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Managing ovarian hyperstimulation syndrome: A qualitative interview study with women and healthcare professionals

Elizabeth Lumley RGN, MSc, Research Associate[1] | Alicia O'Cathain BSc (Hons), MSc, C.Stat, MA, PhD, Professor[1] | Sarah Drabble PhD, Honorary Research Associate[1] | Clare Pye RGN, SCEPTR Lead Research Nurse[2] | Kate Brian PPI Representative[3] | Mostafa Metwally MD, Consultant Gynaecologist[2]

[1]Health and Care Research Unit, School of Health and Related Research, The University of Sheffield, Sheffield, UK

[2]Jessops Wing, Sheffield Teaching Hospital NHS Foundation Trust, Sheffield, UK

[3]PPI Representative for STOP-OHSS and Member of Fertility Network, London, UK

Correspondence
Elizabeth Lumley, Health and Care Research Unit, School of Health and Related Research, The University of Sheffield, Sheffield, UK.
Email: e.lumley@sheffield.ac.uk

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Abstract

Aim: To explore the experiences of women who have had ovarian hyperstimulation syndrome, and healthcare professionals who care for them.

Background: Ovarian hyperstimulation syndrome is a side effect of fertility treatment. Little research exists internationally that explores the experiences of women who have had this condition, or the healthcare professionals who manage it.

Design: Qualitative study using semi-structured interviews.

Methods: Eighteen interviews with women who had experienced ovarian hyperstimulation syndrome ($n = 10$) and healthcare professionals ($n = 8$) in six UK fertility centres. Framework analysis was used. This paper is reported following COREQ guidelines.

Results: Women described a range of symptoms and severity, sometimes experiencing worrying physical health problems such as abdominal swelling and shortness of breath. The combination of the symptoms, and their management, on delaying future fertility treatment could cause emotional distress. Healthcare professionals at different centres described variation in practice, which generally involved 'active monitoring' until symptoms became severe, when women would be hospitalised. Women expressed feeling 'left in limbo' while waiting for symptoms to improve or worsen, and described a lack of control during this waiting period. Healthcare professionals felt they provided adequate information about ovarian hyperstimulation syndrome and its management. This, however, did not align with women's perceptions that information, including potential delays to their fertility treatment, was missing. There was similar mismatch between women's and healthcare professionals' views of decision-making about fertility treatment following ovarian hyperstimulation syndrome, including women's concerns about having to make rushed, unplanned decisions about their fertility treatment when they did not feel adequately informed to do so.

Conclusion: Ovarian hyperstimulation syndrome and its management can have a significant physical and emotional impact on women, and influence their fertility

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treatment. Improvements could be made to the information women receive about this condition, its management and its implications for wider fertility treatment.

Implications for the profession and/or patient care: Nurses have the skills and knowledge to support women through the physical and emotional stresses of fertility treatment. Therefore, they are well placed to provide specialist information and support for OHSS and ensure women are fully informed about all aspects of the condition, including how its management might delay fertility treatment.

KEYWORDS
communication, decision-making, fertility treatment, infertility, information, ovarian hyperstimulation syndrome, patient satisfaction, qualitative, reproduction techniques

1 | INTRODUCTION

Ovarian hyperstimulation syndrome (OHSS) is a condition that women undergoing Assisted Reproductive Technology treatment, particularly in-vitro fertilisation (IVF), can develop in response to the fertility drugs taken to stimulate ovaries in order to increase the production of eggs. Overstimulated ovaries become enlarged and release chemicals into the bloodstream; fluid from the blood vessels can leak into the abdomen (known as ascites), and in very severe cases into the space around the heart and lungs (Royal College of Obstetricians and Gynaecologists (RCOG), 2016).

Ovarian hyperstimulation syndrome can have a significant impact on a woman's health resulting in prolonged hospitalisation and posing a significant economic burden to both women and health services (RCOG, 2016). In the United Kingdom there is a significant amount of public interest in OHSS. Over the last 5 years, there have been at least three parliamentary questions regarding OHSS (Parliamentary Questions, 2018a, 2018b, 2018c), including concern expressed about significant under reporting of severe OHSS (McDonagh, 2018).

We explored women's and healthcare professionals' experiences of OHSS while undertaking a qualitative interview study of the feasibility and acceptability of proposed new treatments strategies for OHSS. This was done in preparation for a National Institute for Health Research (NIHR) funded randomised controlled trial – STOP-OHSS – Shaping and Trialling Outpatient Protocols for ovarian hyperstimulation syndrome: A feasibility study and randomised controlled trial, with internal pilot, to assess the clinical and cost effectiveness of earlier active management of OHSS https://www.sheffield.ac.uk/scharr/research/centres/ctru/stop-ohss.

What does this paper contribute to the wider global community?

