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CLINICAL ARTICLE

Obstetrics

Health-related quality of life and quality of care in pregnant and postnatal women during the coronavirus disease 2019 pandemic: A cohort study

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Abstract

Objective: Health-related quality of life (HRQoL) and the delivery of high-quality care are ongoing concerns when caring for pregnant women during the coronavirus disease 2019 (COVID-19) pandemic. We compared self-reported HRQoL and hospital quality of care among perinatal women with and without COVID-19.

Methods: This is a prospective cohort study of perinatal women attending a tertiary maternity unit during the pandemic. Eighteen women who tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and 20 SARS-CoV-2-negative women were recruited. Participants completed the Short Form Health Survey (SF-12), Clinical Outcomes in Routine Evaluation-Outcome Measure, and Quality from the Patient's Perspective questionnaires. Mean scores were compared.

Results: Of the Non-COVID-19 cohort, 95% (n = 19) were Caucasian, whereas 67% (n = 12) of the COVID-19 cohort were not Caucasian (χ^2 = 16.01, P < 0.001). The mean SF-12 for physical health in the COVID-19 cohort had significantly lower scores (P < 0.002). There was no difference in mental health and well-being between cohorts. The quality of care experienced was notably similar and very positive.

Conclusion: There was a significantly greater burden on physical health among pregnant women with COVID-19. Mental health and psychological status were similar in both groups. High quality of care during a pandemic is possible to deliver in a maternity setting, irrespective of COVID-19 status.

KEYWORDS
coronavirus disease 2019, mental health, pregnancy, quality of health care, quality of life

1 | INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a serious public health emergency. With rising numbers worldwide and ongoing surges, the impact of COVID-19 has been felt especially among vulnerable and high-risk cohorts such as pregnant women.[1,2] Immunosuppressed, pregnant, as well as Black, Asian, and ethnic minority cohorts are among the most vulnerable to the physical and psycho-social effects of COVID-19.[1,3,4]

To date, the literature has been mixed, with initial reports that no vertical transmission from pregnant mother to fetus was possible[5];

however, recent evidence suggest that, although rare, SARS-CoV-2 in utero vertical transmission is possible.[6] However, pregnant women in previous coronavirus epidemics of SARS-CoV and Middle East respiratory syndrome coronavirus often suffered more severe illness than their non-pregnant counterparts, with increased risk to mother and fetus.[7] The severity of COVID-19 in pregnant women is similar to that in non-pregnant adults, with no increased risk of spontaneous abortion or preterm labor.[8] In fact, pregnant women are affected less by COVID-19 compared with the non-pregnant population,[9] though they may also be more at risk of severe illness if in respiratory failure.[5]

The COVID-19 pandemic and its sequelae have also caused mental health challenges, affecting pregnant women and their partners.[10] Perinatal anxiety is an emerging consequence of the pandemic, with implications for physical health.[11] The impact of COVID-19 on pregnant women is not only the direct impact of contracting COVID-19, but also the indirect impact of lockdown, social distancing, and isolation measures, as part of the international efforts to stem the spread of the virus.[2]

Recommendations are that pregnant women with COVID-19 require specialist care in relation to diagnosis, management, and prevention of complications for mother and baby.[9] Quality of life and quality of care are commonly used measures to ascertain health-related quality of life (HRQoL) and the woman's perspective of the quality of care received in healthcare settings. This research evaluated HRQoL and quality of care among pregnant and postpartum women in an Irish maternity unit during the COVID-19 outbreak. It was conducted to gain insight into the physical and mental well-being of pregnant women and review the quality of care provided during the COVID-19 pandemic. It aims to inform healthcare providers in providing pregnant women with the best care during this ongoing high-risk period.

