n (%))	P value
Median age (IQR) (years)	33 (30–35)	32 (29–35)	<0.001
Previous pregnancies			<0.001
No previous pregnancies	1830 (44.5)	2150 (37.9)	
Previous pregnancies	2284 (55.5)	3520 (62.1)	
Ethnicity			<0.001
White	3580 (87.0)	5021 (88.6)	
Black/African/Caribbean/Black British	34 (0.8)	32 (0.6)	
Asian/Asian British	143 (3.5)	130 (2.3)	
Mixed/multiple ethnic group	124 (3.0)	125 (2.2)	
Other	42 (1.0)	48 (0.8)	
Did not disclose	191 (4.6)	314 (5.5)	
Geographical location			<0.001
Wales	181 (4.4)	334 (5.9)	
Scotland	240 (5.8)	441 (7.8)	
Northern Ireland	69 (1.7)	118 (2.1)	
London	867 (21.1)	771 (13.6)	
Greater London	80 (1.9)	104 (1.8)	
East of England	385 (9.4)	549 (9.7)	
East Midlands	273 (6.6)	414 (7.3)	
North East	274 (6.7)	393 (6.9)	
North West	339 (8.2)	518 (9.1)	
South East	550 (13.4)	804 (14.2)	
South West	361 (8.8)	513 (9.0)	
West Midlands	298 (7.2)	375 (6.6)	
Undisclosed	197 (4.8)	336 (5.9)	
Access to contraception			<0.001
More difficult than usual	25 (0.6)	366 (6.5)	
Less difficult than usual	11 (0.3)	20 (0.4)	
About the same as usual	757 (18.4)	917 (16.2)	
Not trying to access contraception	3321 (80.7)	4367 (77.0)	
Median total LMUP score (IQR)	11 (10–12)	11 (10–12)	<0.01
Pregnancy intentions			<0.01
Unplanned pregnancies (total LMUP score 0–3)	55 (1.3)	119 (2.1)	
Ambivalent (total LMUP score 4–9)	663 (16.1)	1163 (20.5)	
Planned pregnancies (total LMUP score 10–12)	3396 (82.5)	4388 (77.4)	

IQR, interquartile range; LMUP, London Measure of Unplanned Pregnancy.

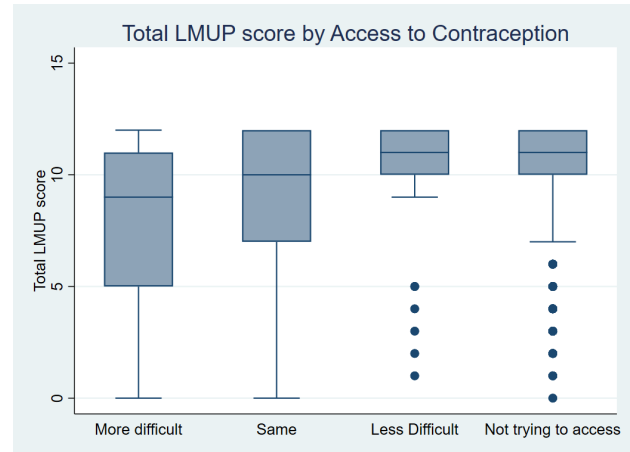
nine times more likely to report difficulty accessing contraception after lockdown compared with pre-lockdown (adjusted odds ratio (aOR) 8.96, 95% CI 5.89 to 13.63,  $p<0.001$ ) ([table 2](#)).

#### Pregnancy intention

The median LMUP score was the same in the pre- and post-lockdown groups (11 (IQR 10–12)); however,



**Figure 1** Percentage of women reporting difficulty accessing contraception by month of last menstrual period between October 2019 and October 2020.



**Figure 2** Total London Measure of Unplanned Pregnancy (LMUP) scores by access to contraception.

there is a significant difference in the distribution of the scores, with higher proportions of unplanned ( $n=119$ , 2.1% vs  $n=55$ , 1.3%) and ambivalent pregnancies ( $n=1163$ , 20.5% vs  $n=663$ , 16.1%) and lower proportions of planned pregnancies ( $n=4388$ , 77.4% vs  $n=3396$ , 82.5%) in the post-lockdown group ( $p<0.001$ ) (table 1).

