

Pregnant women voice their concerns and birth expectations during the COVID-19 pandemic in Italy

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ABSTRACT

Background: In March 2020, COVID-19 was declared to be a pandemic. While data suggests that COVID-19 is not associated with significant adverse health outcomes for pregnant women and newborns, the psychological impact on pregnant women is likely to be high.

Aim: The aim was to explore the psychological impact of the COVID-19 pandemic on Italian pregnant women, especially regarding concerns and birth expectations.

Methods: A cross-sectional online survey of pregnant women in Italy was conducted. Responses were analysed for all women and segregated into two groups depending on previous experience of pregnancy loss. Analysis of open text responses examined expectations and concerns before and after the onset of the pandemic.

Findings: Two hundred pregnant women responded to the first wave of the survey. Most ($n = 157$, 78.5%) had other children and 100 (50.0%) had a previous history of perinatal loss. 'Joy' was the most prevalent emotion expressed before COVID-19 (126, 63.0% before vs 34, 17.0% after; $p < 0.05$); fear was the most prevalent after (15, 7.5% before vs 98, 49.0% after; $p < 0.05$). Positive constructs were prevalent before COVID-19, while negative ones were dominant after ($p < 0.05$). Across the country, women were concerned about COVID-19 and a history of psychological disorders was significantly associated with higher concerns ($p < 0.05$). A previous pregnancy loss did not influence women's concerns.

Conclusions: Women's expectations and concerns regarding childbirth changed significantly as a result of the COVID-19 pandemic in Italy. Women with a history of psychological disorders need particular attention as they seem to experience higher levels of concern.

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Statement of significance

Problem or issue

The COVID-19 pandemic has sparked fear, anxiety and concern throughout the world. Anecdotally, this has resulted in increased stress, anxiety, loneliness and depression, particularly for pregnant women.

What is already known

Although severe respiratory infections are usually associated with adverse health outcomes for pregnant women and babies, current evidence suggests that COVID-19 is not associated with a significantly increased risk.

What this study adds

Italian women are very concerned about COVID-19, particularly in relation to the health of their baby, partner and elderly relatives. While joy and feelings of closeness, safety, serenity and love characterised childbirth expectations before COVID-19; fear, loneliness, anxiety, danger and worry are now dominant.

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1. Introduction

The World Health Organization (WHO) declared coronavirus disease (COVID-19) to be a pandemic on March 11th 2020 [1]. SARS-CoV-2 is the novel coronavirus responsible for the associated respiratory infection designated as COVID-19. Most people infected with COVID-19 will experience mild to moderate symptoms including fever, fatigue, sore throat, cough and shortness of breath [2]. Emerging data indicate that people with comorbidities and those aged over 60 years appear to have an increased risk of severe respiratory disease and death [3], whilst pregnant women do not appear to be adversely affected [4]. At present, more than 170 countries and territories around the world are affected, with numbers rising daily [5]. By early June 2020, there were more than 7 million confirmed COVID-19 cases globally and more than 400,000 deaths, with significant numbers occurring in Italy, Spain and USA [6].

SARS-CoV-2 appears to have similar genomic sequencing to other known coronaviruses, such as SARS-CoV-1 (79% genomic analogy, associated with SARS) and MERS-CoV (50% analogy, associated with MERS) [7]. Despite genomic similarities there appears to be significant differences in disease sequelae, infectiousness and lethality. Both SARS and MERS were associated with severe respiratory infections, particularly in pregnant women [8]. Approximately, 30% of pregnant women infected with SARS died, compared to less than 10% of the general population; 60% of pregnant women required intensive care, compared to 20% of the general population [8]. Limited data available for MERS also reported severe disease with a Case Fatality Rate (CFR) in the order of 20–40%, with around 60–80% of women requiring intensive care admission [9].

For pregnant women, severe respiratory infections, like pneumonia, are usually associated with adverse health outcomes for both the women and babies, these include an increase in maternal mortality, eclampsia, low birth weight and preterm birth [10,11]. As a result, pregnant women are strongly encouraged to receive the seasonal flu vaccination [12]. Current evidence, although limited and constantly updating, suggests that COVID-19 is not associated with a significantly increased risk for pregnant women. Chinese researchers published the first paper of nine pregnant women during their third trimesters and found that clinical outcomes were comparable to those of non-pregnant women [13]. More recently, a retrospective epidemiological and clinical evaluation of medical records from all 50 COVID-19 designated hospitals in Wuhan city, China (first epicenter of the disease), showed that among 118 pregnant women with COVID-19, 92% had mild disease, and only one (0.8%) needed noninvasive mechanical ventilation [13]. The initial data from hospitals in northern Italy showed similar results [14]. According to a review of published papers, among 46 neonates whose data have been reported in the literature, no definite evidence of vertical transmission was present [4], resulting in cautious optimism among maternity providers.