2 | MATERIALS AND METHODS

2.1 | Study design and participants

This was a prospective cohort study on HRQoL and quality of care for pregnant and postnatal women attending an Irish tertiary maternity hospital, during the COVID-19 pandemic. Women were recruited from June to July 2020 to complete the Short Form Health Survey (SF-12), the CORE-Outcome Measure Questionnaire (CORE-OM), and Quality from the Patient's Perspective questionnaire (QPP) and provided basic anonymous demographic information. Questionnaires were available through Creative Commons Attribution license.[12–14] Data were anonymously collected and were not linked to maternal medical records. All questionnaires were completed by a single researcher for consistency. Women were recruited during maternity service interactions and from a voluntary COVID-19 registry, following completion of a Cohen power primer analysis recommending 26 participants per group. The latter is an institutional registry of pregnant women who tested positive for SARS-CoV-2 during pregnancy and consented to being contacted for future research. Eighteen women who were SARS-CoV-2-positive consented to complete this research project, all of these women had SARS-CoV-2 infection during the prenatal period and completed the questionnaire within <4 weeks postpartum. Twenty perinatal women who had never had signs, symptoms or positive results for SARS-CoV-2 were recruited from the postnatal wards and completed the questionnaire within <4 weeks postpartum. Women were eligible to participate if they attended the maternity unit during the COVID-19 pandemic, if they had capacity, spoke English, and were at least 18 years old.

2.2 | Questionnaire tools

The SF-12 is a widely used instrument for assessing general health and outcomes; it was used to measure HRQoL. The SF-12 measures physical and mental health using 12 questions. Summary scores for the physical and mental component summary were collated according to published guidelines.[15] A low score represents poorer quality of physical or mental health.

The CORE-OM is a 34-question validated self-reported questionnaire, using a five-point scale that ranges from "not at all" to "most of/all the time".[13] Four dimensions are captured, including: women's well-being, problems and symptoms, life functioning, and risk/harm. Mean and total scores were calculated to quantify the level of psychological global distress. A higher score represents a higher level of health and less global distress in well-being, problems and symptoms, and life functioning. A high score in the risk/harm domain represents a higher level of psychological distress.

The QPP, a 24-question model for assessing a woman's perception and experience of the quality of care in a healthcare environment,[12] consists of four dimensions: medical-technical competence of the healthcare provider, physical-technical conditions of the healthcare organization, degree of identity-orientation in the attitudes and actions of the caregivers, and the socio-cultural atmosphere of the healthcare organization. Questions were answered using a Likert scale (1–4) including: "do not agree at all", "slightly agree", "mostly agree", and "completely agree".

2.3 | Statistical analysis

Data distribution was analyzed by parametric and non-parametric tools using mean (standard deviation) or median (range), and Student *t* tests or Mann-Whitney tests, respectively. Relations between nominal data were assessed by χ^2 analysis. Pearson correlation was used for parametric correlation analysis. Significance was deemed a P value < 0.05. Analysis was completed using Excel V16 (Microsoft Office Suite; Microsoft, Redmond, WA, USA) and GraphPad Prism V8 (GraphPad).

2.4 | Ethical approval

This study (REC 2020-016) was given ethical approval by the Rotunda Hospital Research Ethics Committee on June 23, 2020, and research was conducted in line with local research policies, European GDPR guidelines, and the Helsinki Ethical Principles for Medical Research.

3 | RESULTS

3.1 | Demographics

A total of 23 perinatal women who tested positive for SARS-CoV-2 consented for further research; 18 of these were recruited to this study, representing a 78% uptake rate. Of the 38 women who took part in the study, the mean age was 32 (± 6.6) years, 66% were Caucasian, and 74% (n = 28) were multiparous. Full demographics are detailed in Table 1 and were equally represented between COVID-19 and Non-COVID-19 cohorts. Of the Non-COVID-19 cohort, 95% (n = 19) were Caucasian, whereas 67% (n = 12) of the COVID-19 cohort were not Caucasian. This relation between ethnicity and COVID-19 status was significant (χ^2 = 16.01, P < 0.001).

