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ORIGINAL ARTICLE ***Psychology and counselling***

Patient experiences of fertility clinic closure during the COVID-19 pandemic: appraisals, coping and emotions

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STUDY QUESTION: What are appraisals, coping strategies and emotional reactions of patients to coronavirus disease 2019 (COVID-19) fertility clinic closures?

SUMMARY ANSWER: Clinic closure was appraised as stressful due to uncertainty and threat to the attainability of the parenthood goal but patients were able to cope using strategies that fit the uncertainty of the situation.

WHAT IS KNOWN ALREADY: Psychological research on COVID-19 suggests that people are more anxious than historical norms and moderately to extremely upset about fertility treatment cancellation owing to COVID-19.

STUDY DESIGN, SIZE, DURATION: The study was of cross-sectional design, comprising a mixed-methods, English language, anonymous, online survey posted from April 9 to 21 to social media. Eligibility criteria were being affected by COVID-19 fertility clinic closure, 18 years of age or older and able to complete the survey in English. In total, 946 people clicked on the survey link, 76 did not consent, 420 started but did not complete the survey and 450 completed (48% completion, 446 women, four men).

PARTICIPANTS/MATERIALS, SETTING, METHODS: Overall 74.7% (n = 336) of respondents were residents in the UK with an average age of 33.6 years (SD = 4.4) and average years trying to conceive, 3.5 years (SD = 2.22). The survey comprised quantitative questions about the intensity of cognitive appraisals and emotions about clinic closure, and ability to cope with clinic closure. Open-text questions covered their understanding of COVID-19 and its effect on reproductive health and fertility plans, concerns and perceived benefits of clinic closure, and knowledge about closure. Sociodemographic information was collected. Descriptive and inferential statistics were used on quantitative data. Thematic qualitative analysis (inductive coding) was performed on the textual data from each question. Deductive coding grouped themes from each question into meta-themes related to cognitive stress and coping theory.

MAIN RESULTS AND THE ROLE OF CHANCE: Most patients (81.6%, n = 367) had tests or treatments postponed, with these being self (41.3%, n = 186) or publicly (46.4%, n = 209) funded. Patients appraised fertility clinic closure as having potential for a more negative than positive impact on their lives, and to be very or extremely uncontrollable and stressful ($P \leq 0.001$). Most reported a slight to moderate ability to cope with closure. Data saturation was achieved with all open-text questions, with 33 broad themes identified and four meta-themes linked to components of the cognitive stress and coping theory. First, participants understood clinic closure was precautionary due to unknown effects of COVID-19 but some felt clinic closure was unfair relative to advice about getting pregnant given to the public. Second, closure was appraised as a threat to attainability of the parenthood goal largely due to uncertainty of the situation (e.g. re-opening, effect of delay) and intensification of pre-existing hardships of fertility problems (e.g. long time waiting for treatment, history of failed treatment). Third, closure taxed personal coping resources but most were able to cope using thought-management (e.g. distraction, focusing on positives), getting mentally and physically fit for next treatments, strengthening their social network, and keeping up-to-date. Finally, participants reported more negative than positive emotions ($P \leq 0.001$) and, almost all participants reported stress, worry and

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frustration at the situation, while some expressed anger and resentment at the unfairness of the situation. Overall, 11.8% were not at all able to cope, with reports of intense feelings of hopelessness and deteriorating well-being and mental health.

LIMITATIONS, REASONS FOR CAUTION: The survey captures patient reactions at a specific point in time, during lockdown and before clinics announced re-opening. Participants were self-selected (e.g. UK residents, women, 48% starting but not completing the survey), which may affect generalisability.

WIDER IMPLICATIONS OF THE FINDINGS: Fertility stakeholders (e.g. clinics, patient support groups, regulators, professional societies) need to work together to address the great uncertainty from COVID-19. This goal can be met proactively by setting up transparent processes for COVID-19 eventualities and signposting to information and coping resources. Future psychological research priorities should be on identifying patients at risk of distress with standardised measures and developing digital technologies appropriate for the realities of fertility care under COVID-19.

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Key words: COVID-19 / coronavirus disease 2019 / infertility / stress and coping / appraisal / mental health / counselling psychology / communication

Introduction

The coronavirus disease 2019 (COVID-19) pandemic caused fertility clinic closures worldwide. More than a million cycles of fertility treatment are typically performed every year with many patients affected by unexpected clinic closure (Adamson *et al.*, 2018). Guidance about COVID-19 emerged mid-March from professional societies (e.g. ESHRE, American Society for Reproductive Medicine, British Fertility Society (BFS)) often with abrupt closures following. In the UK, the government regulator (the Human Fertilisation and Embryology Authority, 2019) issued direction to end all treatments by mid-April (with some exceptions for patients with cancer), which meant that patients could not access treatment and, depending on timing, cycles in progress were abandoned or converted to freeze all. Although clinics have re-opened worldwide, much uncertainty remains for patients about whether fertility services will continue, the prioritisation of waitlists or potential re-closure for a 'second wave' of COVID-19. A vaccine is not expected for some time though some are promising. Professional societies have jointly affirmed the importance of fertility care and the principles to guide how it could be delivered safely (Veiga *et al.*, 2020). Given this uncertainty, the distress it can cause, and numbers potentially affected, the aim of the present study was to gather data about patient experiences of COVID-19 fertility clinic closures to inform on the present and future needs of patients.

According to stress and coping theory, an imbalance between appraisal of a threat and ability to cope with it is what leads to stress reactions (Lazarus and Folkman, 1984). People facing disasters generally experience more stress than usual, but remarkably most cope and recover, with some eventually seeing benefits from the situation (e.g. personal strength) (Pfefferbaum and North, 2020). Research to date on experiences of COVID-19 in the general population indicates more anxiety and depression among respondents than historical norms (online survey, Nelson *et al.*, 2020), worry about becoming mentally unwell due to uncertainty, and loss of control but nevertheless able to use coping efforts to manage the situation (online survey, Cowan, 2020). Factors associated with better mental health include receiving up-to-date information about the outbreak and lack of pre-existing health problems (online surveys, Cowan, 2020; Wang *et al.*, 2020). To our knowledge, peer-reviewed research on COVID-19 appraisals and emotions in infertile populations has not yet been published but a survey at an American centre posted that 85% of patients ($n = 253$) were moderately to extremely upset about treatment cancellation and only one-third supported a cancellation policy (Turocy *et al.*, 2020, unpublished).