The same cannot be said for the psychological impact on pregnant women, which might be significant. It is common for pregnant women with pre-existing psychological issues to experience a worsening of symptoms during and after pregnancy [15] and these will undoubtedly be exacerbated by COVID-19 concerns. Similarly, anxiety during and after pregnancy is not uncommon as women anticipate and adjust to motherhood, particularly in those women and couples who have previously experienced traumatic life events, such as, miscarriage and perinatal death [16]. The COVID-19 pandemic has sparked fear, anxiety and concern in many countries as a result of the pandemic itself, but also due to the restrictive public health measures implemented to reduce community transmission [17]. Border

closures, travel bans, quarantine measures, physical distancing have resulted in increased isolation and decreased access to, and interaction with, social supports and networks [18]. This is likely to result in increased stress, anxiety, loneliness and depression, particularly for pregnant women who will have an added level of concern about their own health and protecting their unborn baby.

On 9 March 2020, the Government of Italy imposed a national quarantine, restricting the movement of people except for necessity, work, and health reasons in response to the growing threat of COVID-19 in the country. This followed an earlier restriction which already had affected the whole region of Lombardy and prior to that eleven municipalities in the province of Lodi (the first epicenter of Covid-19 breakout in Europe) implemented in late February. The lockdown measures were widely approved by public opinion (76%) [19], but were also described as the largest suppression of constitutional rights in the history of the republic, with many citizens feeling restricted, isolated and in danger [20].

According to the Italian National Observatory on Women's Health (ONDA), approximately 90,000 women in Italy experience anxiety and depressive symptoms during the perinatal period, ranging from 10 to 23% of women during pregnancy and 10–40% postpartum. It is likely that these figures are an underestimation and the situation is much worse, as only half of women receive adequate diagnosis and treatment [21]. There are currently thousands of pregnant women in Italy and approximately 1200 babies are born every day [22]. The combination of rapid community transmission of SARS-CoV-2 [23], the number of deaths and restrictive public health measures being implemented in Italy, and indeed worldwide, may emotionally and psychologically overwhelm women during, and after, pregnancy.

Pregnant women are likely to be affected by the significant changes in the management of pregnancy, labour, birth and postnatal care provided by health services including a reduction in face-to-face appointments and use of telehealth. Anecdotal reports from volunteers and support groups suggest that the forced isolation from the Italian lockdown is creating significant stress on pregnant women with flow on effects to the maternity providers (obstetricians, midwives, nurses, allied health professionals) caring for them [24].

The rising 'infodemic', as coined by WHO Director-General Tedros Adhanom Ghebreyesus at the Munich Security Conference on February 15 "We're not just fighting an epidemic; we're fighting an infodemic" also presents a formidable task in responding to COVID-19 [25]. The saturation of mass and social media with COVID-19 related news and the spread of this information within the community feeds a climate of fear, uncertainty and anxiety, regarding the present and future. This will be magnified for pregnant women at this time who even in the absence of a pandemic commonly experience feelings of uncertainty and anxiety related to labour, childbirth and the arrival and care of a newborn [26].

To understand the psychological impact of COVID-19 on pregnant and postpartum women in Italy, we undertook a national survey called "COVID-19 related Anxiety and Stresses in preEgnancy, poSt-partum and breaStfeeding" (COVID-ASSESS). This paper presents the preliminary findings of a mixed methods analysis (qualitative and quantitative) and describes pregnant women's expectations and concerns on their birth experience, before and after the onset of COVID-19 in women with or without previous pregnancy loss.

2. Methods

A cross sectional study design was used. The COVID-ASSESS questionnaire was developed by CR (psychiatrist and

psychotherapist) and AV (pharmacologist and epidemiologist), both with extensive expertise in questionnaire development and validation, and uploaded as an online survey using the Survey-monkey platform (www.surveymonkey.com). The survey was distributed via CiaoLapo Foundation, an Italian charity for perinatal loss support, using existing networks and support groups across Italy. The network of CiaoLapo Foundation comprises women and couples affected by perinatal loss, as well as numerous associations, organizations and groups dealing with healthy pregnancy and perinatal health.

Participants self-selected to complete the survey and participation was voluntary. In order to address issues of women who were either pregnant, breastfeeding or caring for newborns or infants during lockdown, participants were considered eligible to complete the survey if over 18 and (a) currently pregnant (first wave of the survey, data reported here) or if (b) they gave birth after the 1st January 2019 (second wave, still running, data reported elsewhere). Consent was provided at the start of the survey once participants had read the participant information and met the eligibility criteria. The survey was launched, and data collected during the first weeks of national COVID-19 lockdown in Italy. Human research ethical approval to conduct the survey was received from Florence University ethics committee (Florence, Italy).

The survey consisted of questions across several key areas including:

- Sociodemographic information
- Section (A) anamnestic variables (comorbidities, previous losses, history of psychological disorders)
- Section (B) birth expectations before and after COVID-19
- Section (C) concerns regarding pandemic consequences
- Section (D) breastfeeding
- Section (E) perception of media and health professionals' information and communication on COVID-19
- Section (F) psychometric evaluation.

Women's concerns were examined using a Likert scale (from 0 "not at all concerned" to 3 "very concerned") regarding six issues: (i) their own health, (ii) baby's health, (iii) partner's health, (iv) elderly relatives' health, (v) baby's future and (vi) future of society. Women were also asked to provide three words to describe their expectations for their birth experiences before and after the onset of the COVID-19 pandemic. Women were able to use the same words if they felt that their expectations had not changed over this time.