TABLE 1 Patient demographics by COVID-19 and Non-COVID-19 cohort, with χ^2 analysis of relation, using a significance level of 0.05[a]

Demographics[b]	Non-COVID-19	COVID-19	P and χ^2 values
N	20	18	
Age	32.6 ± 7.6	31.3 ± 5.542	P = 0.583
Ethnicity			
Caucasian	19	6	P = 0.001
Other	1	12	χ^2 = 16.01
Parity			
Primigravida	4	6	P = 0.351
Multiparous	16	12	χ^2 = 0.868
Marital status			
Single	1	3	
Married	7	11	P = 0.162
Partnership/ co-habiting	11	4	χ^2 = 5.123
Divorced/widowed	1	0	
Education			
None	0	1	P = 0.858
Secondary level	5	3	χ^2 = 0.305
Higher level	15	14	
Income			
Comfortable	11	10	P = 0.989
Coping	8	8	χ^2 = 0.022
Difficult	1	0	
General health			
Very good	15	15	P = 0.529
Good	5	3	χ^2 = 0.395
Bad	0	0	

Significance of P < 0.001, χ^2 = 16.01 was seen between cohorts for ethnicity.

Abbreviation: COVID-19, coronavirus disease 2019.

[a]Values are given as mean ± standard deviation or as number.

[b]Age was analyzed by a comparison of the mean using t test.

3.2 | Health, well-being and physical questionnaire results

Women's scores on the SF-12 domains and the CORE-OM are presented in Table 2. There was no difference in the overall mental SF-12 between the two cohorts. The Non-COVID-19 cohort had a slightly higher but not significant SF-12 score. In the SF-12 physical domain for physical health and functionality the COVID-19 cohort had significantly lower scores (36.54 vs 49.21, 95% confidence interval [CI] 6.9–20.2, P < 0.001) (Table 2).

In sub-analyses of single items in the SF-12 questions women in the COVID-19 cohort reported having much less energy in comparison to women in the Non-COVID-19 cohort (3.27 vs 1.8, 95% CI −2.362 to −0.5937, P < 0.002). Women in the COVID-19 cohort were also more limited when climbing stairs (0.083 vs 1.45, 95% CI 0.132–1.1, P < 0.015), felt significantly more pain interfering with normal work and life functioning (2.28 vs 1.1, 95% CI −2.12 to −0.24, P < 0.016), and reported poorer results when asked about feeling downhearted and sad (2.55 vs 3.56, 95% CI 0.13–2.06, P < 0.027). There were no significant differences between cohorts in the overall CORE-OM score, or the CORE domains in well-being, functioning, problems/symptoms, or risk. However, in individual sub-analyses of questions, the COVID-19 cohort reported themselves as "lacking in energy and enthusiasm" (1 vs 2.11, 95% CI −1.93 to −0.29, P < 0.009) and suffering more "aches, pains or other physical problems" (1.3 vs 2.5, 95% CI −2.16 to −0.24, P < 0.016) compared with the Non-COVID-19 cohort.

Overall SF-12 mental health and well-being question results in both groups correlated with CORE-OM results by Pearson analysis (−0.787, 95% CI −0.9171 to −0.5067, P < 0.001).

3.3 | Quality of care questionnaire results

There were no significant differences in the overall scores between the COVID-19 and Non-COVID-19 cohorts in relation to the quality of hospital care received (Table 3). There was a statistically significant result between cohorts in the physical technical conditions domain, where the women in the COVID-19 cohort reported significantly more satisfaction in relation to nutrition received, equipment

TABLE 2 Results for SF-12 mental health, SF-12 physical health, and CORE-OM questionnaires in women with and without COVID-19[a]

Mental and physical well-being	Non-COVID-19	COVID-19	*P* value[b]
SF-12 MCS mental	45.12 ± 9.5	42.81 ± 11.5	0.432
SF-12 PCS physical	49.21 ± 7.2	35.64 ± 12.6	0.001
CORE W	1.08 ± 0.90	1.15 ± 0.84	0.785
CORE P	0.76 ± 0.69	1.14 ± 0.79	0.115
CORE F	0.52 ± 0.42	0.73 ± 0.60	0.207
CORE R	0.09 ± 0.28	0.02 ± 0.08	0.289
CORE-OM total	0.76 ± 0.52	0.61 ± 0.48	0.359

Abbreviations: CORE F, Clinical Outcomes in Routine Evaluation life functioning questions; CORE P, problems and symptoms-related questions; CORE R, risk and harm-related questions; CORE W, well-being-related questions; CORE-OM, CORE-Outcome Measure; COVID-19, coronavirus disease 2019; SF-12, Short Form Health Survey; MCS, Mental Component Summary; PCS, Physical Component Summary.