To have a more in-depth understanding of patient experiences the present study used an online mixed-method survey (quantitative-qualitative) to collect data on experiences of COVID-19 fertility clinic closures.

Materials and methods

Participants

Eligibility criteria were being a patient affected by fertility clinic closure, 18 years of age or older, and ability to respond in English. In total, 946 people clicked on the survey link, 76 did not consent, 420 started but did not complete the survey and 450 completed (all female except four men). Power calculations were not performed due to uncertainty of any quantitative effects. Table I shows the demographic characteristics of the final sample.

Materials

The quantitative-qualitative English, anonymous, online survey was created using Qualtrics (Qualtrics, Provo, Utah, USA). Quantitative questions were from the daily record-keeping (DRK) form (Boivin and Lancastle, 2010), which was designed from cognitive stress and coping theory (Lazarus and Folkman, 1984; Peacock and Wong, 1990).

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Table I Demographic characteristics of the sample.

Demographic characteristics	Total sample (*N* = 450)
Age (years), *M* (SD)	33.65 (4.37)
Gender female, % (n)	99.1 (446)
Married or cohabiting, % (n)	91.8 (412)
Relationship length, (years), *M* (SD)	8.76 (4.27)
Financially at risk due to COVID-19, % (*n*)	
Yes	10.7 (48)
No	58.6 (262)
Maybe	30.6 (137)
Country of residence % (*n*)	
UK	74.7 (336)
Non-UK$^{\infty}$	24.9 (112)

M = mean, COVID-19: coronavirus disease 2019.
$^{\infty}$Other Countries are Australia (*n* = 1), Canada (*n* = 11, 2.4%), Croatia (*n* = 23, 5.1%) Germany (*n* = 1), Ireland (*n* = 27, 6.0%), Israel (*n* = 2), Norway (*n* = 1), New Zealand (*n* = 1) Poland (*n* = 3), Romania (*n* = 5), Switzerland (*n* = 1), The Netherlands (*n* = 1), USA (*n* = 34, 7.6%), and Not specified (*n* = 1).

Five single appraisal items asked whether clinic closure could have a positive or negative impact for the person (primary appraisal), was controllable or stressful, and whether the person had the resources to cope with the situation (secondary appraisal). A further eight single items asked about the intensity of emotional reactions associated with threat (nervous, worried), harm (sad, discouraged), challenge (positive, hopeful) and benefit (relieved, happy). The appraisals and emotions were rated on a five-point response scale (1 not at all to 5 extremely) where higher scores indicated more of the attribute. The response scale differed from the original four-point response scale in Boivin and Lancastle (2010) and we used only 8 of the 16 Daily Record Keeping in IVF scale items. Owing to the use of single items, the reliability could not be computed. Open-text questions (without character limits) asked participants to indicate, in their own words, their understanding of COVID-19 and its reproductive impact, perceptions of closure (i.e. who decided, when clinics would re-open, desired information), its impact on fertility plans, fears and concerns related to closure, ways of coping with closure, and any perceived benefits from the closure. Background information was collected (e.g. gender, age, relationship status, financial risk due to COVID-19 and fertility status, treatment funding). The School of Psychology, Cardiff University, Cardiff, Wales provided the study ethical review and approval.

Procedure

A draft survey was generated and submitted to our professional and patient group collaborators (BFS, Fertility Network UK, British Infertility Counselling Association). Comments were integrated and the revised draft uploaded to Qualtrics and distributed. Webmasters at five charities and social influencers in the fertility domain were contacted to help distribute the survey via social media from 9 to 21 April 2020. Two webmasters could not distribute due to full social media schedules and prioritising their own surveys. Upon clicking the survey link, an information and consent form was presented. There was no time limit on survey completion, but interrupted surveys had to be completed within 1 week of last input. At the end of the survey participants were thanked, debriefed and provided with links to support resources.

Data analysis

Descriptive and inferential statistics were used on quantitative data. A within-subject ANOVA was used to compare appraisals and emotions rated by the same person. Significant main effects were followed-up with Bonferroni-adjusted paired Student's *t*-tests. A value of $P < 0.05$ was considered significant. Qualitative analysis was used on textual data according to the method of Braun and Clarke (2006) with the first steps being familiarisation with data, inductive coding (attaching meaningful labels to textual data segments) and reviewing coding with colleagues. Coding was carried out until no new codes (variation in data) were identified (i.e. data saturation reached). Codes were then organised into themes that captured a recurrent more abstracted idea present in the data. Meta-themes according to stress and coping theory (Lazarus and Folkman, 1984) were then deduced from themes occurring across questions. Given the rapid response nature of the survey J.B., C.H. and S.G. were all first coders and code reviewers on at least one question. Authors came together multiple times across the coding process for peer debriefing, to reflect, discuss, review and name the themes emerging from the data. Themes were cross-checked against the extracts of data. Textual data analysis was presented as a summary accompanied by a thematic map and illustrative verbatim quotations. Within illustrative quotations the use of [. . .] indicated part of the quotation was not presented because it was not relevant whereas (text) indicated additional text was added for clarity (i.e. readability, comprehensibility). Grammatical errors were corrected. Individual participant number was indicated with *P*.

Results

Sample fertility characteristics

Table II shows fertility and treatment characteristics for the sample. For the majority (>80%) the clinic was closed at the time of the survey and treatments or testing postponed.