- As the number of assisted fertility cycles increases worldwide, it is likely that there will be increasing cases of ovarian hyperstimulation syndrome (OHSS) unless preventative measures are successful. This study provides a unique insight into the experiences of women who have had OHSS and highlights the need for additional information for women about the condition, and its implications for fertility treatment.
- In some fertility centres there is a 'watch and wait' approach to managing OHSS until it becomes severe. There is variation in management across treatment centres, and healthcare professionals. Healthcare professionals at fertility centres should consider women's information needs at this difficult time so that they are informed about both the initial signs and symptoms of OHSS, and signs of escalating severity, and the actions they need to take if their condition deteriorates.
- Women who develop OHSS sometimes find the management of the condition impacts on their fertility treatment plan, causing delays to fertility treatment they were not prepared for. Healthcare professionals could consider how best to inform women about these potential delays and look for opportunities for involving women and their partners in decision making.

2 | BACKGROUND

2.1 | Assisted reproductive technology

Assisted reproductive technology (ART) treatment such as IVF is used to assist conception. ART generally involves women taking fertility hormones to stimulate their ovaries to produce multiple eggs, which are then collected and combined with sperm in a laboratory. If the eggs are successfully fertilised, then embryos are left to develop for between 2 and 6 days before an embryologist selects the strongest embryo for transfer back into the woman's womb (known as a fresh embryo transfer); any remaining embryos are usually frozen for later use.

ART is common internationally. In 2019, approximately 53,000 women had 69,000 fresh and frozen IVF cycles at licensed fertility clinics in the United Kingdom (Human Fertilisation & Embryology

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Authority, 2019). In the United States in 2020, approximately 300,000 assisted reproductive cycles were performed across 449 clinics (Centres for Disease Control and Prevention (CDC), 2020). In Europe the most recent figures suggest a total of approximately 900,000 treatment cycles, including 165,379 for IVF, across 40 countries (European Society of Human Reproduction and Embryology (ESHRE), 2022).

2.2 | Ovarian hyperstimulation syndrome

According to the RCOG (2016), OHSS can be classified as mild, moderate, severe or critical (See Table 1 for OHSS severity classifications). Grades of OHSS are not strictly separated, and women can transition quickly from one to another (Humaidan et al., 2016). Mild OHSS is more common (approximately one in three women undergoing IVF treatment); moderate and severe OHSS is less common (up to 8% of women for combined moderate and severe OHSS; RCOG, 2016).

Ovarian hyperstimulation syndrome can further be classified as 'early or 'late' OHSS (RCOG, 2016) (see Table 2). Late OHSS is usually more difficult to control, lasts for longer and is likely to be more severe. OHSS can occur whether women become pregnant or not. There are certain risk factors which may make development of OHSS more likely, including age (30 years or younger), low body-weight, polycystic ovary syndrome, and high follicle count after stimulation drugs have been administered (Humaidan et al., 2016).

The clinical symptoms linked to OHSS are acknowledged to be highly variable, and some degree of OHSS is to be expected following administration of the follicle stimulation drugs (Humaidan et al., 2016). However, initial presentation typically includes abdominal distension due to increased ovarian size and accumulation of fluid. The RCOG OHSS information guidance also advises women to be aware of discomfort/pain, nausea/vomiting, shortness of breath, reduction in urine output, increased thirst and the potential for formation of blood clots in legs or lungs (RCOG, 2016).

Currently in the United Kingdom, OHSS is typically managed conservatively, where women with OHSS are monitored by their clinical teams until their symptoms become severe, at which point they are generally admitted to hospital (RCOG, 2016). Once in hospital, treatment can vary dependent on symptoms. Hospital treatment may include daily blood tests, clinical and laboratory investigations such as ultrasounds and chest x-rays, intravenous fluids, analgesia for pain, antiemetics for nausea and vomiting, and monitoring of fluid intake and urine output. In-patient management may also include drainage of ascitic fluid (paracentesis) to improve symptoms and overall condition (Levin et al., 2002; Qublan et al., 2012). Duration of hospital admission is estimated to be approximately 3 days (NHS Digital, 2011). However, dependent on the severity of the OHSS and the possible need for intensive care treatment, length of stay may be much longer (Csokmay et al., 2010).

2.3 | Existing literature

Research on OHSS has predominantly focused on medical aspects of the condition such as incidence (Tomas et al., 2021), prevention (Mourad et al., 2017), and management (Zeng et al., 2019). There is currently little research internationally that explores the experiences of women who have had OHSS, or the perceptions of healthcare professionals who manage OHSS. We found only one qualitative study related to experiences of OHSS (Chang & Mu, 2008). However, the main aim of that study was to report the impact of OHSS-related hospitalisation on family life, and the associated stresses of fertility treatment, rather than experience of having OHSS. No other qualitative studies related to OHSS appear to have been conducted to date; therefore, this study is the first qualitative exploration of the experience and management of OHSS.

TABLE 1 Severity of OHSS based on RCOG guidelines (RCOG, 2016).