[a]Values are given as mean ± standard deviation.

[b]Analysis by comparison of means using unpaired *t* tests.

TABLE 3 Results for QPP Questionnaire in women with and without COVID-19, analysis by parametric comparison of the means using unpaired *t* tests[a]

Quality from the patient's perspective	Non-COVID-19	COVID-19	*P* value
QPP medical technical competence	3.63 ± 0.52	3.72 ± 0.56	0.582
QPP physical technical conditions	3.4 ± 0.71	4.00 ± 0.69	<0.004
QPP identity oriented approach	3.66 ± 0.41	3.69 ± 0.46	0.846
QPP socio cultural atmosphere	4.00 ± 0.38	3.98 ± 0.43	0.806
QPP total patient satisfaction score	3.67 ± 0.37	3.87 ± 0.39	0.804

Abbreviations: COVID-19, coronavirus disease 2019; QPP, Quality from the Patient's Perspective questionnaire.

[a]Values are given as mean ± standard deviation. Scores range from 1 to 4, with 4 (very good) being the highest rating for the quality of care received.

provided in the room and hospital, and the quality of the hospital bed (4.11 vs 3.4, 95% CI −1.18 to −0.24, $P < 0.003$).

4 | DISCUSSION

The cohort studied reflected the routine perinatal population attending our tertiary maternity unit. The proportion of non-Caucasian ethnic groups in the COVID-19 group was significantly higher. This reflects a national and international pattern whereby Black, Asian, and ethnic minority populations are seemingly more at risk of contracting COVID-19.[4] Most women in both cohorts were in a partnership/co-habiting, had secondary or higher-level education, were coping or comfortable financially, and reported a baseline good to very good level of health.

Global reports have highlighted the increase in anxiety in comparison to pre-pandemic levels,[16] including increased depression and anxiety in pregnant women and their partners.[17] In assessing HRQoL, we found no significant difference between COVID-19 and Non-COVID-19 cohorts of women in relation to their mental health and psychological well-being. Both groups reported similar psychological well-being scores by two validated measures, SF-12 and CORE-OM, and those scores correlated closely (−0.787, 95% CI −0.9171 to −0.5067, $P < 0.001$), supporting their validity. A similar pilot study in the UK reported no comparative difference in anxiety between prenatal women with or without COVID-19.[18] This study had smaller samples and used different validated tools. It found that sociodemographic influences during the pandemic might have a greater impact on mental health among perinatal women.[18] Our data echo these findings, suggesting that anxiety and mental health consequences seen during the COVID-19 pandemic are a product of the cultural and social environment rather than the SARS-CoV-2 infection itself.

Our data demonstrate a significantly higher physical burden for women who had COVID-19 during the pandemic period. They reported higher levels of fatigue, pains, aches, shortness of breath, and an overall decline in daily function (Table 2). Many common gestational signs and symptoms of pregnancy, such as physiological dyspnea, altered pulmonary function, congestion, and fatigue, are also manifestations of COVID-19, and we may have been underestimating the physiological impact among the COVID-19 cohort. It is unclear how the precise pathophysiology of COVID-19 in pregnancy can be both less severe generally among a pregnant cohort, and very severe among those women who have acute severe respiratory failure.[5,9,19] Some hypotheses include the protective hormonal environment attenuating severity, similar to hormonal effects shown in influenza infections during pregnancy.[20] Another hypothesis is the combination of the immunological response to viral pathogens transitioning to a T helper type 2 milieu, which favors anti-inflammatory cytokine expression and may reduce the severity of COVID-19 in pregnancy.[21] In spite of these hypotheses, much remains unknown; however our COVID-19 cohort reported an acute physical burden on their functional day-to-day physical capacity.