2.1. Statistical analysis and data presentation

Survey responses were downloaded and extracted from the online survey tool, SurveyMonkey, and imported into Excel for data management. Data were cleaned and checked. Responses were analysed for all women and segregated based on previous experience of pregnancy loss, given the perinatal loss networks and support groups used to recruitment women. Quantitative data were imported into Stata/IC 16.1 (StataCorp) for statistical analysis. Qualitative analysis of open text responses was conducted using Raven's Eye software (<https://ravens-eye.net/>) and MAXQDA 2018 (VERBI Software GmbH). Analysis of single word frequencies and fifth order word relations was conducted using Raven's Eye, an online natural language analysis tool based on quantitative phenomenology, a systematic method for identifying themes in natural language. MAXQDA was used to analyse extended responses related to basic emotions and psychological constructs. MAXQDA is a software program designed for computer-assisted qualitative and mixed methods data, text and multimedia analysis.

Two criteria were used for the MAXQDA qualitative analysis: (1) expression of basic emotions (joy, anticipation surprise, trust, fear, sadness, anger and disgust), and (2) expression of psychological constructs, further divided into positive (closeness, safety, serenity, love etc.) and negative (loneliness, anxiety, danger, worry etc.) constructs. Differences between emotions and constructs before and after COVID-19 were quantitatively analysed by means of Stata/IC to identify any statistically significant differences in relation to birth expectations.

Descriptive statistics were used to analyse quantitative data. Categorical data were reported as frequencies and percentages and compared using the chi-squared test, whereas continuous data were reported as mean values with standard deviations and compared using t-test. All results were considered to be statistically significant at $p < 0.05$. The number of confirmed cases per 100,000 inhabitants and concerns reported by mothers were mapped by regional areas across Italy using Tableau Desktop 2020.1 (Tableau Software, LLC).

3. Findings

3.1. Sample characteristics

The final sample of COVID-ASSESS national survey consisted of 1787 women. Here we report preliminary results of qualitative and quantitative evaluation of 200 pregnant women who responded in the first wave of the survey. Respondents had a mean age of 34 years (SD 3.8; range 18.4–47.4) and mean pregnancy gestation of 26.1 weeks (SD 9.6; range 5.8–41.2) (Table 1); 157 (78.5%) respondents already had other children, while 43 (21.5%) were in their first pregnancy. Respondents were categorised into two groups, those with previous pregnancy loss (100 respondents 50.0%) and those without (100 respondents, 50.0%). There were no significant differences between the two groups in sociodemographic information and anamnestic variables (Tables 1 and 2).

Seventy-two women (36.0% of respondents) experienced a previous psychological distress (Table 2); in particular, most reported disorders were anxiety (62, 31.0%), mood disorders (22; 11.0%), eating disorders (8; 4.0%) or obsessive-compulsive disorder (2; 1.0%). Table 2 also shows that 100 women reported to have suffered one or more previous losses, that included miscarriage (110, 55.0%) or perinatal loss (36 women, 18.0%); women were able to choose multiple responses. Distribution of previous psychological distress was not significantly different between women with or without previous losses. Similarly, when we mapped the distribution of respondents (Fig. 1, larger circles correspond to larger clusters of women) according to previous pregnancy loss (Fig. 1A, orange) and history of psychological distress (Fig. 1B, orange), we found that both variables were homogeneously distributed across Italy.

Table 1

Main characteristics of the sample. No significant difference was present among groups (chi-square = 4.73, $p = 0.09$ for trimesters/losses distribution; $p > 0.05$ for age and weeks differences among groups).

Previous losses	Trimesters	N	Age (mean \pm SD)	Weeks (mean \pm SD)
No	First	10	32.2 \pm 3.0	10.9 \pm 2.5
	Second	33	33.1 \pm 4.5	20.0 \pm 3.2
	Third	57	34.2 \pm 3.9	34.2 \pm 4.0
Yes	First	16	34.8 \pm 3.2	9.5 \pm 2.3
	Second	42	35.1 \pm 3.5	21.3 \pm 4.3
	Third	42	34.5 \pm 3.7	34.9 \pm 3.1

Table 2

History of psychological distress and previous losses. No significant difference was present among groups (chi-square = 0.34, $p = 0.55$).

Psychological distress		Previous losses		Total
		No	Yes	
No	n (%)	66 (51.6%)	62 (48.4%)	128 (100%)
Yes	n (%)	34 (47.2%)	38 (52.8%)	72 (100%)
Total	n (%)	100 (50.0%)	100 (50.0%)	200 (100%)

Psychological distress: self reported history of previous lifetime diagnosis of psychopathology.

Previous losses: self reported history of previous perinatal losses including miscarriages, stillbirth and neonatal death.

3.2. Women's concerns

The number of confirmed COVID-19 positive cases in each Italian region, at the time of the survey, was reported per 100,000 inhabitants (Fig. 1C) using national data [27]. The highest numbers

of COVID-19 cases were in northern Italy. We mapped the geographical distribution of mean values of concern across the country (Fig. 1D). We found that women were concerned all over Italy with mean values over 2 throughout the country. Of note, women were particularly concerned in areas where there were limited COVID-19 cases.