Experiences of fertility clinic closures

Inductive coding revealed 33 themes for the open-text questions. Figure 1 shows the meta-thematic map relating themes generated across questions to the four main components of the cognitive stress and coping theory. According to theory, people first appraise an event (i.e. closure) in terms of whether it has the potential to threaten well-being, and then if yes, appraise whether they have the resources to cope with this stressor. Imbalance between these appraisals can trigger diverse stress reactions (psychological, physical, behavioural). Supplementary Table SI shows meta-themes and linked question themes with illustrative quotes, and Supplementary Tables SII, SIII, SIV, SV, SVI and SVII show coding for each question.

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Table II Fertility and treatment characteristics of the sample.

Variable	Total sample (*N* = 450)
Have children % yes, (n)	16.9 (76)
Time trying to achieve pregnancy in years, *M* (SD)	3.54 (2.22)
Is your clinic closed?, n (%)	
Yes	81.6 (367)
No	2.2 (10)
Limited service	16.2 (73)
Treatment status, n (%)	
Tests/treatments postponed (cancelled)	82.2 (370)
Not currently undergoing tests/treatment	3.8 (17)
Tests/treatments ongoing	3.6 (16)
Other	10.4 (47)
Treatment funding, n (%)	
Costs covered (i.e. national health service)	46.8 (209)
Costs partially covered	4.3 (19)
Private	41.6 (186)
Other	7.4 (33)

Experience and appreciation of uncertainty in COVID-19 and context for fertility clinic closure

The context of clinic closure was understood by patients to be precautionary and due to uncertain effects of COVID-19 on fertility, pregnancy and baby health, government guidance to stop non-essential treatments, and health service staffing issues (e.g. redeployment). Among those responding to this question (n = 399), patients understood the decision to close clinics involved the government or its regulator (hereafter 'government', 64.7%, n = 258), professional societies (20.1%, n = 80), clinics (15.8%, n = 63) and the health service (6.5%, n = 26), with a proportion being unsure (11.5%, n = 46). At the time of the survey, the patients' recollection was that no details ('nothing') were provided about re-opening.

The nature of evidence used to express views on COVID-19 effects varied in quantity and source (Supplementary Table SI). Participants were in agreement regarding the belief that: pregnancy reduced immunity to fight off COVID-19, fever or illness in early pregnancy was damaging to the foetus, COVID-19 in late pregnancy could cause preterm delivery and it would be difficult to treat pregnant women (e.g. use of ventilator). In contrast, mixed agreement was expressed about risk of contracting COVID-19, vertical transmission between mother and foetus, increased risk of miscarriage, or affected mothers giving birth to unhealthy babies. In the few occasions that fertility effects

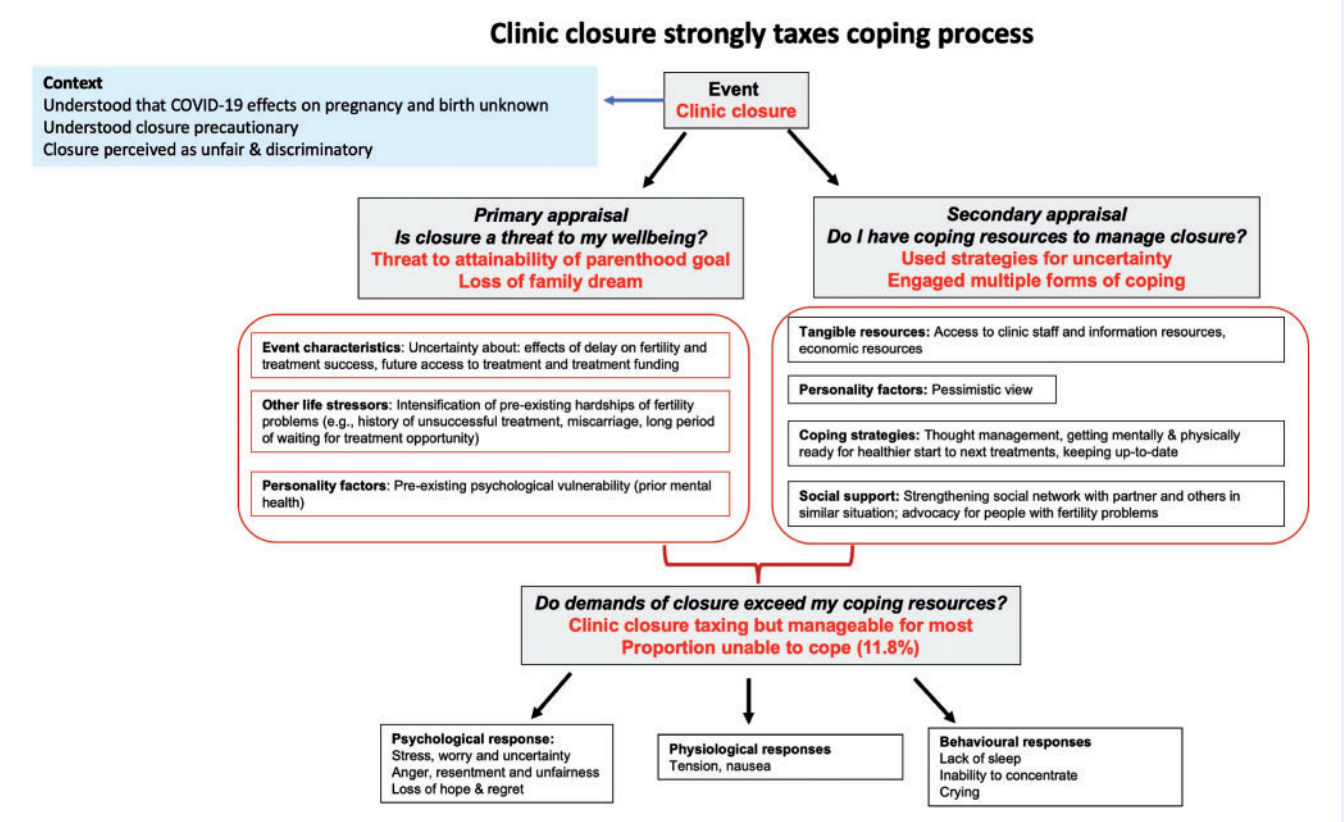

Figure 1. Meta-themes generated from cross-question themes, mapped onto key components of the cognitive stress and coping theory (Lazarus and Folkman, 1984).