Figure 2 shows the distribution of LMUP scores in those accessing contraception. Women reporting more difficulty accessing contraception had a lower median LMUP score (9, ie, more unplanned) compared with those reporting easier to access or same as usual (11 and 10, respectively) ( $p<0.001$ ).

Unadjusted analysis showed that women were 28% less likely to have a planned pregnancy after lockdown (OR 0.72, 95% CI 0.65 to 0.80,  $p<0.001$ ) (table 2). After adjusting for differences in age, ethnicity, parity and ability to access contraception, women who conceived after lockdown were still significantly less

likely to have a planned pregnancy (aOR 0.88, 95% CI 0.79 to 0.98,  $p=0.025$ ) (table 2).

## DISCUSSION

This is the first UK study to assess changes in women's self-reported access to contraception as a consequence of the COVID-19 pandemic. Access to contraception has become harder since the first national UK COVID-19 pandemic lockdown of March 2020 and has continued to worsen over the time studied. Our data may not have captured the women who were not planning to continue their pregnancy but there appears to be an almost doubling in the proportion of unplanned pregnancies.

We do not have information on why women found it harder to access contraception; however, a recent online study from Scotland reported several factors impacting access to contraception during the COVID-19 pandemic.<sup>12</sup> These include a lack of clarity about the legitimacy of trying to access SRH services during a pandemic, uncertainty about which SRH services are still available, limited GP appointments, challenges to contraceptive prescribing, and closure of usual points of access to free condoms within community settings.<sup>12</sup>

During the COVID-19 pandemic, many countries recognised the need for continuing contraception provision and implemented new practices and policies to deliver this. In the UK, the Faculty of Sexual & Reproductive Healthcare acted rapidly to provide guidance to healthcare professionals and commissioners to ensure that high standards in SRH care could be maintained throughout the duration of the COVID-19 pandemic.<sup>13</sup> The UK saw a significant shift to telemedicine along with remote prescription for the progestogen-only-pill and combined contraceptive pill for up to a year compared with the usual 3–6 months. Many maternity services also worked to improve the postnatal contraception provision available in hospitals. In England, Scotland and Wales,

**Table 2** Results of logistic regressions for (A) reporting difficulty accessing contraception by pre/post lockdown conception and (B) or having a planned pregnancy by difficulty accessing contraception

Parameter	OR	95% CI		P value
		Lower	Upper	
Difficulty accessing contraception (yes/no)				
Unadjusted OR post-lockdown	11.29	7.51	16.96	<0.001
Adjusted OR post-lockdown	8.96	5.89	13.63	<0.001
Planned pregnancy pre- vs post-lockdown (LMUP score >9)				
Unadjusted OR post-lockdown:	0.72	0.65	0.8	<0.001
Adjusted OR post-lockdown	0.88	0.79	0.98	0.025

CI, confidence interval; LMUP, London Measure of Unplanned Pregnancy; OR, odds ratio.

abortion regulations were changed to allow medical termination of pregnancy at home supported by tele-medicine. Despite these changes, we have shown a steep increase in the proportion of women reporting difficulty in accessing contraception between March and April 2020.

The overall annual cost of unplanned pregnancies in England, including those ending in births or abortions, was estimated as £193 million in 2010.<sup>14</sup> A rise in unplanned pregnancies will increase pressures on already stretched abortion and maternity services. Unplanned births are also associated with negative social and economic outcomes for parents and for their children.<sup>15–17</sup> It is unclear at present what will happen to birth rates following the pandemic.