Women were less worried about their own health than the health of others (Table 3 and Fig. 2). Particular concern was expressed for the health of elderly relatives. We did not find that having experienced a previous pregnancy loss significantly influenced women's concerns, whilst a history of previous psychological disorders was significantly associated with higher concern for both their own health and their partner's health.

3.3. Women's emotions

The distribution of basic emotions, physical experiences and psychological constructs (both positive and negative) related to

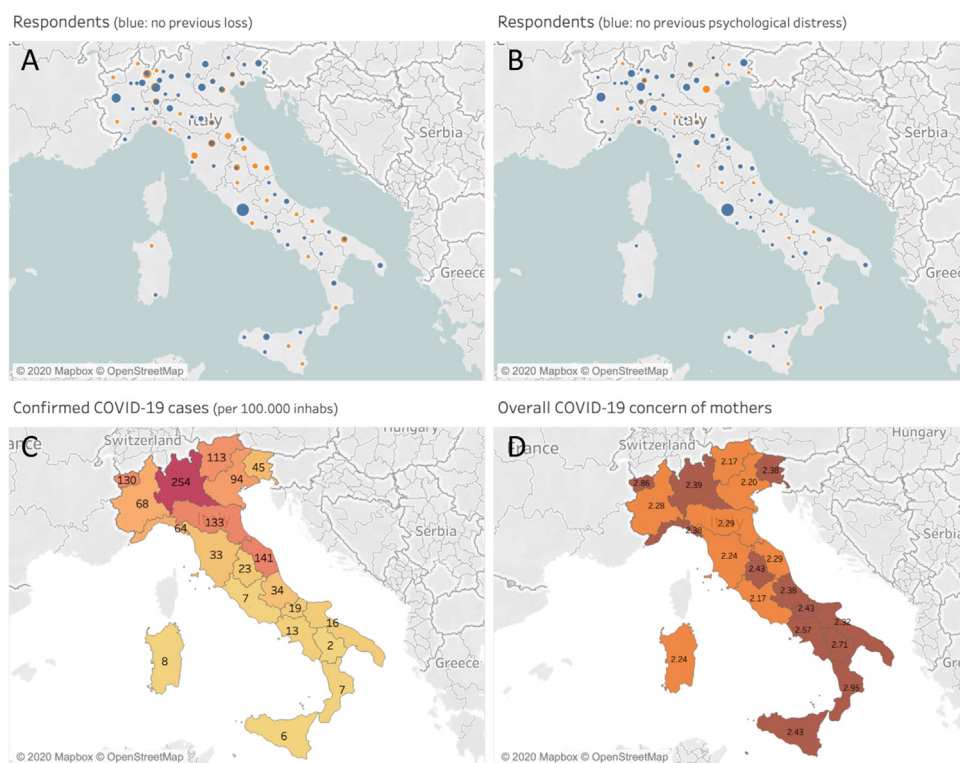


Fig. 1. (A, B): Distribution of respondents according to previous pregnancy loss (A, orange) and history of psychological distress (B, orange); larger circles correspond to larger clusters of women. (C, D): Number of confirmed COVID-19 positive cases per 100,000 inhabitants in each Italian region, at the time of the survey (C). Geographical distribution of mean values of concern in each Italian region (D).

Table 3

Level of concern of women according to history of psychological distress and previous losses.

Concerns	Total sample	History of psychological distress		History of previous loss	
		Yes	No	Yes	No
Overall	2.32 ± 0.47	2.39 ± 0.47	2.28 ± 0.46	2.35 ± 0.47	2.29 ± 0.46
My health	2.07 ± 0.75 *	2.21 ± 0.71 **	1.98 ± 0.77	2.10 ± 0.74	2.03 ± 0.77
Baby	2.36 ± 0.80	2.47 ± 0.76	2.30 ± 0.81	2.40 ± 0.79	2.32 ± 0.81
Partner	2.48 ± 0.61	2.63 ± 0.59 **	2.40 ± 0.61	2.49 ± 0.62	2.47 ± 0.61
Elders	2.62 ± 0.59	2.71 ± 0.54	2.56 ± 0.61	2.60 ± 0.58	2.63 ± 0.59
Baby's future	2.35 ± 0.79	2.31 ± 0.84	2.37 ± 0.76	2.36 ± 0.81	2.33 ± 0.77
Society	2.44 ± 0.60	2.39 ± 0.72	2.46 ± 0.53	2.48 ± 0.62	2.39 ± 0.58

Women's concerns were examined using a Likert scale (from 0 "not at all concerned" to 3 "very concerned").

* $p < 0.05$ vs other concerns.