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were mentioned these were for an effect on sperm quality (usually due to fever).

Participants understood that clinic closure had been necessary. ('It's a necessary evil to help stop the death toll from COVID-19 rising even higher. P74']. When asked about possible benefits of closure, about half of the sample reported at least one, with most referring to safety of healthcare staff and the general population, and reduced strain on healthcare services. ('Personally none, but in holistic terms there are more staff to help with the pandemic [. . .] P71'].

Unfairness at clinic closure was expressed for diverse reasons. First, it was perceived as discriminatory that people dependent on clinics to achieve pregnancy were treated differently than those able to do so without treatment: ('Get the clinics open. If not, start telling everyone not to conceive otherwise this is a massive breach against our human rights. P163'). Linked to this was the view that COVID-19 could have been handled differently ('It was cruel to stop treatment halfway through and before the (regulator's) deadline. P66') and that clinics could provide ['[. . .] at least some treatments safely even if on a reduced scale. P243']. Second, unfairness was expressed at the closure decision not being well-founded ('. . .it felt like the decision to stop IVF treatments was based on very little evidence. P243') or based on remote evidence ('. . .some arbitrary decision made by the distant international organization. . .. P254'). Participants also perceived fertility services not being considered essential as unfair ('(fertility treatment) is not deemed as essential service but yet garden centres and off license (for purchase of alcohol) can remain open. It feels like the government don't care. P168').

Negative appraisals of clinic closure

Figure 2 shows descriptive data for appraisals. The main effect of appraisal in within-subject ANOVA was significant ($F(4, 1764) = 1074.37$, $P < 0.001$). Bonferroni-adjusted paired Student's *t*-tests showed that all appraisals were significantly different from each other ($P < 0.001$) except for perceived negative impact and stressfulness ($P = 0.412$), which were both highest, and between positive impact and controllability ($P = 0.082$), which were both lowest.

As indicated in Figure 1 textual analysis showed that clinic closure was appraised as a threat to the attainability of the parenthood goal because it meant the possible end to hopes and dreams to get pregnant (with own eggs), to become a parent, or give a child a sibling. Participants perceived missing out on their one or very last opportunity to become pregnant ('running out of time'). Delay was also appraised as a loss that participants were processing: ('It's painful to think [. . .] we will have gone through another year without a child. P210').

Two characteristics of the situation made threat and loss appraisals stronger. First, uncertainty overall, and especially regarding the impact of treatment delay on fertility (e.g. egg quality, lower ovarian reserve) and success rates ('By the time clinics reopen I may no longer have any eggs left at all. P14'; 'my eggs will be in decline therefore reducing the success rate of IVF being successful even further'. P117). Uncertainty about personal circumstances was also expressed (e.g. reaching age limit, Supplementary Table SI). A second situational characteristic linked to threat appraisals was closure being an additional burden on top of what patients had already experienced due to fertility problems. The sense of waiting on top of waiting was described as being an unacknowledged challenging process in fertility treatment ('[. . .] just feels like another setback and waiting game and you get plenty of this in the awful world of infertility. P332'; '. . . Infertility is cruel as it is let alone combined with COVID-19. P142'). People also referred to accumulated past disappointments (miscarriages, treatment failures) to which COVID-19 was now added, making ['. . . this (clinic closure) is not easy to take. P32']. When asked, some participants did see that closure could have benefits such as providing an opportunity to process difficult emotional experiences before re-starting ('[. . .] I can grieve my previous losses. P229', '[. . .] give me more time to process the grief associated with using a donor [. . .] P426').

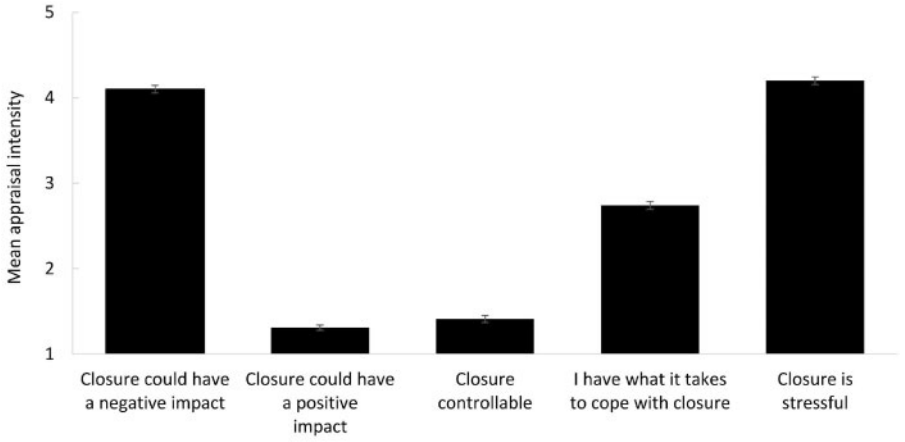

Figure 2. Mean intensity of cognitive appraisals about clinic closure (N = 448). Higher scores = more of the attribute. Mean ± 95% CI around the mean. Main effect of appraisal using analysis of variance $P < 0.001$. Bonferroni-adjusted paired *t*-tests showed appraisals were significantly different from each other ($P < 0.001$) except for perceived negative impact and stressfulness ($P = 0.412$), which were both highest, and positive impact and controllability ($P = 0.082$), which were both lowest.

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Coping with clinic closure is taxing

Figure 2 shows that participants reported slight to moderate ability to cope with the situation (coping significantly lower than scale mid-point, $t(445)=16.03$, $P < 0.001$). Coping efforts were most often directed at managing the uncertainty of waiting, the perceived threat to attainability of the parenthood goal, and perceived losses.