#### Comparison with other data

Our findings are in keeping with those reported by Marie Stopes International (MSI) who found that more than a third (36%) of UK women were unsure how to access contraception during the COVID-19 pandemic.<sup>8</sup> Increased difficulty in accessing reproductive healthcare is not unique to the UK, with studies from the USA and China also reporting similar findings.<sup>18–20</sup> In the USA, one in six women reported difficulty accessing contraception, with those living in poverty and people of colour disproportionately affected.<sup>19</sup> A Guttmacher survey, also conducted in the USA, found that one in three women had to delay or cancel general SRH care visits, including contraceptive care, due to the pandemic.<sup>20</sup>

#### Strengths and limitations

The simple online study design enabled us to reach a large number of women across the UK in a short period of time. However due to the nature of the study, which intended to follow women through to the outcome of their pregnancy, it is likely that we have not captured those women who were not planning to continue with their pregnancy. We therefore believe that the percentage of unplanned pregnancies reported in this study is an underestimation.

Our cohort was recruited primarily using social media which has been shown to be a more effective and efficient strategy compared with offline, hospital-based methods.<sup>21</sup> However, social media recruitment can yield a less diverse sample.<sup>22</sup> Despite this caveat, our cohort appears to be a good representation of women conceiving in the UK in terms of age, where the highest percentage of conceptions are seen in women aged 30–34 years.<sup>23</sup> We have a very small overrepresentation of white participants in both the pre- and post-lockdown groups (87.0% and 88.6%, respectively) compared with the UK population of white ethnic groups (86%).<sup>24</sup> Given the disproportionate impact that COVID-19 has had on BAME communities, and the fact that our method of recruitment may overrepresent women of higher educational level

and income, we may have underestimated the overall impact on access to contraception and unplanned pregnancies. Further studies with more women from BAME backgrounds are needed.

#### CONCLUSIONS

This is a national study and based on possible comparisons it appears to be representative of women conceiving in the UK. Our study has shown a significant increase in the proportion of women reporting difficulty in accessing contraception since the first national UK COVID-19 pandemic lockdown of March 2020. Given that our data may not have captured those women who were not planning to continue their pregnancy, there may have been at least a doubling in the proportion of unplanned pregnancies. There is an ongoing risk of unplanned pregnancies and births if couples are forced to rely on less effective contraceptive methods. Better planning and resources, and communication with women about service availability, are required to ensure that access to essential services such as these are not disrupted in any future pandemics.

**Contributors** NB conceived and JAH, GB, JMS, EY, DM, MD, AD and NB designed the study. NB and JAH analysed and interpreted the data and drafted the first version of the manuscript. All the authors contributed to, read and approved the final manuscript. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. JAH is the guarantor.

**Funding** This study was supported by a grant from the Elizabeth Garrett Anderson Hospital Charity. The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. JAH is supported by an NIHR Advanced Fellowship. AD is supported by the National Institute for Health Research University College London Hospitals Biomedical Research Centre.

**Competing interests** All authors have completed the ICMJE uniform disclosure form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: support to JAH and AD as declared; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** The University College London (UCL) Ethics Committee approved all data collection (REC ID Number 18251/001). The online surveys and database were hosted on Redcap using the UCL Data Safe Haven platform to meet all GDPR requirements.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available in a public, open access repository. The data relating to this analysis will be made available from the UCL Discovery database linked to the publication record in the UCL Research Publication Service.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others

to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iDs

Neerujah Balachandren <http://orcid.org/0000-0003-3086-5235>  
Geraldine Barrett <http://orcid.org/0000-0002-9738-1051>