** $p < 0.05$ vs no history of psychological distress.

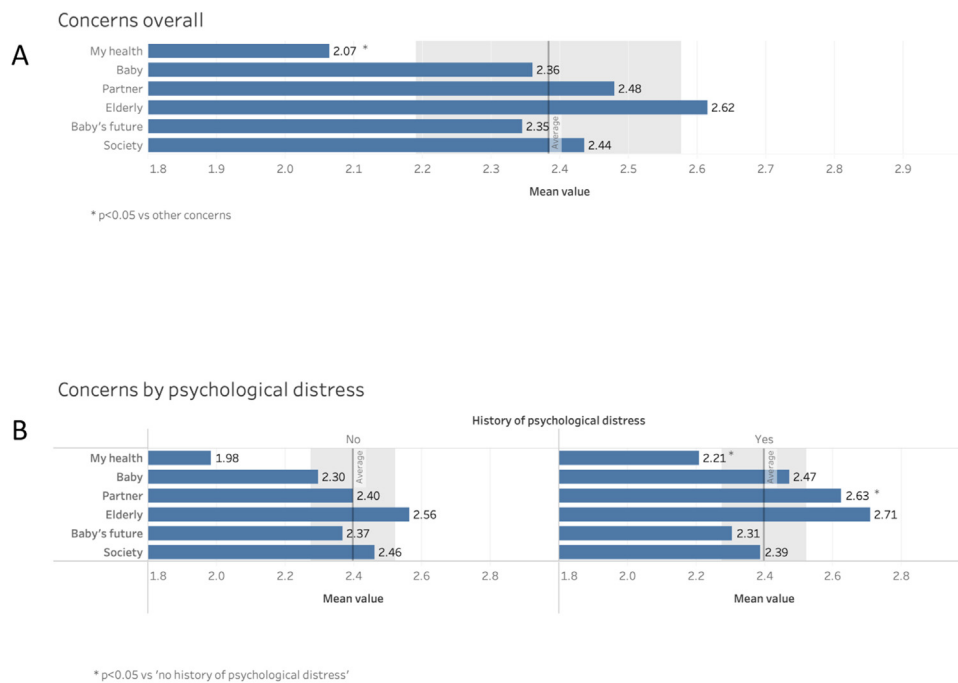


Fig. 2. Level of concern of women according to history of psychological distress.

Table 4

Distributions of primary emotions, physical sensations and psychological constructs regarding birth experience, before and after COVID-19 pandemics.

	Before N (% out of 200)	After N (% out of 200)	Chi-square (p)
Basic emotions			
Joy	126 (63.0%)	34 (17.0%)	88.1 (p < 0.00001)
Anticipation	53 (26.5%)	28 (14.0%)	9.6 (p < 0.01)
Surprise	21 (10.5%)	5 (2.5%)	10.5 (p < 0.01)
Trust	14 (7.0%)	1 (0.5%)	11.7 (p < 0.001)
Fear	15 (7.5%)	98 (49.0%)	84.9 (p < 0.0001)
Sadness	1 (0.5%)	21 (10.5%)	19.2 (p < 0.0001)
Anger	–	1 (0.5%)	^a 1.0 (n.s.)
Disgust	–	1 (0.5%)	^a 1.0 (n.s.)
Physical sensations			
Negative	33 (16.5%)	27 (13.5%)	0.7 (n.s.)
Positive	7 (3.5%)	2 (1.0%)	2.8 (n.s.)
Psychological constructs			
Positive			
Awareness	14 (7.0%)	1 (0.5%)	11.7 (p < 0.001)
Closeness	99 (49.5%)	1 (0.5%)	128.1 (p < 0.0001)
Empathy	11 (5.5%)	2 (1.0%)	6.4 (p < 0.05)
Freedom	4 (2.0%)	–	^a 0.1 (n.s.)
Hope	16 (8.0%)	11 (5.5%)	0.9 (n.s.)
Love	26 (13.0%)	6 (3.0%)	13.5 (p < 0.001)
Relief	7 (3.4%)	2 (1.0%)	2.8 (n.s.)
Safety	76 (38.0%)	15 (7.5%)	52.9 (p < 0.0001)
Serenity	51 (25.5%)	2 (1.0%)	52.2 (p < 0.0001)
Strength	9 (4.5%)	6 (3.0%)	0.6 (n.s.)
Negative			
Anxiety	6 (3.0%)	65 (32.5%)	59.6 (p < 0.0001)
Danger	–	52 (26.0%)	^a 59.7 (p < 0.00001)
Loneliness	2 (1.0%)	107 (53.5%)	139.1 (p < 0.0001)
Restriction	–	38 (19.0%)	^a 41.99 (p < 0.00001)
Self-doubt	2 (1.0%)	18 (9.0%)	13.4 (p < 0.001)
Worry	2 (1.0%)	39 (19.5%)	37.2 (p < 0.0001)

^a In case of empty cells, Fisher exact probability test was calculated, instead of Chi-square test.

childbirth expectations substantially changed before and after COVID-19 pandemic (Table 4). In regard to basic emotions, 'joy' was the most prevalent emotion expressed before COVID-19, with fear being the most prevalent after. Sadness was virtually absent before COVID-19 and yet present in 10.5% of women's responses after (Fig. 3). Positive constructs were largely prevalent before COVID-

19, while negative ones were dominant after (Chi square = 482.6; p < 0.01) (Table 4 and Fig. 4).