As indicated in Figure 1 textual analysis showed that people mostly used thought-management strategies especially in relation to coping with uncertainty and waiting (Supplementary Table SI). These included keeping busy (distraction coping), and focusing on the present (e.g. yoga, meditation, mindfulness), the positives (e.g. positive reappraisal coping, valuing the small things in life, reading positive stories), or what could be controlled. People also compared themselves to others (perspective taking) in worse situations ('I can't feel sorry for my situation and treatment stopping mid-cycle. I've friends who are NHS staff treating covid-19 patients, that's scarier … Perspective is needed here. P64') but this was not always possible ('[…] not being able to try again feels much worse than COVID-19. P444'). Thought avoidance and denial were also used ('I am trying not to think at all about a future I cannot control. P80'; 'Denial. I try to convince myself this will be over very soon and that a 2-month delay is meaningless. P150'). A few were accessing therapy or counselling ('I contacted the counselling service of the clinic. It is helpful to a degree to have some special time to talk about it and reflect. P134').

A common strategy was focused on getting mentally and physically ready for clinic re-opening by exercising, having a healthy diet, managing weight and taking vitamins and supplements, in order to maximise chances of success of next treatments. Giving the body a rest from the past burden of treatment was seen by some as a benefit of clinic closure. The reverse was also true with reverting to '… using bad habits to cope. P217' being mentioned ('I fell into a slump of drinking wine, eating rubbish and not exercising, not being able to sleep […] P281').

Participants reported strengthening their social support network by staying close and communicating with their partner, reaching out and maintaining contact with friends and family. Many participants used social media for support ('[…] we met through the hospital support group and have continued this during covid-19 via WhatsApp groups. P411'). These participants were reassured they were not alone and felt understood because ([…] most others don't understand the difficulties we are experiencing. P248'). For a minority, these were spaces to express frustrations and share indignation ('I am on a number of fertility forums. We all feel the same. Victimised and robbed of our human rights […] P28'). Not all social contact was seen as positive: ('I cannot speak to or see via the internet any friends with young children, and I have had to block them all… P313').

Information gathering was also an important coping strategy. The ability to communicate and get updates from clinics was perceived as integral to forming accurate threat appraisals and essential to coping. Participants kept up-to-date about clinics re-opening by directly asking for updates and advice from clinics or organisations (e.g. government), by following social media, checking clinic websites, reaching out to consultants or voicing concerns to clinics. Diverse proactive clinic initiatives (e.g. personal call, Q&A sessions, webinars, clinic Facebook page for patients, dedicated line for questions) were perceived as helpful. Perceived benefits of receiving updated clinic information were mental well-being, preparation for treatment, and to counter social media (mis)information. Communication was sometimes perceived to be problematic. Participants were told that clinics would update regularly but updates were not posted and patients felt 'left in the dark', 'left hanging', 'forgotten', 'dropped off with no follow-up', which was difficult ('I know it's hard for them to predict but it's just not good for any of us to have no hope! P102'). The main information participants wanted was when clinics would re-open (even a rough estimate) and prioritisation of the waitlist. Comments suggested that tailored information might be needed for a sub-group of patients who were not officially on the waitlist because they were awaiting results, using medication (e.g. ovulation induction), undergoing cross-border reproductive care or egg donors (shortage of donors expected). Finally, some participants coped by being the providers of information, active in groups that raised awareness of their own and others' situation with professional societies and government, with variable success.

While most reported coping with the situation, 11.8% (n = 53) did not feel they had the resources to cope with clinic closure (reported on quantitative scale) which was reflected in textual replies that nothing was helpful and that coping in this situation was very difficult, despite trying ('[…] I find my mind wanders and I start thinking about never being a mum etc. I try to focus on something else but it's very difficult. P30'). Coping was also described as being ineffective. Paradoxically, a few participants found comfort in the idea that there was nothing they could do. ('I am aware there is nothing I can do, so there is a small amount of comfort in that […]. P184').

Stress reactions despite coping efforts

Quantitative emotion analysis (Fig. 3) using within-subjects ANOVA showed the main effect of type of emotion was significant ($F(3.00, 1332.17) = 1054.57$, $P < 0.001$, Greenhouse-Geiser-adjusted degrees of freedom). Harm (sad, discouraged) and threat emotions (nervous, worried) were most intense compared to challenge (positive, hopeful) and benefit (relieved, happy) emotions. Paired *t*-tests using the Bonferroni correction revealed that all emotions were significantly different from each other ($P < 0.000$) except for nervous and discouraged, and relieved and happy. Strong emotional terms were used about clinic closure (e.g. devastated, heartbroken) and of high intensity ('through the roof P114', 'shattered our world P243', 'horrendous P19').

As indicated in Figure 1 textual analysis showed that clinic closure was taxing but manageable for most. A range of stress reactions was reported (Supplementary Table SI). Participants referred to stress, worry and frustration about clinic closure, usually linked to strain of uncertainty ('…hate the uncertainty… P232', 'not knowing … is agonising P104'). Uncertainty also entrained rumination with unanswerable 'what if' questions ('I have a lot of 'what if' questions, such as what if we were at a private clinic that was still operating, what if my cycle started earlier and we could have seen treatment through etc. P26'). Perceptions that clinic closure was unfair (see above) were echoed in feelings of resentment (implicit, explicit) towards experiences of pregnancy and parenting in others ('[…] but then I see other people getting naturally pregnant and can't help feeling how it's so unfair and unjust. Feel angry and a deep, deep sadness. P86'). Fewer participants expressed deeper hopelessness, sadness, depressive feelings and lack of control. A minority were starting to acknowledge they might have to come to terms with being childless ('…I won't be able to have my own children and face the feelings and emotions that go with that.