Mild	Abdominal bloating, mild abdominal pain, ovarian size usually <8 cm
Moderate	Moderate abdominal bloating, ovarian size usual 8–12 cm, nausea with or without vomiting, fluid accumulation in abdomen (ascites) confirmed by ultrasound scan
Severe	Abdominal ascites confirmed by ultrasound with or without hydrothorax (excess fluid outside lungs in pleural cavity), low urine output (<30 mL/h or <300 mL/day), ovarian size >12 cm, blood haematocrit >0.45 (confirmed by FBC test)
Critical	Clinically obvious ascites with one of following: tense ascites or large hydrothorax, haematocrit > 0.55, white cell count > 25,000/mL, little or no urine output (<100 mL/day), thromboembolism, acute respiratory distress syndrome

TABLE 2 Categorisation of early or late OHSS (RCOG, 2016).

Early OHSS	Usually presents within 7 days of the final hCG injection and is usually associated with an excessive ovarian response
Late OHSS	Typically presents 10 or more days after the hCG injection and is usually the result of endogenous hCG derived from an early pregnancy

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3 | THE STUDY

3.1 | Aim

To explore the experiences of women who have had OHSS, and of healthcare professionals (HCP) who manage it, in fertility services in the United Kingdom.

4 | METHODS

4.1 | Design

We undertook a qualitative interview study with women who had recently experienced OHSS and HCPs (Doctors and Clinical Nurses) who work in fertility services and who are involved in the management of OHSS. A descriptive qualitative approach, using semi-structured interviews, was chosen in order to explore the experiences of participants. Doyle et al. (2020) highlight how a descriptive qualitative approach is particularly relevant in nursing and healthcare research, which often focus on how patients experience illness, and any related healthcare interventions. This approach provides straightforward descriptions of experiences and perceptions, often in areas where little is known about the topic (Sandelowski, 2010); this is particularly relevant to our study as it is the first to focus on experiences of OHSS.

4.2 | Sampling

Our patient inclusion criteria were women 18 years and over, able to read and understand English so they could give informed consent and participate in an interview conducted in English, and were at least 1 month post OHSS (once acute symptoms of OHSS were likely to have settled). The HCP inclusion criteria were HCPs who had experience of providing care for women undergoing fertility treatment who developed OHSS. We selected participants from six UK fertility centres based on diversity in terms of NHS and private clinics, and size to ensure we included small and large centres.

4.3 | Recruitment

At each fertility centre either a research nurse/midwife or the site principal investigator (PI) identified women who had experienced OHSS using clinical records, or during outpatient visits. The research nurse/midwife or PI approached the women with a brief explanation of the study and, if interested in participating, an introductory letter, an information sheet, and a response card with FREEPOST return envelope addressed to the research team were provided. Due to difficulties recruiting women via fertility centres caused by the COVID-19 pandemic, we also placed an online advertisement on the Facebook site of a fertility charity. We aimed for maximum diversity of sample in terms of both early and late OHH and different severity levels of OHSS.

Healthcare professionals were recruited by the site PI who gave an introductory letter with the university research team contact details, and an information sheet to potential participants, and asked for their permission to pass email details to the research team. HCPs could also contact the researchers directly to ask any questions and to arrange an interview if they wanted to participate. We aimed for maximum diversity in terms of clinical discipline and NHS or private care.

4.4 | Sample

We interviewed 10 women, both early and late OHSS, with a range of OHSS severity levels. Diagnosis of early or late OHSS was taken from the medical notes by the site PI or research nurse/midwife, and confirmed during the interview. Grading of mild, moderate or severe OHSS was reliant on reports from the women interviewed, and based on what they had been told by their clinical team, and on the symptoms reported in the interviews. We interviewed eight HCPs with an equal number of doctors and nurses, from both NHS and private fertility centres.

We undertook fewer interviews then planned due to delays caused by COVID-19 (18 compared to the planned 24–31). However, we were satisfied with the diversity, with the exception of the paucity of women who had experienced late OHSS. As recruitment progressed, in an effort to recruit more late cases, we asked recruiting staff to specifically identify more women with late OHSS. However, even with this proactive approach we were not contacted by any further women with late OHSS. We felt that we achieved data saturation because no new findings were apparent as we approached the end of recruitment and interviewing. More detailed participant demographic information can been seen in the 'Results' section.

4.5 | Data collection

We conducted qualitative semi-structured interviews with women and HCPs virtually or by telephone between December 2020 and May 2021. We did not undertake face-to-face interviews due to the COVID-19 pandemic. We asked women about their experiences of OHSS, and any treatment they received for it. We asked HCPs about current experiences of managing and treating OHSS, including discussion of local protocols. Example topic guides can be seen in Appendix S2.

The interviews were undertaken by two experienced qualitative researchers, one a psychologist (SD) and one a university-based nurse researcher (EL). Interviews were audio-recorded on an encrypted digital recorder. Reflexive notes were made during and after the interviews. Women's interviews lasted an average of 77 min (range 54–116). HCP interviews lasted an average of 52 min (range 29–63).