The format of healthcare delivery in hospitals and healthcare settings has experienced changes in an attempt to ameliorate the spread and risk of COVID-19 to women and healthcare workers. The healthcare environment has similarly adapted and re-developed to meet new emerging requirements to ensure safe and high-quality care.[19] Hospitals worldwide, including our site, have prepared to face severe disruptions to routine protocols and procedures. Similarly to international units, our site created a dedicated task force to ensure that specific protocols were developed and applied; new Emergency department triage protocols, patient isolation rooms, visitor restrictions, and COVID-19 delivery

and theater practices were implemented as per the latest government guidance. Dedicated COVID-19 theater measures were engaged and staff received up-to-date hospital developments as well as training in personal protective equipment, and patient and self-management.[22] Collaboration and hospital multidisciplinary team work are notably at the core of successfully managing the pandemic and current resurgences.[11] The positive consequences of these proactive measures are clearly seen in the quality of care results (Table 3). No differences were seen in the medical care received in the COVID-19 and non-COVID-19 cohorts. Women in the COVID-19 cohort were significantly happier with the element of care received, specifically the physical technical domain; but both the COVID-19 and non-COVID-19 groups had very positive results in this domain. The possible rationale for the COVID-19 cohort expressing significantly more satisfaction in relation to nutrition, equipment, and the quality of the hospital bed (4.11 vs 3.4, 95% CI −1.18 to −0.24, $P < 0.003$) might be a result of the isolation measures required for their COVID-19-positive status. These women will have received single rooms, with en-suite bathrooms, better sleep, and more targeted postnatal care to minimize interactions, and as such they may have felt there was greater care, both provision and quality, given to them than they originally may have expected. The overall positive responses between both groups across a broad range of quality assessments from outpatient, inpatient, emergency room, medical, and nursing care, to the quality of the hospital environment is highly reassuring. Our results reinforce that a high level of care can be delivered, and women's satisfaction can be maintained even when following stringent COVID-19 isolation and infection control management protocols.

The limitations of this study include the small sample number, the single center studied, the bias associated with women self-selecting for future research, and self-reporting results. Similarly, full maternal medical records were not accessed, and relevant history was excluded from the study. Future studies might look to complete multivariate analysis and power results with larger sample numbers, though post hoc power analysis of our significant differences between cohorts was well powered, there is a risk of type two error in results that were non-significant.

The management of COVID-19 in a pregnant woman remains an evolving challenge for obstetricians and physicians. It is imperative that pregnant women receive holistic care during these times. There is a real risk of increased maternal, fetal, and pregnancy complications among laboring and pregnant women who lack support, with literature highlighting the importance of social connections during pregnancy.[23] Specific strategies targeting maternal isolation or maternal stress, such as psychological first aid and effective risk communication, can reduce risk to women and their infants.[24] As the sequelae of the pandemic unfold, and as further surges arise, the care provided needs to focus on the added physical burden suffered by pregnant women who have contracted COVID-19, as well as psychological, emotional and mental health supports that too often are forgotten when other health crises present.[25] Additionally, maternity units must continue to meet the required demands for the expected quality of care, which we have shown is achievable, when caring for women, infants, and their families during this ongoing pandemic.

In the cohort of perinatal women with COVID-19 there was a significantly greater burden on women's physical health and well-being, in particular there was reduced energy and motivation in women with SARS-CoV-2 infection. Mental health and psychological status were similar in both groups; this may reflect that the higher mental health needs are not linked to infection but rather to the social, cultural, and healthcare environment. High quality of care during a pandemic is possible to deliver in a maternity setting, irrespective of COVID-19 status.

CONFLICTS OF INTEREST

The authors declare that the principal investigator for this research, Professor Michael PP Geary, is the Editor-in-Chief of *IJGO*. The other authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS

FA collected the data. FA and AW analyzed the data. FA, AW, FO'T, JD, RD, and MG were involved in writing and reviewing the final version of the paper.

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