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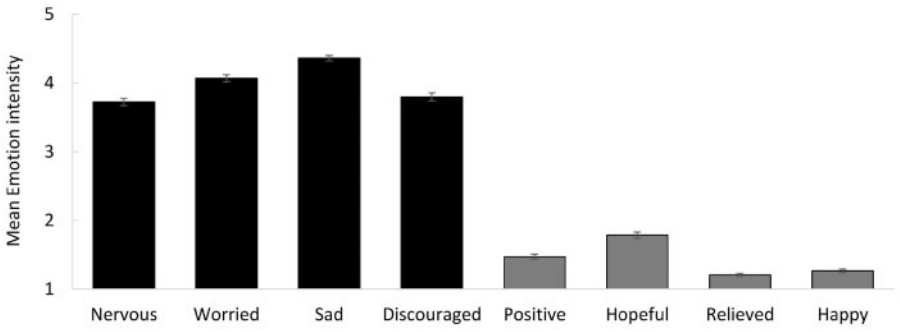

Figure 3. Mean intensity of emotions about clinic closure (N = 448). Higher scores = more of the attribute. Black bars are negative emotions, grey bars are positive emotions. Mean ± 95% CI around the mean. Main effect of emotions using analysis of variance ($P < 0.001$). Bonferroni-adjusted paired *t*-tests showed all emotions significantly different ($P < 0.000$) except for nervous and discouraged, and relieved and happy.

P141'). The situation occasionally caused people regret ('It's particularly hard knowing that with a different partner I probably could've had the children that I wanted when I wanted them and been happy P217'). Those most affected referred to deterioration in mental health ('my mental health is spiralling out of control [. . .]. P66') or impacts on relationship ('Fear of the strain it may put on my marriage. P290'). Approximately half of participants could not report any personal benefits when asked, and a few felt clinic closure would require serious long-term support ('. . . It's [closure] just going to cause a number of people needing antidepressants, counselling and therapies perhaps lifelong. P28'). Four participants reported suicidal ideation ('Not only this but (closure has) had huge impact on my mental health and put me into a deep depression, causing suicidal thoughts that I never experienced before in my life and never thought it can happen to me. P331').

Finally, some people reported more physical or behavioural stress reactions: ('The extra stress put upon an already intense situation [. . .] I have lost weight, unable to eat correctly, feeling nauseous the majority of the time due to anxiety. . .P155'). Many people reported 'crying every day. P292' or not being able to 'sleep very well. P217', for example.

Discussion

The COVID-19 fertility clinic closure was experienced as an exceptional event but is one likely to recur, or at minimum one that will substantially change delivery of fertility care worldwide. Results show that the precautionary need for clinic closure was understood but viewed as a significant threat to the attainability of parenthood goals. Most study participants experienced significant stress reactions as judged by the wording of textual replies, suggesting coping was not optimised, and 11% reported feeling unable to cope on a quantitative measure. Managing fertility care under COVID-19 will require processes for COVID-19 eventualities and boosting patient coping resources. These processes are likely to involve communication strategies optimised for uncertain and unpredictable situations, expectation management and a stepped approach to psychosocial support. We make suggestions to achieve these, which we believe apply in times of closure and future operations under COVID-19 circumstances. This study was a rapid assessment at an early time during clinic closure. Future research will need to assess longer-term psychosocial adjustment to COVID-19 using standardised measures of anxiety and depression, and support development and evaluation of interventions to address emerging support needs.

Clinic closure was a devastating event that taxed the coping resources of participants reporting from the UK, Europe and North America. According to stress and coping theory, accommodative strategies (e.g. distraction, acceptance, positive reappraisal) are best suited to manage unpredictable and uncontrollable situations like clinic closure (Lazarus and Folkman, 1984) as these help people modify their view of the situation rather than try to change a situation they cannot change. Accommodative strategies have been shown to be effective for non-fertility and fertility-related stressors (e.g. waiting for pregnancy tests results, Ockhuijsen *et al.*, 2014). Participants in the present study and other COVID-19 studies (Cowan, 2020) seem to intuitively use these strategies, alongside other forms of coping such as social support for validation and information-seeking to reduce uncertainty (e.g. checking in with forums, monitoring clinic information). However, the benefits of accommodative coping were not maximised, as indicated by significant stress reactions. These results suggest that boosting and optimising the accommodative coping that patients already do and encouraging wider stakeholders (patient groups, professional organisations, regulators) to intervene in a way that aligns with such efforts could extend coping benefits (e.g. ability to tolerate uncertain situation, well-being).

One way for clinics to boost coping resources is to achieve better signposting of information and present it in a way that matches patient preferences (e.g. format, gaps in knowledge). Coping and communication strategies for uncertainty are needed because uncertainty was a modifiable situational characteristic strongly associated with appraisals of closure being a threat. In other COVID-19 studies, regular up-to-date information was perceived to be especially useful (Cowan, 2020; Wang *et al.*, 2020). Table III provides recommendations for information provision according to the needs and preferences expressed by participants, and ways in which uncertain information could be presented more certainly. While we suggest signposting, we are aware of

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Table III Suggestions for provision of information and psychosocial support based on needs and preferences expressed by participants affected by clinics closure.