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4.6 | Rigour

Rigour, as a means of establishing the trustworthiness in the findings of a qualitative study, can be demonstrated by considering four criteria: credibility, transferability, dependability and confirmability (Guba & Lincoln, 1994). To ensure credibility the researchers first looked for existing literature to familiarise themselves with the phenomena; however as there was little that exists, the qualitative research team used discussions with the trial clinical and PPI co-applicants to gather in-depth information. In addition, in order to include varying perspectives the researchers ensured that the sample was diverse, by sampling from a range of participants in terms of differing levels of severity and classification in women with OHSS and different professions and settings for HCPs. To demonstrate transferability we have provided detailed contextual information about the participants and settings in the study so that readers can conclude whether or not the findings are applicable to them or their healthcare settings. To achieve dependability we have described the study in sufficient detail to allow it to be reproduced by others; this includes the presence of interview topic guides as supplementary information which can often be a helpful resource for other researchers. To establish confirmability that the findings are reflective of the participants' experiences a selection of quotes has been used. Researcher reflexivity, and awareness of the potential for bias, is also key to ensuring rigour. Before the study started the two researchers conducting the interviews (EL, SD) discussed how their professional and personal backgrounds could have the potential to influence their approaches to the research in an effort to mitigate this. In addition, detailed reflexive notes were made immediately after each interview and used to support the analysis of the data. In order to further demonstrate the quality and rigour of the study this paper has used the Consolidated Criteria for Reporting Qualitative Studies checklist (COREQ; Tong et al., 2007), to enhance the reporting of the study, demonstrating the comprehensiveness and quality of methods and approach. (See Appendix S1).

4.7 | Data analysis

All recordings were transcribed verbatim, anonymised for identifiable information and erased after transcription. EL and SD listened back to recordings in conjunction with field notes to identify missing or inaccurate data. Data collection and analysis was iterative, whereby learning from the early interviews was discussed by the research team to ensure that the topic guide adequately captured relevant data. After six interviews (three women and three HCPs) in two centres, we created a grid of themes to determine if any revisions to the topic guide were needed.

EL and SD used framework analysis (Ritchie & Spencer, 1994-2002). They read the transcripts for familiarisation. They developed a coding frame of 'a priori' themes (based on the research objectives) and 'emergent' themes (based on reading transcripts). SD left the project before the full analysis commenced therefore the coding of transcripts was carried out solely by EL, using NVivo 12™. EL applied the coding frame to each transcript in NVivo, and then considered the content of the themes and relationships between themes. EL discussed the coding and themes on a regular basis with AOC.

4.8 | Ethical considerations

Ethical approval was obtained from the Cambridge South NHS Research Ethics Committee (20/EE/0123). All participants were given detailed information about the study purpose, and what involvement would entail; informed consent was also obtained from everyone. Confidentiality was maintained by removal of identifying data from transcripts and through use of alphabetical and numerical identifiers unique to each participant to preserve anonymity.

Due to the subject matter of the interviews (OHSS developed during fertility treatment) the research team were conscious that the interviews could be upsetting for some participants. In order to manage the potential for distress we ensured that the interview topic guide was constructed with input from the study patient/public co-applicant and an experienced fertility research nurse. The topic guide was also reviewed by the (group name removed for anonymity) patient and public involvement group. The participant information sheet advised that women could pause, or stop the interview altogether, if they became upset; this was also reiterated at the beginning of the interview. The two researchers that conducted the interviews are a nurse (EL) and health psychologist (SD) by background; both have extensive experience of interviewing, including covering sensitive topics and how to support interview participants. Throughout the interviews themselves the researchers were alert to any signs of distress. Some women did become emotional while being interviewed and were given the opportunity to pause or stop; no-one felt the need to do so. As part of the research plan the team had a process outlined to refer women back to their fertility centre, or to signpost them to additional support, if it was felt to be necessary.

5 | RESULTS

5.1 | Participants

We sampled from six centres in England and Scotland including four NHS and two private sites. We interviewed 10 women (seven early OHSS, two late OHSS and one woman who had had both early and late OHSS; five mild, two moderate, one moderate–severe and two severe OHSS; two of the 10 women had been hospitalised for OHSS). We interviewed eight HCPs: four doctors and four nurses.

Women came from a mix of English or Scottish social deprivation quintiles where quintile 1 is the most deprived and quintile 5 is the least deprived/most affluent: quintile 1: $n=2$, quintile 2: $n=1$,

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quintile 3: $n=3$, quintile 4: $n=3$, quintile 5: $n=1$. One woman self-described as British Asian and the other nine as White British. The age range of women was 28–39 (average 30).

5.2 | Themes

We identified three themes: the significant impact of symptoms on women's lives; the challenges of 'active monitoring' as a way of managing OHSS; and the mismatch between women's and HCP's perceptions of information, communication and decision-making relating to OHSS. Quotes are used to illustrate the findings with each interviewee having a unique number. Women are identified as P and the stage and classification of OHSS indicated. HCPs are identified as HCP and the clinical discipline indicated.