Using single word frequencies analysis, 'fear' was the most common word used by women to describe their birth expectations both before and after COVID-19 (Fig. 5). However, when looking at the network of words associated with fear, using a fifth order word

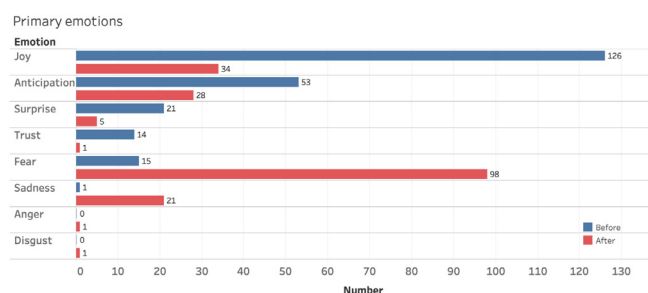


Fig. 3. Distributions of primary emotions regarding birth experience, before and after COVID-19 pandemics.

relations network analysis, we found the words associated with 'fear' significantly differed across the two time points. Before COVID-19, fear was associated with joy, happiness, sharing and serenity, whilst after it was associated with restriction, sadness, loneliness, pain, anxiety and inability.

4. Discussion

To our knowledge, COVID-ASSESS is the first study to investigate the psychological impact of COVID-19 or any other pandemic on pregnant women's expectations and concerns regarding childbirth. Our study found four key findings related to women's expectations and concerns regarding childbirth before and after the onset of the pandemic in Italy: (i) women were uniformly concerned across Italy despite the spread of COVID-19 cases being irregularly distributed; (ii) women were more concerned about the health of others than their own; (iii) women with a history of psychological distress were significantly more overwhelmed by the pandemic; (iv) expressions of emotions and

psychological constructs around childbirth dramatically changed before and after the onset of COVID-19.

4.1. Geographical distribution

Women responded to the survey from across Italy, although there were important regional differences. The distribution of women who had a history of a previous pregnancy loss or psychological distress was evenly spread across the country. At the time of the survey and at the time of writing, the density of COVID-19 cases is highest in northern Italy (Fig. 1C). Whilst overall concern of pregnant women was high across Italy, it was markedly higher in regions where there were fewer COVID-19 cases. This may indicate that women are expressing fear in anticipation of an increase in cases as they watch the disaster unfold in Lombardy (which at the time of writing, has the highest number of COVID-19 cases in the world [28]). Education attainment is higher in Northern Italy than Southern Italy [29] and this may also affect women's interpretations and concerns regarding the threat of COVID-19.

4.2. Domains of concern

Pregnant women expressed greater concern about the health and wellbeing of their elderly relatives, their partner and their baby than their own health. Despite the health of the mother being critical to the health of the baby in utero, women prioritised the health of others above their own. This is a common psychological occurrence in pregnancy where women may place the wellbeing of their baby first [30], potentially linked to an innate desire for women to protect their offspring. The current pandemic may be exacerbating this protective response and increasing concerns women have for those around them. This shift of focus to other's health rather than the women's own could be potentially damaging to the women's own health, particularly their mental

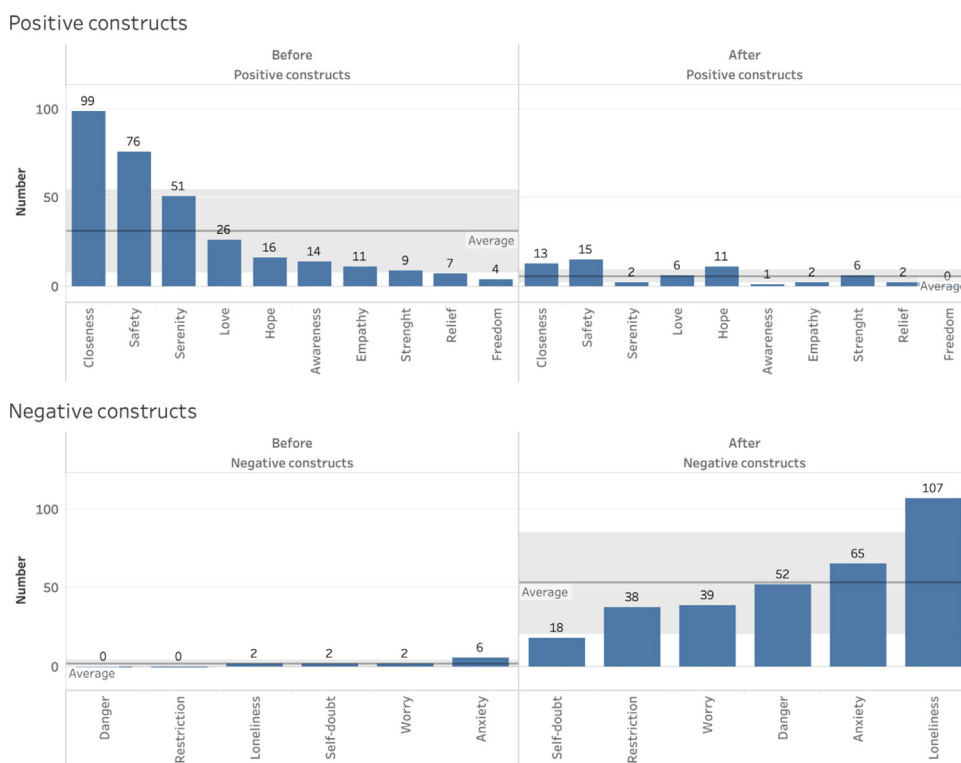


Fig. 4. Distributions of positive and negative psychological constructs regarding birth experience, before and after COVID-19 pandemics. Black line indicates average number of positive/negative concerns (shaded area 95% CI; $p < 0.05$ before vs after).