Information resources*	Psychosocial resources
General clinic • Centralise resources in a single location (e.g., webpage) and keep consistency between contents here and those delivered via social media. • Actively monitor misinformation circulating about COVID-19 effects to rapidly and unequivocally counteract it with patients. • Signpost patients to information subjected to regular updates, indicate dates for next update and explicitly acknowledge if update results in change or no-change for each topic. This may allow patients to leave aside uncertainty until the next update. • Provide patients with a clear mechanism to voice their concerns (which may change as the situation evolves). Concerns can be addressed in information updates or support initiatives making it easy for clinics to identify and address common patient worries *Access to treatment* • Provide clear information about the status of the clinic and the services still accessible. Information should outline organisation of fertility treatment such as waiting lists, prioritisation, change in practice, work hours, staffing. Patients can prepare in advance, and manage their expectations of care. • Provide general information on the requirements clinics must meet for re-opening/operating to increase patient understanding of health and safety concerns. Examples from the BFS (UK) and ESHRE (Europe) are: https://www.britishfertilitysociety.org.uk/2020/05/06/arcs-and-bfs-u-k-best-practice-guidelines-for-reintroduction-of-routine-fertility-treatments-during-the-covid-19-pandemic/ https://www.eshre.eu/Home/COVID19QApatients *Health and safety* • Provide trustworthy information sources about the effects of COVID-19 on fertility, pregnancy and baby health to help patients keep up-to-date. Examples: https://cgf.cochrane.org/news/covid-19-coronavirus-disease-fertility-and-pregnancy https://www.rcog.org.uk/en/guidelines-research-services/guidelines/coronavirus-pregnancy/ • Reassure patients about medical issues (e.g. safety of stored gametes and embryos, effect of delay on pregnancy and success rates) keeping in mind that needs of subgroups may be additional (e.g. cross-border, LGBTQ, third part reproduction).	*Staff and patient preparation* • Ensure staff are familiar with psychosocial care guidelines for fertility staff: https://www.eshre.eu/Guidelines-and-Legal/Guidelines/Psychosocial-care-guideline.aspx • Proactively provide psychoeducation to manage uncertainty. Many websites exist with tips on coping with anxious thoughts, including those related to COVID-19 (written and audio). https://www.nhs.uk/oneyou/every-mind-matters/anxiety/ https://www.nhs.uk/conditions/stress-anxiety-depression/moodzone-mental-wellbeing-audio-guides/ • Some patients reported processing a feeling of loss over parenthood goals, for which online guidance is also available. https://fertilitynetworkuk.org/life-without-children/finding-more-to-life-self-help-guide • Identify patients that are at risk for severe psychosocial distress and provide private and free-of-cost access to fertility counselling, which can be found through national organisations. These patients too can benefit from psychoeducation about depressive symptoms and advice about suicidal thoughts. https://www.nhs.uk/conditions/stress-anxiety-depression/low-mood-and-depression/ https://www.nhs.uk/conditions/suicide/ https://www.bica.net • Connect people to national patient groups and those that work with specific sub-populations, as well as counselling organisations. UK and European examples are: https://fertilitynetworkuk.org http://www.fertilityeurope.eu

*Mainly UK illustrative examples provided but these could be substituted for national resources.

the complexities of information provision in the COVID-19 context. First, is identifying who can best deliver what information. Patients were monitoring multiple sources of information (e.g. governments, regulators, health organisations, professional societies, clinics) in addition to informal sources (social media, news). In principle, the body responsible for deciding whether clinics open or not (i.e. government, professional society or clinic) should be responsible for announcing closures and naming the trigger event(s) by which clinics will re-open (e.g. minimum effective [R]eproduction number, maximum number of new COVID-19 cases). The government/regulator could work with patient groups and professional organisations to collate and make resources readily available. Second, is the format of information. Results suggest that personal contact (e.g. personal call or email) and personalised information (e.g. clinics will open on date X and you will be seen on date Y) were especially valued. Generic information on social media and websites was also appreciated. Third, clinic re-opening is not the end of the COVID-19 impacts for patients or clinics. As part of the 'new normal', clinics will have to make their processes resilient for the challenges of providing fertility care under COVID-19 and be transparent to patients who will need to adapt to these new processes. Already there is discussion and guidance about clinic operations (e.g. COVID-19 screening, triage, telemedicine, micro-teams, recurring closures) and the possibility that clinic closures will recur as part of managing COVID-19 flare-ups. To minimise disappointment patients will need to be forewarned on how their treatment experience will change, and of criteria that may lead to more change, delay

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or even termination in treatment cycle procedures (e.g. presence of COVID-19 symptoms, regulator announcement of clinics re-closure). We illustrate this here with information sources from the UK and Europe owing to our familiarity with these sources (Table III) but information specific to each country should be provided.

The results also suggest a need to support patients develop realistic expectations of fertility care constrained by COVID-19 operational requirements. First, and a warning for patients, is that creation of new knowledge takes time and patients will often need to tolerate long periods of a no-change status in clinic updates. Information providers (clinics, regulators) can ease this waiting if dates for regular updates are clearly indicated and the change/no-change status is explicitly acknowledged. Even when information is provided, it is important to forewarn patients that it is subject to review because of the constant emergence of new evidence and rapidly evolving situation. Second, is addressing the perceived unfairness of clinic closure as soon as voiced. The explanation could reflect that, as collaborators to the patient's parental project, fertility staff are partly responsible for the welfare of the child, which entrains specific legal constraints and duty of care not imposed on couples achieving pregnancy without treatment (Boivin and Pennings, 2005). However, clinic staff strive to apply such legal constraints (e.g. closure) for the shortest period of time possible to achieve safety for all. Finally, patients often want personalised information and not just information, which is an expectation that often cannot be met. For example, most patients worried about the effects of delay on their own chance of pregnancy. Patients should be reassured that in the majority of cases a delay of 6 months in fertility treatment is unlikely to reduce the likelihood of live birth (Romanski *et al.*, 2020). However, a caveat needs to be provided because clinics cannot be sure that for this specific patient a delay of 3 or 4 months will not make a difference.