5.3 | The significant impact of symptoms on women's lives

The most commonly reported symptoms by the women interviewed were abdominal pain, bloating and distension, nausea and vomiting, loss of appetite, being unable to pass urine (or only in very small amounts) and shortness of breath. All the women described difficulties sitting and walking caused both by the abdominal bloating and shortness of breath. Two women also reported having diarrhoea, and another reported headaches. HCPs highlighted the same symptoms but also mentioned more extreme symptoms of severe OHSS, such as vulva oedema, that made it impossible for women to walk.

> So I'd just found I felt very short of breath and then very bloated [...] But it was mainly shortness of breath. I was struggling to lie flat, so I had to be really propped up. [...] Just walking up the stairs and things I was quite out of breath.
>
> P03 (Late mild OHSS)

> I knew it wasn't going to be easy but the OHSS [...] made it a million times worse because you're feeling [bad] anyway, because you're having to go through the [fertility] process and then your belly is completely swollen too. I couldn't even lie on my stomach at night and the only thing that helped was a hot water bottle. The nausea was terrible as well. It really took over.
>
> P08 (Early moderate OHSS)

These symptoms impacted on women's physical functioning and ability to work, and had detrimental consequences for their subsequent fertility treatment which impacted on their emotional health. Even women with mild OHSS described physical symptoms lasting for at least a week, and often a number of weeks. Of the 10 women interviewed, seven were signed off from work because of OHSS, while two pre-emptively booked time off from work for their planned egg collection which covered the period they had OHSS. A woman who had severe late OHSS described being signed off work for nearly 3 months due to ongoing symptoms.

The nature of women's employment had some influence on their length of time off work. For example, women in demanding face-to-face roles such as nursing or teaching felt unable to work until symptoms resolved.

> I think had I not done the job I do and sort of being on my feet for a long time, I probably would've gone back to work a bit sooner, but I just didn't feel that I could manage a twelve hour shift with it.
>
> P03 (Late mild OHSS)

Developing OHSS also caused delays to ongoing fertility treatment for women in the sample. Women were not mentally prepared for having parts of their treatment cancelled, and found having to wait longer for the next stage upsetting. One woman described how at the beginning of her fertility treatment she had been told that the ART process would take 3–4 months, but OHSS extended this to over 6 months. As well as delays to the fertility process, women described facing unexpected financial consequences in both private and NHS fertility centres. For example, one of the women having private treatment developed blood clots because of OHSS, and had to pay for the anticoagulant injection treatment as well as the storage of her frozen embryos.

Having even mild OHSS, and the subsequent delays to their fertility treatments negatively impacted on women's emotional health, even in the context of them being willing to put up with considerable challenges to have a baby.

> I think at that point I was like 'when is this going to stop?' I've gone from feeling ill all the way through it to thinking 'right, I've had collection, I'll feel better' to feeling ill again. I think if I'd have not had [OHSS] I might have been in a better frame of mind ...'
>
> P18 (Early mild OHSS)

5.4 | The challenges of 'active monitoring' as a way of managing OHSS

Healthcare professionals described a variety of ways of trying to prevent OHSS including reducing the number of eggs collected, using a 'short protocol/antagonist cycle' or freezing the embryos rather than doing fresh embryo transfers. These preventative measures did not always work. Therefore, HCPs also described the importance of monitoring women at risk of OHSS for example, younger women, women with polycystic ovaries and where larger numbers of follicles and eggs were produced.

Mild and moderate OHSS was managed through 'active monitoring' although this varied between clinics and doctors. HCPs

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suggested that they would advise women who they thought were at risk of OHSS to drink plenty of water, move around, observe the colour of their urine (light not dark) and monitor nausea, vomiting and abdominal distension. HCPs were aware of the variation in approaches taken by their colleagues, from relaxed through to conservative.

> you get some doctors that are more relaxed about things 'don't worry it'll be alright, you know you can stay at home, come back in a couple of days, drink a bit more and we'll monitor your bloods' and usually that kind of approach does seem to be right and that lady does come back a couple of days better and probably things are getting better but then you've got- you get some doctors who are more conservative and they will be asking for TEDS stockings and a measurement of the abdomen. We don't measure every lady's tummy. It's those doctors who are more conservative or…some of them are more exacting on the things we need to monitor.
>
> HCP5 (NHS nurse)

All HCPs in our sample stated that women at risk of OHSS were contacted on a regular basis by clinical staff – either daily or every 2–3 days, as part of the monitoring process. Women with OHSS were also advised to contact the centres if they felt that their symptoms were worsening. The women interviewed echoed this but described struggling to understand if their symptoms were due to the fertility treatment or due to OHSS, making them uncertain about making contact with clinics. Women who had experienced previous cycles of ART were able to compare their current response to previous treatment, giving them more confidence in identifying symptoms of OHSS.

Women in the sample with mild or moderate OHSS found the lack of 'active treatment' difficult. One woman attended her clinic twice in the same day due to her symptoms. Another found it difficult to accept that monitoring was the only option, particularly when staff had initially seemed so worried.