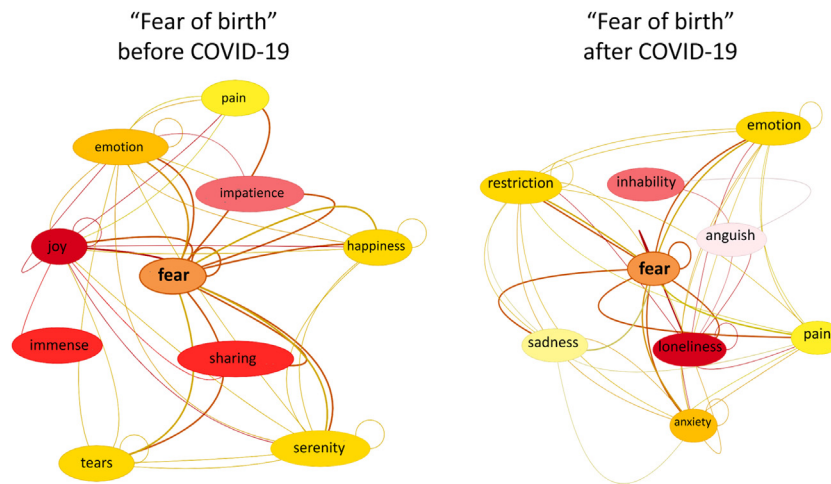


Fig. 5. Network of words associated with the word 'fear', plotted using a fifth order word relations network analysis (Raven's Eye software), before and after COVID-19 pandemic.

health. The risk of developing anxiety or depressive disorders may be increased as a result, as well as potentially negatively affecting the maternal-newborn relationship. These findings have relevance to health promotion initiatives and indicate that potentially ones which focus on the woman rather than the mother/baby or family unit may not be as effective for Italian women at this time.

4.3. Domains of concern in women with psychological distress

Women with a history of psychological distress (previous anxiety or depressive disorders) expressed greater concern for their partner's health and wellbeing than women without a psychological history. This highlights the important role a partner assumes during pregnancy, childbirth and the postpartum period, especially for women with a history of poor mental health. This is particularly important given increasing reports that women are in labour alone as hospitals implement restrictive measures to prevent COVID-19 transmission [31]. Giving birth alone may be a sad, anxious and stressful experience for women, particularly those with a history of mental illness. Women should be allowed and encouraged to have a birth companion of their choice present during labour and childbirth [32]. This not only provides women with a more positive pregnancy experience but can be associated with improved health outcomes for both mother and baby [32]. It is well recognised that women with a history of poor mental health are at an increased risk of postnatal depression [33] and in light of this pandemic, highlights the need for even greater support for mental health services for women and their partners at this time.

4.4. Expectations of childbirth

Women were much more likely to view their childbirth with joy and excitement pre COVID-19 compared to after where women expressed fear, uncertainty and sadness. Some fear pre-COVID was associated with the physical pain of labour, and other life adjustments required with a newborn. However, after the onset of COVID-19, birth expectations were completely mutated: fear and sadness were present in more than half of the women who responded, accompanied with uncertainty. Only one in six women retained joy as an emotion associated with childbirth. Over 80% of women expressed fear when thinking about childbirth post COVID-19, that is quite evident from our findings when we explore the fear-of-birth construct, known as tokophobia [34], and look at the main representations related to it before and after the pandemic.

Before the pandemic, the fear of childbirth was associated in most women with constructs related to physical pain, the commitment of childbirth, the emotion of finally being able to meet the child; joy, happiness, serenity and a sense of impatience are the emotions more closely related to fear in this setting. This picture is well known by midwives and women all over the world, and it is considered part of that early physiological anxiety that allows women to prepare for the moment of childbirth in the best possible way. During the pandemic, the change in response was startling: fear no longer correlated with anticipation, impatience, joy and encounter, but with sadness, loneliness, anguish, inability, sense of isolation and constriction. Physical pain remains, as the only trait in common with the past.

The scenario imagined by women is one that minimises the sense of empowerment and threatens their well-being and health in the short and long term. It is up to midwives and obstetricians to help women regain their imagination, potential and confidence in themselves and in caregivers. With this in mind, guaranteed compliance with WHO rules could reassure women about their basic rights and enable them to achieve their desired childbirth experience as much as possible, under the current restrictions [32].