In considering psychosocial support, a stepped approach to care is advocated according to psychosocial guidelines for staff in fertility clinics (Gameiro *et al.*, 2015) and suggested best practice for the COVID-19 pandemic (Pfefferbaum and North, 2020). This stepped approach starts with prevention (e.g. screening) psychoeducation and low intensity psychological support (e.g. normalising information, modelling resilience, coping boosts, links to support groups) provided to all, with personalised support for specific vulnerabilities (e.g. counselling) and formal assessment for urgent support needs, such as suicidal ideation (e.g. psychiatric support), provided to those with specific needs. The results of the present study indicated the need for all levels of service and, accordingly, Table III shows suggestions for psychosocial support at different levels of intensity and tailored to specific needs. An important issue is how to ensure that vulnerable patients in need of urgent support are identified during this period when access to care is limited. In the present survey, it was only possible to direct patients to resources in the study debrief because of the anonymous nature of replies. However, clinics can proactively offer psychosocial support to any patients they identify (or have identified) as being at risk for high distress (e.g. via screening using generic standardised or disease-specific measures) or to patients with a history of traumatic events (e.g. miscarriage) that could be re-triggered by the current crisis. Having information about patients' infertility-related psychosocial vulnerability is always useful but particularly during unexpected crises that are expected to tax already stretched coping resources. Clinics that do not yet have screening or mood monitoring procedures in place should consider its implementation, given the established feasibility and usefulness of existing methods (e.g. SCREENIVF, Van Dongen *et al.*, 2012; Ockhuijsen *et al.*, 2017; FertiQoL, Koert *et al.*, 2019).

Due to the present cross-sectional design, the psychological experiences reported could have been multiply determined and not just arising from clinic closure. Reactions could be due to patients' history of infertility, which is often associated with significant distress (Gameiro *et al.*, 2016) and not *de novo* experiences. Similarly, it is possible that some reactions were due to other correlates of COVID-19 (e.g. confinement, social isolation) and not clinic closure *per se*, as these too have effects on well-being (e.g. stress, feelings of being inadequately informed) (Brooks *et al.*, 2020, Cowan, 2020). Finally, this survey captured experiences in the middle of the pandemic and clinic closure, and therefore reflects raw experiences, which may change over time. Future studies should consider including fertile controls and longitudinal designs to differentiate effects due solely to clinic closure, and to understand how people adapt psychologically (and in their fertility planning) to COVID-19 and the new ways of providing fertility care. We focused on the patient but staff too are facing unprecedented challenges (e.g. major changes to work schedule, setting, responsibilities; working with highly distressed patients; deployment to frontline, etc.) in a work environment already shown to be highly demanding (Boivin *et al.*, 2017). Internal audits to assess and provide adequate support to staff should be considered of equal priority.

Psychological research priorities in times of COVID-19 are numerous and ours follow those expressed by international groups (Holmes *et al.*, 2020). Particularly relevant to fertility care is developing strategies for monitoring mental health so we can understand its prevalence in times of COVID-19 and the causal mechanisms associated with poorer mental health trajectories beyond what is already known (see reviews in Gameiro *et al.*, 2015). Monitoring should use generic measures with clinical cut-offs to capture possible clinical need in this population. Identifying resilience factors and support technologies that can be fitted to the COVID-19 demands of social distancing, avoidance of in-clinic contacts or periods of isolation is certainly critical. New digital psychological interventions being tested, especially those that can both monitor and support, are especially valued.

Strengths and limitations

A strength was that all participants were patients who were affected by clinic closure. The sample was self-selected from social media websites, mainly associated with patient support groups and this profile may affect generalisability. Informative comparisons across gender and country were impossible because only four participants were men and the 25% of non-UK respondents were from 13 countries (Table I). However, background characteristics were in line with UK ART data, and psychological experiences were in line with recent COVID-19 studies (Cowan, 2020) and empirical work from cognitive theory of stress and coping, all of which increases confidence in the findings. Attrition was 48% (i.e. started but uncompleted surveys), which is common in online studies and could be reduced in future studies by putting background questions first, providing financial incentives and asking fewer questions (Howell, 2020). The mixed-methods approach allowed us to collect theory driven quantitative data while giving patients the opportunity to voice experiences in their own words (qualitative data). The sample was large and we achieved saturation in

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thematic analysis of all questions. The mixed approach allowed us to contextualise quantitative scores with fertility-specific factors. While we took measures to strengthen thematic analysis (code checking, consistency between coders, triangulation with quanitative data, and saturation) it was a rapid qualitative assessment and deeper analysis could reveal more marginal but important issues. We made some adaptations (number of items, response scale) to the Daily Record Keeping emotion scale, which makes average scores not comparable with other studies using it. Finally, we do not know what patients were told, and relied entirely on their own account of information provided to them by, for example, the clinic, regulator or professional society. We do not know what information was actually provided, for which a separate survey would be needed.

Conclusion

COVID-19 has undoubtedly changed how fertility care is delivered worldwide for the foreseeable future, and we all need to be prepared for the impact that such events produce for patients, namely great uncertainty and worry about attainability of parenthood goals. Patients intuitively used coping strategies suited to unpredictable and uncontrollable situations but fertility stakeholders (clinics, patient groups, government and regulators, health services, professional societies) could bolster patient coping by working together to set up transparent processes for COVID-19 eventualities and signposting information and coping resources. Psychological research priorities are to develop and evaluate digital technologies that are appropriate for the realities of fertility care in a COVID-19 situation.

Supplementary data

Supplementary data are available at *Human Reproduction* online.

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Authors' roles

J.B., C.H. and S.G. conceptualised, designed and together executed all aspects of the study, drafted the manuscript and revised the manuscript. R.M., G.B., A.P.-S. contributed to the design of study materials, recruitment of participants, review of draft manuscript, and revised the manuscript and advised (respectively) on medical aspects, patient support and counselling.

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Conflict of interest

Outside of the submitted work, Prof. J.B. reports personal fees from Merck KGaA, Merck AB, Theramex, Ferring Pharmaceuticals A/S; grants from Merck Serono Ltd; and that she is co-developer of the Fertility Quality of Life (FertiQoL) and MediEmo apps. Outside of the submitted work, Dr R.M. reports personal or consultancy fees from Manchester Fertility, Gedeon Richter, Ferring and Merck. Outside of the submitted work, Dr S.G. reports consultancy fees from Ferring Pharmaceuticals A/S, Access Fertility and SONA-Pharm LLC, and grants from Merck Serono Ltd. The other authors declare no conflicts of interest.

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