> There were quite a few people in the room at some point, I think about 7 other people in the room kept coming in and out, obviously they seemed to be quite worried. But then they just sent me home and just said 'just monitor it'.
>
> P13 (Late severe OHSS)

Some women did not feel that they were sufficiently monitored. There were instances of women being sent home after attending clinic due to their symptoms, with very vague instructions on what to do, and being unsure if, or when, they would be contacted by the clinic. Other women described being seen by HCP who did not seem to understand what OHSS was. Furthermore, one woman described how different HCP had measured her swollen abdomen in different places, each using different units of measurement, so that rate at which her abdomen was increasing was not accurately recorded. Overall, there appeared to be a lack of continuity and communication from clinical teams about monitoring at home. However, not all women had negative experiences.

> I was so happy when they said 'right come to the clinic, we need to check you over'. I was thrilled because I was like 'oh, they listened to me'.
>
> (P08 early moderate OHSS)

Healthcare professionals in the sample expected to admit, to an inpatient bed, any women with severe OHSS or whom they suspected was developing severe OHSS. They monitored women for worsening clinical presentation such as increased shortness of breath or decreased urine output. Once hospitalised, HCPs described treatments such as regular clinical observations, daily blood tests, chest x-rays, thromboprophylactic injections and/or stockings, IV fluids, pain relief, antiemetic's, fluid balance monitoring and potential paracentesis to drain ascites. Two women in the sample were admitted to hospital for a number of days for treatment. One was given pain relief and IV fluids and drugs to improve her kidney function; she felt relieved to be in hospital and receiving treatment for her symptoms. The other had severe shortness of breath and bloating; she felt like she would rather have been at home and that things could have been monitored by attending the outpatient clinic.

5.5 | The mismatch between women's and HCP's perceptions of information, communication and decision-making

There appeared to be a mismatch between how well the HCPs felt that they communicated with women about OHSS, and the experiences of the women from those centres. The HCPs that were interviewed seemed confident that their fertility centres provided comprehensive information about OHSS to women both verbally and in writing, including about the risks of developing OHSS, what the symptoms might be, and what the women should do if they developed symptoms.

> All patients who undertake treatment at [name of centre], they are given information leaflets about the risk of OHSS, the symptoms to watch for, and they are given contact details for out of hours to attend an early pregnancy unit.
>
> HCP02 (NHS doctor)

> For every patient that we think there is going to be a risk of OHSS they are given written instructions about fluid intake and about monitoring urine

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> output, and shortness of breath symptoms to look out for and have an emergency contact number to call us 24/7.
>
> HCP11 (Private Consultant)

Yet the majority of women in our sample did not feel that they received enough information, or for some any information at all, prior to, or indeed after, they developed OHSS. In fact, two women in our sample were not aware that they had had OHSS until they were approached to take part in our study.

> I'd never even heard of it before, you know, before it came on.'
>
> P02 (early mild OHSS)

> There's no leaflet, there's not even stuff in the department, you know, like sometimes there's stuff up in the department or in the scan rooms to say that if you have the following symptoms then you probably have got OHSS. There's literally no official documentation for it and even when I was trying to explain it to [person] I didn't have a lot of information to go by. I just had whatever was on the internet.
>
> P01 (early mild OHSS)

Women highlighted problems not just with the amount of information they received but also with how it was communicated. Some women could recall discussion of OHSS with their clinical team during their fertility treatment but described it as lacking detail or not being given much importance: 'it wasn't being given much weight' (P03 late mild OHSS). Sometimes OHSS was not mentioned specifically; rather *'doctors talk around it (OHSS)'* (P06 early moderate OHSS).

One woman in the sample was pleased with the information she received about her OHSS risk at the beginning of the ART process; this had given her the opportunity to do her own research. The importance of doing their own research in order to feel properly informed about OHSS, was also mentioned in another interview. This woman pointed out the contrast between all the information she had received about other aspects of the fertility treatment compared with the lack of communication about OHSS. She emphasised the importance of being kept informed as a way of preventing additional worry.

> It was barely mentioned, it was just like 'Oh it could happen, read the bottom of this leaflet and if you've got any symptoms', but to be honest I did a lot of research myself to find out.
>
> P13 (Late severe OHSS)

As a result of the perceived lack of information about OHSS from their fertility centres, women discussed doing their own research and turning to other sources of information and support such as the internet, digital forums and social media. While some women were happy to do their own research, most felt that they were left with no choice due to the lack of information from their care teams. Some women found these sources of information helpful either because they provided additional information or were a place where they could talk to other women who had been through similar experiences. The downside was that information focused on the more severe end of OHSS, which raised anxiety in some of the women in our sample, and could contain inaccurate advice from non-clinical sources.

The mismatch between HCPs and women's perceptions of information and communication about OHSS was also evident in decision-making linked to frozen embryo transfers. Again, HCPs discussed decision-making by describing how during fertility treatment they gave women information about the possibility of not being able to have a fresh embryo transfer, if they were to develop OHSS, therefore they would need to have a frozen embryo transfer. However, the women in this sample reported being unaware that OHSS could cause delays in fertility treatment, or that there could be the possibility they might need to have a frozen embryo transfer at a later date, rather than a fresh embryo transfer on the date planned. Some women highlighted how decision-making occurred at an inappropriate timepoint in their care and when they had presented at clinic for a fresh embryo transfer, but a decision was made not to do the fresh transfer but freeze the embryos and delay transfer. These women felt they did not have all the information about frozen transfers that would be needed to make an informed decision at this time.