#### REFERENCES

- Bateson DJ, Lohr PA, Norman WV. The impact of COVID-19 on contraception and abortion care policy and practice: experiences from selected countries. *BMJ Sex Reprod Health* 2020;46:241–3.
- Riley T, Sully E, Ahmed Z, *et al*. Estimates of the potential impact of the COVID-19 pandemic on sexual and reproductive health in low- and middle-income countries. *Int Perspect Sex Reprod Health* 2020;46:73–6.
- World Health Organization (WHO). COVID-19: operational guidance for maintaining essential health services during an outbreak: interim guidance, 2020. Available: <https://apps.who.int/iris/handle/10665/331561>
- Prime Minister's Office 10 Downing Street. Prime Minister's statement on coronavirus (COVID-19), 2020. Available: <https://www.gov.uk/government/speeches/pm-address-to-the-nation-on-coronavirus-23-march-2020>
- British Association of Sexual Health and HIV (BASHH). BASHH Covid-19 survey, 2020. Available: <https://www.bashh.org/news/news/bashh-covid-19-survey-finds-over-half-of-services-have-been-closed>
- All Party Parliamentary Group on Sexual and Reproductive Health in the UK (APPGSRH). Women's lives, women's rights: strengthening access to contraception beyond the pandemic, 2020. Available: <https://www.fsrh.org/documents/womens-lives-womens-rights-executive-summary/>
- Faculty of Sexual & Reproductive Healthcare (FSRH). FSRH COVID-19 SRH service survey - interim results 07 May 2020, 2020. Available: <https://www.fsrh.org/documents/covid-19-fsrh-survey-interim-results-07-may-2020/>
- Marie Stopes International (MSI). Resilience, adaptation and action: MSI's response to COVID-19, 2020. Available: <https://www.msichoice.org/media/3849/resilience-adaptation-and-action.pdf>
- Barrett G, Smith SC, Wellings K. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. *J Epidemiol Community Health* 2004;58:426–33.
- Hall JA, Barrett G, Copas A, *et al*. London Measure of Unplanned Pregnancy: guidance for its use as an outcome measure. *Patient Relat Outcome Meas* 2017;8:43–56.
- Barrett G, Hall JA. The LMUP in 2020 (English, UK), 2020. Available: <https://measure.ascody.co.uk/docs/LMUP-UK2020.pdf>
- Lewis R, Blake C, Shimonovich M. Disrupted prevention: condom and contraception access and use among young adults during the initial months of the COVID-19 pandemic. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. An online survey. *BMJ Sex Reprod Health* 2021.
- Faculty of Sexual & Reproductive Healthcare (FSRH). Essential services in sexual and reproductive healthcare, 2020. Available: [www.fsrh-position-essential-srh-services-during-covid19-24-march-2020%20\(1\).pdf](http://www.fsrh-position-essential-srh-services-during-covid19-24-march-2020%20(1).pdf)
- Montouchet C, Trussell J. Unintended pregnancies in England in 2010: costs to the National Health Service (NHS). *Contraception* 2013;87:149–53.
- Herd P, Higgins J, Sicinski K, *et al*. The implications of unintended pregnancies for mental health in later life. *Am J Public Health* 2016;106:421–9.
- Barber JS, Axinn WG, Thornton A. Unwanted childbearing, health, and mother-child relationships. *J Health Soc Behav* 1999;40:231–57.
- de La Rochebrochard E, Joshi H. Children born after unplanned pregnancies and cognitive development at 3 years: social differentials in the United Kingdom millennium cohort. *Am J Epidemiol* 2013;178:910–20.
- Li G, Tang D, Song B, *et al*. Impact of the COVID-19 pandemic on partner relationships and sexual and reproductive health: cross-sectional, online survey study. *J Med Internet Res* 2020;22:e20961.
- Lin TK, Law R, Beaman J. The impact of the COVID-19 pandemic on economic security and pregnancy intentions among people at risk of pregnancy. *Contraception*.
- Lindberg LD VA, Mueller J, Kirstein M. Early impacts of the COVID-19 pandemic: findings from the 2020 Guttmacher survey of reproductive health experiences, 2020. Available: <https://www.guttmacher.org/report/early-impacts-covid-19-pandemic-findings-2020-guttmacher-survey-reproductive-health>
- Benedict C, Hahn AL, Diefenbach MA, *et al*. Recruitment via social media: advantages and potential biases. *Digit Health* 2019;5:205520761986722–3.
- Whitaker C, Stevelink S, Fear N. The use of Facebook in recruiting participants for health research purposes: a systematic review. *J Med Internet Res* 2017;19:e290.
- Office of National Statistics (ONS). Birth characteristics in England and Wales: 2017, 2019. Available: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2017#average-ages-of-mothers-and-fathers-of-all-babies-have-continued-to-rise>
- Office of National Statistics (ONS). Ethnicity and national identity in England and Wales: 2011, 2012. Available: <https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/articles/ethnicityandnationalidentityinenglandandwales/2012-12-11>