The moment of childbirth is a unique experience, and every woman experiences childbirth differently. Having previous birth experiences, both positive and negative, can affect women's expectations of their next childbirth experience. In this study, all women, with and without previous perinatal losses, showed positive expectations for their childbirth before the pandemic. Constructs associated with these positive expectations for birth included proximity of the partner, sense of protection, security and serenity. During the pandemic these constructs changed to feelings of danger, anxiety and loneliness. The perception of childbirth dramatically changed for women, likely influenced by the seismic social and structural shifts occurring to contain the pandemic. In the last six weeks, the information that media spread in Italy and around the world regarding pregnancy, childbirth and COVID-19 is at odds with each other, and the choices of individual countries or hospitals are often not in keeping with WHO guidelines. It is evident that women from our study, while acknowledging the concern about the pandemic and the health of the elderly and their partners, are feeling the change of scenery adopted by many Italian hospitals. Although the media are stressing the fact that restrictions are due to security reasons, this does not seem sufficient to appease the sense of fear and danger perceived by women, who are experiencing estrangement from their partner and new bans as a maddening solitude.

Among the human rights in pregnancy and childbirth, WHO recognises the importance of birth companionship, freedom of birthing positions, keeping mothers and their babies together after birth as much as possible and the promotion of breastfeeding. Unfortunately, in many places around the world, the pandemic has altered care of women and children in drastic ways, such as, separation of COVID-19 suspected/confirmed women from their babies and avoidance of breastfeeding, contrary to both WHO standards and most COVID-19 guidelines. Given studies published to date continue to show that COVID-19 does not seem to affect pregnant women more than the general population [13], it is even more critical that reproductive human rights are respected and upheld.

It is important for women to have trusted support people including health care workers and birth companions around them during labour and childbirth [32], since restrictive changes and constraints, such as banning of birth companions or breastfeeding, can undermine trust and can negatively affect women's birth experiences [35]. Our study has found that this pandemic is certainly altering women's perspectives resulting in reduced feelings of trust, closeness and serenity and an increase in danger, anxiety and abandonment constructs. If these negative constructs pervade then there may be unintended consequences including an impact on birth experiences and further distress for the woman and the child [36]. Taking into account how women feel and their specific needs at this time ensures that healthcare workers can strive to create a respectful alliance and empower women with self-confidence.

5. Study limitations

This is the first study to assess how women expectations of childbirth were affected by the COVID-19 pandemic. Although differences between their pre-COVID feelings and their post-COVID feelings are significant, it should be noted that women were asked to report their pre-COVID expectations after the onset of the pandemic. Therefore, it is possible that women would have reported more positive feelings prior to the commencement of the pandemic. Understandably, this was not possible due to the unexpected nature of the pandemic and it is important to note that the feelings reported by women in the present study, in reference to 'normal' conditions, are consistent to what has been previously reported in interviews with Italian women [37].

Finally, we would like to point out that the first wave of the COVID-ASSESS survey was mainly distributed through a charity dealing with perinatal loss support. Therefore, we may have recruited a higher proportion of women who had experienced loss than in the general population. Nevertheless, while we acknowledge that their experiences may differ, our findings show that the responses of women with a history of previous pregnancy loss were not significantly different from those of women without a previous loss. Although this is somewhat unexpected [16,38], it can be explained by the fact that recruitment was promoted by a charity for perinatal loss support and most women who had experienced this particular type of trauma and answered the questionnaire were already being cared for by volunteers and professionals of the organisation. A future multivariate analysis evaluating the role of previous loss together with other socio-demographic and anamnestic variables (such as the presence of psychological disturbances) might help clarifying this point. We aim at addressing this point with the second wave of the COVID-ASSESS survey, that includes mainly quantitative outcomes.

6. Conclusions and recommendations

After the onset of the pandemic in Italy, women's expectations and concerns regarding childbirth changed significantly. Even in

those regions where the epidemic was not very widespread, women were significantly concerned about COVID-19 and more about the health of their partner and their relatives than their own; this was particularly true for women who had suffered from psychological disorders.

Although current scientific knowledge indicates that SARS-CoV-2 infection is not particularly dangerous for pregnant women and newborns, results of this survey suggest that women's concern for COVID-19 pandemic is extremely relevant, particularly in the presence of a psychological history. Nevertheless, a better understanding of the psychological impact of the pandemic will be possible after a quantitative evaluation of psychological dimensions, currently running in the second wave of COVID-ASSESS investigation.

We recommend that all women and newborns are warranted the respect of their rights while receiving care within a health facility despite the pandemic, with particular attention to respectful, inclusive and quality maternity care. Women with a psychological history need special consideration and care, since their concerns, fears and worries are going to be particularly relevant.

Authors contribution

CR & AV led this research including proposal write up and designed the instrument. CR, AV & VR collected and analysed data. CR, AW, VR, CH & AV discussed data and wrote the manuscript. All authors read and approved the final manuscript.

Ethical statement

The survey was voluntary and anonymous, no personal data were recorded, in no way it was possible to identify the single respondents. Informed consent was obtained from all participants. Data were acquired in compliance with GDPR regulation (General Data Protection Regulation, European Union 2016/679). The research proposal was approved by Florence University Commission for Ethics.

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Conflict of interest

The Editor in Chief Caroline Homer is a co-author on this paper. To reduce any real or perceived conflict of interest, the Deputy Editor managed the paper.

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