> So, she explained to me while I was on the table about frozen transfers, because again I hadn't looked at frozen transfers because I was under the impression I was having a fresh transfer. They hadn't said that this could possibly happen. It was literally just while I was lying there on the bed just before they transferred they told me… And obviously at this point I didn't know about frozen transfers, so I was like what is. Is that safe? Is that normal? Does that affect the embryos?
>
> P01 (Early mild OHSS)

6 | DISCUSSION

Women described a range of symptoms and severity of OHSS, with both a physical and emotional impact. The severity of some physical symptoms, such as shortness of breath and abdominal swelling caused disruption to women's lives, and for some it necessitated time off work. For some women OHSS resulted in a delay to their fertility treatment, which caused emotional distress. HCPs from different centres described a variation in how OHSS was managed, although in general this involved 'active monitoring' unless symptoms became severe, at which point they were typically hospitalised. Women felt left in limbo while waiting for symptoms to improve or

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worsen, and described a lack of control during this time. Women felt information regarding OHSS, including potential delays to the cycle and future fertility treatment was missing. Many resorted to using other sources such as the internet, which could provide worrying, and at times inaccurate, information. This did not align with HCPs perceptions of information giving, as they felt adequate information was provided. OHSS often resulted in women having to make unplanned decisions about their fertility treatment, which they felt ill informed to do; at times decisions were taken out of their hands. Again there was a mismatch between women's and HCPs perceptions as HCP felt that they provided enough information for women to make informed decisions.

Although there is a wealth of existing OHSS-related research that focuses on medical aspects such as incidence, prevention, diagnosis and management, classification, risk factors and predictors, treatment outcomes and pregnancy outcomes, there appears to be little research reporting women's experiences of OHSS. We identified only one qualitative research study undertaken in Taiwan (Chang & Mu, 2008). It found that hospitalisation of women for OHSS can cause considerable family stress including disruption of work and childcare for the whole family, as well as anxiety about the women's health and the pain she experiences. There are similarities to our findings as this study describes both the physical impact of OHSS symptoms, and how insufficient knowledge and information about OHSS symptoms is a major source of stress. However, much of Chang and Mu's study focuses on the impact of hospitalisation itself, rather than the OHSS, and does not include women with less severe OHSS who were not hospitalised. Therefore, our study is the first to focus on the experiences of women affected by all levels of OHSS, and include the experiences of HCPs providing care for OHSS.

The symptoms reported by the women in this study were of a similar nature to those identified in information and guidance issued by bodies such as the Royal College of Obstetrics and Gynaecology (RCOG, 2016). However, the impact of symptoms is very subjective, and while for some women there was only mild impact on activities of daily living, for others symptoms were far more debilitating. HCPs reported variation in active monitoring of OHSS which means that different doctors may interpret the RCOG OHSS guidance in different ways, and that fertility centres are likely to have different local OHSS protocols for management and treatment.

A key finding was the provision and communication of information by HCP to women about OHSS and its management. The importance of information provision in fertility treatment is not new and it is a significant aspect of the provision of patient-centred care (National Institute for Clinical Excellence (NICE), 2004). Being actively involved in decision-making and making informed treatment choices are part of the key principles of the Human Fertility and Embryology Authority, which specifies that patients should be provided with sufficient and accessible information in order to make informed decisions (Human Fertilisation and Embryology Authority, 2021). Our findings about information and decision-making echo those relating to fertility care more widely. In an overview of information giving in fertility clinics, low user satisfaction with provision of fertility treatment information has been highlighted (Mounce, 2013) and given as a reason for seeking information and support from other sources such as websites and internet forums (Hinton et al., 2010).

There is a challenge to providing both the right level and right amount of information about OHSS, in an acceptable format and at the right time, without inducing anxiety unnecessarily, to women receiving fertility treatment. However, it was clear in this study that there was a mismatch between the perceptions of the women and HCPs interviewed. Again, this finding aligns with other research about fertility services more widely (Aarts et al., 2011; Klitzman, 2018). HCPs should be prepared for the fact that they may be asked to repeat information, or expand on aspects of treatment that they have already discussed, and that women may need opportunities to seek further clarity (Mounce, 2013). HCPs may seek to achieve a balance between providing overly positive or negative information and therefore approach the possibility of developing OHSS with caution. It has been found that HCPs providing fertility treatment often communicate potential problems poorly, or not at all, despite women being willing to understand potential difficulties related to their fertility treatment (Klitzman, 2018).

6.1 | Strengths and limitations

A key strength of the study was that we managed to interview a diverse set of women and HCPs from different types of fertility centres, women who had a range of levels and grades of OHSS and with both early and late OHSS, and both doctors and nurses from NHS and private clinics. There were five limitations. First, the sample was smaller than planned due to the COVID-19 pandemic causing the closure of fertility centres during part of our study, and finding smaller numbers of OHSS cases than expected. Even though the sample size was smaller than expected, the dataset was rich in relevant insights so we had sufficient information power to explore this topic (Malterud et al., 2016). Second, we did not interview as many women with late OHSS as we had planned despite concerted efforts to recruit them. It may be that women with early OHSS were easier to recruit as they were still going through fertility treatment whereas those with late OHSS would be pregnant, potentially have miscarried or have a young baby, and therefore less likely to participate. Third, we excluded women who could not speak English. It is likely that issues around information, communication and decision-making would be more challenging in this population than those discussed here. Fourth, by only interviewing women who have had OHSS we did not explore the impact of OHSS on their partners and wider family members. Finally, this study was undertaken in the United Kingdom where NHS-funded fertility treatment may be free, for a small number of people, in some areas, although the qualifying criteria for funded treatment does vary across the United Kingdom. We did include some private healthcare centres and patients; however, the findings may not be transferable to countries where all fertility treatment is paid for either by health insurance or privately. Despite

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this, research has shown that although fertility-related healthcare organisation and performance may differ between countries, there are similarities between users' perspectives of fertility care in a number of European countries (Dancet et al., 2012). The value placed on provision of information and communication were two key findings from their study, thus demonstrating the similarity to our study.

7 | CONCLUSION

Ovarian hyperstimulation syndrome and its management can have a significant physical and emotional impact on women and their fertility treatment. Improvements could be made to the information women receive about this condition, its management and its implications for wider fertility treatment.

8 | RELEVANCE TO CLINICAL PRACTICE

Relevance to clinical practice: Nurses are used to supporting women through the physical and emotional stresses of fertility treatment in general. They are therefore well-placed to provide specialist information and support regarding OHSS, and ensure that women are fully informed about all aspects of this condition, including potential delays to fertility treatment. Providing women with clear information about fertility treatments, and complications such as OHSS, is likely to reduce levels of stress and anxiety (NICE, 2004). With easy access to unregulated and potentially inaccurate sources of information on the internet, it is even more important to ensure that fertility services provide information that is reliable, timely and easy to understand.

Implementing novel methods of communicating fertility treatment information, in a timely manner, such as using a phone app, have been tested (Timmers et al., 2021). The study reported a small increase in levels of satisfaction and knowledge; however, this was a very small-scale trial, and was related to general fertility treatment rather than specific risks such as OHSS. Consideration should be given to how and at what point OHSS information is provided to women. Further research could focus on the type of information women would like about OHSS, its management and its implications of fertility treatment at different points along the fertility treatment pathway.

AUTHOR CONTRIBUTIONS

Elizabeth Lumley: Data curation (equal), formal analysis (lead), investigation (equal), methodology (equal), project administration (equal), resources (equal), validation (equal), visualisation (lead), writing–original draft preparation (lead), writing–review and editing (lead). Alicia O'Cathain: Conceptualisation (lead), formal analysis (equal), funding acquisition (lead), methodology (lead), supervision (lead), validation (equal), writing–review and editing (equal). Sarah Drabble: Conceptualisation (equal), data curation (equal), formal analysis (equal), funding acquisition (equal), investigation (equal), methodology (equal), project administration (equal), resources (equal), validation (equal), writing–review and editing (equal). Clare Pye: Conceptualisation (equal), funding acquisition (equal), validation (equal), writing–review and editing (equal). Katie Brian: writing–reviewing and editing (equal). Mostafa Metwally: Conceptualisation (lead), funding acquisition (lead), validation (equal), writing–review and editing (equal).

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CONFLICT OF INTEREST STATEMENT

Alicia O'Cathain was a member of a subpanel for the National Institute for Health Research (NIHR) Programme Grants for Applied Research (PGfAR) programme (2007–17). The authors report no other conflicts of interest in this work. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

PATIENT AND PUBLIC CONTRIBUTION

A PPI representative from Fertility UK was a co-applicant, involved in the design and development of the study. As a member of the management group, they were also involved in feeding back on the study at meetings to feedback progress and design. Another study PPI representative took part in the reviewing and editing of this paper. The plan for recruitment, and study participation and consent documents, were also presented to members of The Jessop Wing Reproductive Health Public Advisory Panel for their feedback and recommendations.

ORCID

Elizabeth Lumley https://orcid.org/0000-0002-8962-7568
Alicia O'Cathain https://orcid.org/0000-0003-4033-506X
Sarah Drabble https://orcid.org/0000-0001-7183-6321
Clare Pye https://orcid.org/0000-0003-4929-7215

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Kate Brian https://orcid.org/0000-0002-1583-0416
Mostafa Metwally https://orcid.org/0000-0003-4022-1740

TWITTER

Alicia O'Cathain @aliciaoc55
Sarah Drabble @sarahdrabble
Clare Pye @STOP_OHSS

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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